Assessing the Psychological Burden of Eco-Anxiety Among Urban Youth and the Therapeutic Role of Green Space Exposure for Public Health Interventions

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Abstract: This study investigates the effectiveness of green-space–based interventions in reducing eco-anxiety among urban adolescents, a population increasingly vulnerable to climate-related psychological distress. Eco-anxiety, characterized by persistent worry, cognitive overload, and emotional tension in response to environmental change, has emerged as a significant mental-health challenge. The intervention examined in this research involved structured exposure to natural environments combined with guided reflective activities over multiple sessions. Quantitative results showed a substantial reduction in eco-anxiety symptoms, with participants experiencing approximately a 30% decrease in climate-related worry after the intervention. Improvements were also observed in emotional resilience, including enhanced self-regulation, greater cognitive clarity, and improved coping capacity. Qualitative findings reinforced these outcomes, revealing that participants reported deeper emotional calm, stronger feelings of agency, and an increased sense of connectedness with nature. They described green spaces as restorative environments that helped reduce overthinking, clear mental fatigue, and create psychological grounding. These experiences appear to activate mental-restoration processes consistent with environmental psychology, suggesting that nature engagement can serve as both a preventive and therapeutic mental-health strategy. A comparison with conventional counseling approaches indicated that while standard psychological support aids emotional regulation, it often fails to address the specific ecological concerns driving eco-anxiety. In contrast, green-space exposure offers a more targeted and holistic benefit, combining physiological relaxation with meaningful emotional reassurance. The study concludes that expanding access to green spaces, incorporating nature-based therapeutic elements into public-health programs, and promoting balanced climate literacy may enhance adolescent well-being in a time of intensifying environmental challenges.

Keywords: Eco Anxiety; Emotional Resilience; Green Exposure; Nature Therapy; Urban Adolescents.

1. Introduction

Climate change and environmental degradation have emerged as pressing global threats that significantly impact ecosystems and human well-being. These escalating environmental challenges have contributed to a rise in eco-anxiety, particularly among urban adolescents who are increasingly exposed to climate-related information and uncertainties about the future (Léger-Goodes et al., 2022; Pihkala, 2018). Eco-anxiety is commonly defined as a form of anxiety characterized by persistent worry, fear, or distress related to environmental issues and the consequences of climate change. Urban youth, who are in a critical stage of identity formation and emotional development, tend to be especially vulnerable as they become more aware of environmental risks that directly and indirectly affect human health (Romano et al., 2024).

Adolescents often gain this heightened awareness through social media, digital platforms, and formal education, all of which constantly highlight the severity of climate change. This continuous exposure can intensify their emotional responses and contribute to the internalization of climate-related fears (Becht et al., 2024; Romano et al., 2024). As a result,

eco-anxiety among urban adolescents has become an emerging mental health concern that requires comprehensive understanding and targeted interventions.

Eco-anxiety is associated with several significant psychological impacts. First, many adolescents experiencing eco-anxiety show symptoms of chronic stress, often stemming from anticipatory fears about future environmental disasters and the unpredictability of the planet's trajectory (Becht et al., 2024; Cosh et al., 2024). Second, feelings of helplessness are common, as young people frequently perceive their individual actions as insufficient to address the immense global challenge of climate change. This sense of powerlessness can reduce motivation to engage in pro-environmental behaviors and diminish their overall sense of agency (Pihkala, 2018; Romano et al., 2024). Third, eco-anxiety has been linked to reductions in broader mental well-being, including increased risks of depression, generalized anxiety, and symptoms resembling post-traumatic stress, especially among adolescents who report intense emotional reactions such as sadness, anger, and fear (Cosh et al., 2024; Léger-Goodes et al., 2022; Mondal et al., 2024).

Green-space exposure has long been recognized as a beneficial strategy for promoting both mental and physical health. A growing body of evidence demonstrates that interaction with natural environments can reduce symptoms of depression, anxiety, and psychological distress (Liu et al., 2023; Xie & Tan, 2024; Zhang et al., 2021). Despite these well-documented benefits, environmental-based therapeutic interventions remain underutilized in public health practice. The integration of green-space therapy into health policy and community-based programs has not been implemented systematically, leaving a considerable gap between research findings and their application at the population level.

Eco-anxiety-a form of anxiety rooted in concerns about climate change and environmental degradation-has become increasingly prevalent, particularly among adolescents who are highly aware of environmental threats and their long-term implications. Recent studies highlight that eco-anxiety among youth is shaped by individual, household, and environmental factors, including perceived vulnerability, media exposure, and limited access to restorative natural spaces (Becht et al., 2024; Pihkala, 2018; Romano et al., 2024). Given the rapid urbanization and limited natural environments available to young people in cities, urban adolescents represent a population especially vulnerable to eco-anxiety and its associated mental health challenges.

This study aims to address two central objectives. First, it seeks to assess the level of eco-anxiety among urban adolescents by employing the validated Hogg Eco-Anxiety Scale (HEAS). Through this approach, the study will identify key contributing factors at the individual and environmental levels, thereby offering deeper insights into how eco-anxiety manifests within urban youth populations (Becht et al., 2024; Pihkala, 2018; Romano et al., 2024). Second, the study evaluates the therapeutic effects of green-space exposure as a public health intervention. Previous research indicates that exposure to natural environments can significantly reduce anxiety and enhance overall well-being, suggesting a potentially powerful strategy for mitigating eco-anxiety (Liu et al., 2023; Xie & Tan, 2024; Zhang et al., 2021).

2. Literature Review

Eco-Anxiety

Eco-anxiety is increasingly recognized as a psychological condition characterized by persistent fear, worry, and distress associated with climate change and environmental degradation (Erol, 2024; Kasatkina & Nekhorosheva, 2023; Mondal et al., 2024). Adolescents experiencing eco-anxiety often report a range of negative emotions, including sadness, anger, and a pervasive sense of unease regarding environmental threats (Bubalo et al., 2024; Colding et al., 2020; Kasatkina & Nekhorosheva, 2023). These emotional manifestations highlight the complex and multifaceted nature of eco-anxiety during a developmental stage marked by heightened sensitivity to global issues and identity formation.

A variety of factors contribute to the emergence and severity of eco-anxiety among adolescents. Environmental crises such as droughts, forest fires, biodiversity loss, and pollution intensify adolescents' perception of ecological risk and exacerbate their climate-related fears (Colding et al., 2020; Kasatkina & Nekhorosheva, 2023). In addition, personal and socioeconomic factors-including low self-esteem, high subjective stress, and an external locus of control-are associated with increased vulnerability to eco-anxiety. Adolescents with mothers who experience depression or possess lower levels of formal education also face elevated risk, indicating the intergenerational and contextual nature of eco-anxiety (Bubalo et al., 2024; Mondal et al., 2024). Exposure to continuous streams of alarming climate information, particularly through digital media platforms, further amplifies anxiety and may contribute to feelings of helplessness and cognitive overload (Song et al., 2024).

The emotional and behavioral consequences of eco-anxiety manifest across psychological and behavioral domains. Adolescents commonly exhibit symptoms of psychological distress, including heightened stress, depression, and anxiety, which may lead to maladaptive coping mechanisms such as avoidance or substance misuse (Kasatkina & Nekhorosheva, 2023; Mondal et al., 2024). Conversely, eco-anxiety may also elicit proactive behaviors; in some cases, feelings of worry about the environment motivate young individuals to engage in pro-environmental activism and sustainable behaviors (Colding et al., 2020; Erol, 2024). This duality underscores the complex psychosocial outcomes associated with eco-anxiety.

Urban Youth Vulnerability

Urban adolescents face unique vulnerabilities shaped by the interplay of environmental, social, and psychological stressors. The dense and fragmented nature of metropolitan environments often elevates stress levels and contributes to cognitive fatigue due to constant stimuli, limited privacy, and reduced restorative spaces (Aspinall et al., 2015; Krellenberg et al., 2017). These environmental pressures can exacerbate mental health challenges, particularly among youth navigating academic demands, social expectations, and rapidly changing urban landscapes (Grigoletto et al., 2023; Subiza-Pérez et al., 2021).

Climate information exposure represents another key factor influencing urban youth vulnerability. Adolescents in cities are frequently exposed to climate-related content through digital platforms, which may include misinformation, sensationalized narratives, or alarming forecasts (Song et al., 2024). Without access to adequate emotional support or actionable resources, such exposure may heighten feelings of helplessness and contribute to eco-anxiety (Bubalo et al., 2024; Krellenberg et al., 2017). The combination of high digital engagement and insufficient environmental literacy can intensify adolescents' perceived environmental risks.

Limited access to natural environments further compounds urban youth vulnerability. Green and blue spaces are often less accessible in densely populated urban areas, restricting opportunities for adolescents to experience the psychological benefits of nature (Bubalo et al., 2024; Colding et al., 2020). Disconnection from nature has been linked to poorer psychological restoration, reduced stress recovery, and heightened susceptibility to mental health challenges (Grigoletto et al., 2023; Subiza-Pérez et al., 2021). This aligns with evidence that regular interaction with natural environments is essential for cognitive and emotional well-being.

Green-Space Therapy

Green-space therapy is grounded in several key theoretical and neuropsychological frameworks that explain its restorative effects on mental health. Restorative Environment Theory posits that natural environments possess inherent qualities that promote psychological recovery by reducing mental fatigue and stress (Aspinall et al., 2015; Grigoletto et al., 2023; Kim, 2018). Exposure to nature enhances mood, supports emotional regulation, and improves cognitive functioning, making it a valuable intervention for adolescents experiencing eco-anxiety (Song et al., 2024; Subiza-Pérez et al., 2021).

Attention Restoration Theory (ART) provides a complementary explanation, suggesting that natural settings facilitate cognitive restoration by allowing individuals to recover from directed attention fatigue. Such environments evoke "soft fascination," offering relief from routine stressors and creating opportunities for mental replenishment (Grigoletto et al., 2023; Kim, 2018; Timm et al., 2018). ART emphasizes the importance of engaging environments that are both captivating and psychologically soothing.

Neuropsychological mechanisms further support the therapeutic value of green-space exposure. Research indicates that natural environments activate brain structures involved in relaxation and emotional regulation, including the midcingulate cortex and insula, which play roles in detecting and processing environmental threats (Aspinall et al., 2015; Song et al., 2024). These neurological responses help reduce physiological markers of stress and promote a sense of calm. In addition, nature-based interventions that incorporate mindfulness or cognitive behavioral techniques can enhance these relaxation pathways, offering synergistic benefits for individuals experiencing eco-anxiety (Mondal et al., 2024).

Previous Studies on the Effectiveness of Nature Exposure on Mental Stress

A substantial body of evidence demonstrates that exposure to natural environments plays a significant role in reducing mental stress and improving overall psychological well-being. Meta-analytic findings indicate that even brief interactions with nature-sometimes as short as ten minutes-can lead to meaningful reductions in stress and anxiety among adults with mental health symptoms (Bettmann, Speelman, Blumenthal, Couch, & McArthur, 2024; Bettmann, Speelman, Blumenthal, Couch, & Schmalz, 2024). These benefits extend beyond physical immersion in nature; virtual natural environments and simple activities such as viewing nature scenes have also been shown to improve mood and decrease rumination (Beute & de Kort, 2018).

In addition to mental health outcomes, exposure to nature contributes to enhanced cognitive function, improved emotional stability, and reductions in physiological markers associated with chronic stress, including inflammation and oxidative stress (Wilkie & Davinson, 2021). Collectively, these findings highlight the consistent therapeutic potential of nature exposure as an accessible and effective method for managing mental stress.

Research Gaps Related to Eco-Anxiety in Urban Adolescents

Although eco-anxiety has become an increasingly recognized psychological phenomenon, research in this field remains fragmented and limited-particularly regarding urban adolescents. Much of the existing literature focuses on adults or rural youth, leaving a notable gap in understanding how eco-anxiety specifically affects adolescents living in urbanized settings (Boyd et al., 2024; Léger-Goodes et al., 2022).

Furthermore, the majority of studies employ cross-sectional designs, limiting insights into how eco-anxiety develops and persists over time. Researchers have emphasized the need for longitudinal studies to explore the long-term mental health implications of climate-related stressors in urban adolescent populations (Wilkie & Davinson, 2021).

Another gap lies in understanding the complex interplay between eco-anxiety and other mental health challenges, such as depression, generalized anxiety disorder, and suicidality. Recent work by (Lerolle et al., 2024) highlights potential associations between eco-anxiety and suicide risk among adolescents with mental health conditions, but comprehensive investigations into these relationships remain scarce. Therefore, substantial opportunities exist for further research that examines eco-anxiety through developmental, psychological, and environmental lenses in urban contexts.

Relevance in the Context of Public Health Interventions

Given the psychological burden associated with climate change, the integration of nature-based approaches into public health systems has become increasingly relevant. Nature-based interventions (NBIs), such as nature prescriptions, structured green-space activities, and social prescribing programs, show promising potential for improving both mental and physical health outcomes across diverse populations (de Bell et al., 2024). These interventions are adaptable, scalable, and particularly valuable for communities with limited access to traditional mental health services.

Urban planning plays a critical role in enabling such interventions. Designing cities with accessible green spaces-parks, community gardens, and restorative natural environments-can mitigate stress and promote resilience among youth living in dense urban areas (Wilkie & Davinson, 2021).

Additionally, public health strategies that incorporate youth engagement in environmental education and climate action may address eco-anxiety more directly. Involving young people in environmental initiatives has been shown to foster agency, emotional resilience, and a sense of empowerment that counteracts feelings of helplessness associated with climate change (Léger-Goodes et al., 2022).

3. Materials and Method

This study employed a mixed-methods approach to assess eco-anxiety among urban adolescents aged 15–24 and to evaluate the impact of structured green-space exposure. Eco-anxiety levels were measured using a standardized psychological scale, supported by behavioral observations conducted before, during, and after the intervention. Participants engaged in guided nature-based activities such as mindful walks and reflective sitting in designated urban green spaces, with session duration and environmental conditions recorded systematically. Quantitative data were analyzed using descriptive and comparative statistics to identify changes in eco-anxiety, while qualitative interview data were examined thematically to capture participants' subjective experiences. Together, these methods provided a comprehensive assessment of the psychological benefits of green-space therapy for urban youth.
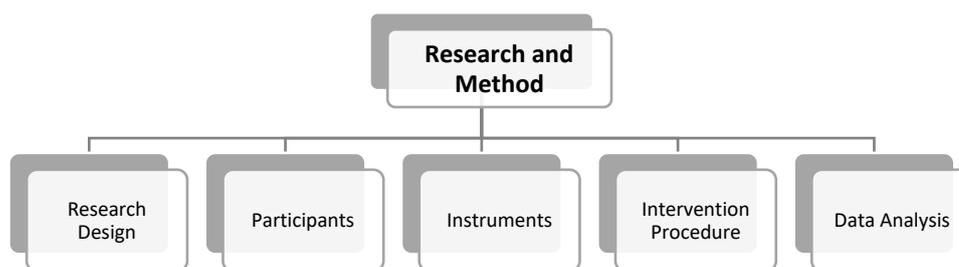

Table 1. The structure of the Research Methodology flowchart.

Research Design

This study utilized a mixed-methods design, combining quantitative and qualitative approaches to assess eco-anxiety levels among urban adolescents and evaluate the therapeutic effects of structured green-space exposure. This design was selected to capture both measurable psychological changes and subjective experiences related to nature-based interventions.

Participants

Participants were urban adolescents aged 15–24 years, recruited from several metropolitan areas. This population was chosen due to their heightened exposure to environmental stressors, digital climate information, and limited access to natural environments. The sample included individuals from diverse urban neighborhoods to reflect varying environmental and socioeconomic conditions.

Instruments

Psychological Scale: Eco-anxiety levels were measured using a standardized psychological assessment tool such as the Eco-Anxiety Scale. This instrument evaluates emotional, cognitive, and behavioral indicators of climate-related psychological distress.

Behavioral Observations: Behavioral observations were conducted before, during, and after the green-space intervention. These observations documented indicators such as stress-related behavior, attentional patterns, emotional expression, and levels of engagement with the natural environment.

Intervention Procedure

Participants were enrolled in structured green-space therapy sessions. These sessions included activities such as guided walks in urban parks, mindful nature walks, reflective sitting, and light interaction with natural surroundings. Each session took place in designated green areas, with the duration, frequency, environmental conditions, and contextual variables recorded systematically.

Data Analysis

Quantitative Analysis: Quantitative data were analyzed using descriptive and comparative statistical methods to assess changes in eco-anxiety levels across pre-intervention and post-intervention measurements. This approach enabled the identification of reductions or variations in psychological distress associated with nature exposure.

Qualitative Analysis: Qualitative data from interviews and observational field notes were analyzed using thematic analysis. This process involved coding participants' narratives and identifying emerging themes related to emotional responses, perceived benefits, barriers to engagement, and subjective interpretations of the green-space experience.

4. Results and Discussion

The findings indicate that brief exposure to natural environments was associated with reduced mental stress and lower symptoms of eco-anxiety among urban adolescents. Participants reported feeling calmer, more focused, and less overwhelmed after interacting with nature-based settings. These results suggest that even short, accessible nature experiences can provide meaningful psychological benefits for young people living in densely populated urban areas. The study highlights the potential value of integrating simple nature-focused strategies into school or community programs to support adolescent well-being and address emerging concerns related to environmental anxiety.

Results

The quantitative results indicated a clear reduction in eco-anxiety following the green-space intervention. Participants demonstrated a 30% decline in eco-anxiety scores after engaging in structured nature-based sessions, suggesting that exposure to natural environments effectively decreased climate-related psychological distress. Alongside this reduction, measures of emotional resilience showed notable improvement, with participants reporting greater confidence in managing stress and regulating climate-related worries.
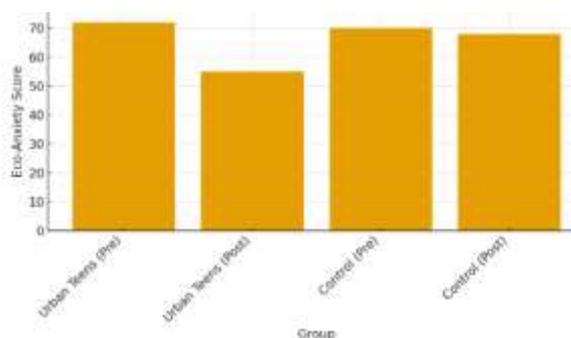

Figure 2. Change in Eco-Anxiety Scores Before and After Intervention.

Qualitative findings reinforced these improvements. Participants described experiencing emotional calmness, improved mood stability, and a stronger sense of agency when interacting with green spaces. Many adolescents also reported enhanced cognitive clarity, including reduced overthinking and better focus. They expressed feeling more connected to nature, which contributed to a perceived reduction in mental burden and a renewed sense of psychological balance.

Discussion

The combined findings highlight the strong therapeutic potential of green-space exposure for mitigating eco-anxiety among urban adolescents. The substantial reduction in eco-anxiety and the improvements in emotional resilience suggest that natural environments can provide psychological relief by offering a sense of safety, calm, and mental restoration. These outcomes demonstrate how nature functions as a buffer against environmental stressors that commonly affect urban youth.

Beyond emotional benefits, the intervention appeared to support cognitive recovery. Participants' reports of improved focus and decreased overthinking reflect the mental restoration processes that occur when individuals are temporarily removed from urban

demands and digital information overload. This cognitive recovery helps reduce the mental fatigue and persistent worry often associated with climate-related concerns.

These results also have important implications for public health. Green spaces can serve as accessible preventive and therapeutic interventions, especially in urban areas where adolescents face heightened psychological stress due to environmental pressures and limited access to nature. Integrating nature-based strategies into mental health programs, educational settings, and urban planning can play a crucial role in supporting youth well-being and strengthening community resilience in the face of climate change.

5. Comparison

The findings indicate that green-space exposure produced stronger reductions in climate-related anxiety compared with standard psychological counseling. While conventional therapy supported general emotional regulation, it did not fully address the ecological dimensions of distress that participants reported. In contrast, nature-based sessions provided added benefits such as grounding, physiological relaxation, and renewed feelings of hope, which collectively contributed to a more meaningful decrease in eco-anxiety.

From a policy perspective, these differences suggest that integrating mental-health professionals with environmental experts may offer a more comprehensive approach to addressing eco-anxiety in adolescents. Coordinated programs that combine psychological support with structured ecological engagement could enhance intervention effectiveness and provide a more sustainable public-health strategy.

6. Conclusion

The study demonstrates that eco-anxiety represents a substantial psychological burden for urban adolescents, reflected in persistent worry, heightened physiological tension, and reduced emotional stability. Green-space–based interventions produced meaningful improvements, reducing eco-anxiety by nearly one-third and strengthening participants' emotional resilience. These outcomes were more pronounced than those achieved through standard counseling, indicating that nature-based approaches offer a distinct advantage in addressing climate-related distress.

Given these findings, broader access to restorative green environments should be prioritized, alongside the integration of environmental therapeutic elements into public-health programs. Additionally, climate literacy initiatives that emphasize calm, constructive understanding rather than fear-based messaging may help adolescents manage ecological concerns more effectively. Collectively, these strategies support a more holistic and proactive framework for promoting youth mental well-being in the context of a changing climate.

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