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Ask Your Doctor About: Prescribing Activism for Eco-Anxiety in Adolescents

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Ask Your Doctor About: Prescribing Activism for Eco-Anxiety in Adolescents

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Abstract

Climate change is an ongoing public health crisis. Efforts to protect future generations' physical and mental health are more urgent than ever. Youth, in particular, are experiencing eco-anxiety, a specific form of anxiety relating to stress or distress caused by environmental changes and one's knowledge of them due to the climate crisis. This scoping review provides a better understanding of the value of youth climate change activism as a strategy to mitigate eco-anxiety. This review evaluates the current definitions of eco-anxiety, the risk factors for eco-anxiety among adolescents, and considers the benefits and drawbacks of youth activism. To identify relevant literature, I searched various databases, related research suggested by database algorithms, reference lists of resulting literature, and grey literature sources such as global reports and governmental resources. I summarize the findings on eco-anxiety and activism and provide recommendations for future research to inform effective public health practices and policy. As we shift our focus to the societal impacts of climate change, we must elevate the issue of eco-anxiety to protect young people and the future.

Keywords: Adolescents, activism, climate change, eco-anxiety, youth

Note: This paper is part of a series regarding eco-anxiety and climate activism among youth. The following papers are part of the series: Ask Your Doctor About: Prescribing Activism for Eco-Anxiety in Adolescents, Building Sustainable Environmental Activism Programs for Youth, Meet Me in the Middle: A Scoping review on understanding adolescent needs in climate communication, Utilizing the Power of Youth for Climate Action: Implications for Health Professionals. These papers were written to meet USF MPH Behavioral Health program CEPH Foundational Competencies ([Appendix A](#)).

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Introduction

The modern environmental movement, dating back to the 1970s, was responsible for enacting the National Environmental Policy Act (NEPA), the Clean Air Act, and the creation of the Environmental Protection Agency (EPA) (Lazarus & Zdeb, 2021). The environmental justice movement was sparked after North Carolina selected Warren County, a predominantly Black community, to dispose of soil laced with polychlorinated biphenyls (PCBs), a highly toxic chemical that leaked into the local water supply (Bullard & Johnson, 2000). In response to the protests in Warren County, a 1983 U.S. General Accounting Office study found that three out of the four offsite commercial hazardous waste landfills in Region 4 (eight states in the South) were located in predominantly Black communities, even though these communities only made up 20% of Region 4's population. Almost four decades later, Greta Thunberg's Fridays for Future ("Skolstrejk För Klimatet") movement mobilized millions of youth climate activists to engage in collective climate change action - over 10 million, to be exact (Sabherwal et al., 2021). These environmental movements are examples of the influence political activism has on society.

Children and adolescents are highly vulnerable to the impact of climate change. From the negligence of older generations to their lack of political power, activism and pressuring politicians and corporations are as much as they can do. Even with the enormous pressure to save the planet, young people also have to worry about schoolwork, family dynamics, and simply trying to enjoy their childhood. When considering the health impacts of climate change, we must consider the intersectionalities of what makes a young person more vulnerable than others, such as socioeconomic status, geographic location, and predispositions to various health concerns.

This scoping review will explore the effect of activism on eco-anxiety in adolescents. Specifically, I will explore the current definitions and symptomatology of eco-anxiety, the

disproportionate effects of climate change on adolescents, the costs of neglecting eco-anxiety and climate-related health concerns, and the benefits and drawbacks of activism. I provide recommendations for future research to help inform public health practices and policies, and the implications of this research to public health.

Methods

Research Strategy

I conducted a scoping review to identify gaps in the research about eco-anxiety in adolescents and activism as a protective factor. The following research questions guided my search strategies:

1. How is eco-anxiety defined and what is the symptomatology?
2. How does climate change impact youth at various levels, and how do these levels interact?
3. What are the costs of neglecting eco-anxiety and other climate-related health concerns?
4. What are the benefits and drawbacks of activism?
5. How can research on this topic expand to inform public health practices and policies?

Setting and Target Population

Because eco-anxiety in adolescents is still a novel topic, I expanded the criteria to children, adolescents, and young people (aged 0-25 years) from all countries.

Keywords

Search terms included: adolescent mental health, activism, eco-anxiety, healthcare costs, natural disasters, climate change, youth climate activism, climate activism, youth activism, and environmental justice.

Databases

The following databases were used: Google Scholar, PubMed, USF Gleeson Library, and the American Psychological Association. Along with these databases, research suggested by database algorithms, reference lists of resulting literature, and grey literature sources such as global reports and governmental resources were also included. Results were limited to publications in English from 2000-2022.

Exclusion and Inclusion Criteria

Inclusion Criteria included the following:

- Children, adolescents, and young people (aged 0-25 years)
- Location: Global
- English articles only

Exclusion Criteria included the following:

- Adults (aged > 25 years)
- Non-English articles

Background and Literature Review

Something in the water: The impact of climate change on adolescent mental health

Climate change is an ongoing public health crisis. With a growing population, increased industrialization, and heightened consumerism, anthropogenic climate change is dramatically impacting human health and well-being. There are many ways that climate change affects human health, from dangerous pollutants exacerbating lung and heart conditions to extreme heat causing elevated illness and death during the summer months. While health organizations are increasing awareness around climate change and physical health (e.g., Union of Concerned Scientists, Climate for Health, Medical Students for a Sustainable Future), recognizing mental health

impacts is equally critical. The Intergovernmental Panel on Climate Change (IPCC) report cautions that climate change can have adverse and even severe impacts on children's and adolescents' well-being (2022). Efforts to protect future generations' physical and mental health are more urgent than ever.

Researchers have consistently found that climate change affects adolescents' mental health in unique and complex ways (Burke et al., 2018; van Nieuwenhuizen et al., 2021; Ma et al., 2022). An example of climate-related effects that have been well-researched for their impact on adolescents is the damaging mental health effects of severe weather events. Children and adolescents are especially vulnerable to post-traumatic stress after an extreme weather event, which can carry negative impacts into adulthood. Research has found that the number of children with significant post-traumatic stress disorder (PTSD) symptoms can be as high as 92% during the subacute phase post-wildfire (To, Eboreime, & Agyapong, 2021). These extreme weather events are associated with psychological distress, poor mental health (especially in people with pre-existing mental health conditions), increased psychiatric hospitalizations, and heightened suicide rates (Cianconi et al., 2020; Charlson et al., 2021). According to van Nieuwenhuizen (2021), the aftermath of severe weather events can alter the social determinants of health, including increased poverty and unstable housing, reduced caregiver presence, and interrupted access to education. In recent years, the term eco-anxiety has gained popularity among media and researchers to describe the distress and poor mental health outcomes related to climate change and the environment¹⁰. However, eco-anxiety among youth and treatment options to alleviate the symptoms for youth remains a nascent field of research.

This scoping review will explore the current definitions and known symptoms of eco-anxiety, break down the developmental, individual, and socio-environmental factors that

make youth more vulnerable to the effects of climate change, elaborate on the costs of ignoring eco-anxiety and other climate-related health concerns, and describe the current literature on activism.

Eco-anxiety in the spotlight: An up-and-coming mental health concern

With growing awareness of the impacts of climate change on mental health, researchers have coined the term “eco-anxiety” to help understand the connection between climate change and anxiety about the climate crisis. Eco-anxiety has been defined in multiple ways; Table 1 presents the varied definitions identified after a thorough literature search of peer-reviewed articles focused on eco-anxiety. Most scholars agree that eco-anxiety is an emotional response to the current state of the environment. While the emotional response to climate change is broadly defined, one of the main differences between definitions is the *severity* of the emotional response. Descriptions of severity range from less severe phrases such as “non-specific worry” and “generalized sense” to more severe phrases such as “chronic fear,” “severe and debilitating worry,” and “paralyzing powerlessness.” Additionally, most scholars acknowledge that eco-anxiety can arise from direct experiences of climate change but also from indirect knowledge or anticipation of climate change and the climate crisis.

Table 1. Operationalization of “eco-anxiety” in current literature

Author (Year)	Operationalization of eco-anxiety
Albrecht (2012)	Generalized sense that the ecological foundations of existence are in the process of collapse
Albrecht (2018), as cited by Pihkala (2020)	Non-specific worry about our relationship to support environments

American Psychological Association & ecoAmerica, as cited by Schreiber (2021)	A chronic fear of environmental doom
Clayton (2020)	Anxiety associated with perceptions about climate change, even among people who have not experienced the direct impacts.
Clayton & Karazsia (2020)	Form of negative emotional response to climate change
Comtesse et al. (2021)	Response to impending threats of climate change
Doherty & Clayton (2011)	Indirect, vicarious impacts of climate change that include intense emotions associated with observation of climate change effects worldwide and anxiety and uncertainty about the unprecedented scale of current and future risks to humans and other species
Gifford & Gifford (2016)	Severe and debilitating worry about the risk that may be insignificant and is not associated with the more proactive behavior associated with habitual ecological worrying
Hickman et al. (2020)	Distress relating to the climate and ecological crises
Lertzman, as cited by Dockett (2019)	Form of pre-traumatic stress disorder in which traumatic consequences are anticipated and felt before the event takes place
Pihkala (2018; 2020)	A contemporary form of the phenomenon where the state of the world affected a person's emotional well-being
Schwartz et al. (2022)	Negative cognitive, emotional, and behavioral responses associated with concerns about climate change
Stanley et al. (2021)	Anxiety experienced in response to the ecological crisis
Usher et al. (2019)	Specific form of anxiety relating to stress or distress caused by environmental changes and our knowledge of them
Van Susteren, as cited by Baudon & Jachens (2022)	Environmental melancholia - a combined sense of primal loss and paralyzing powerlessness

The adverse emotional and behavioral symptoms of eco-anxiety include sadness, depression, irritability, feelings of uncertainty, frustration, panic attacks, loss of appetite, and

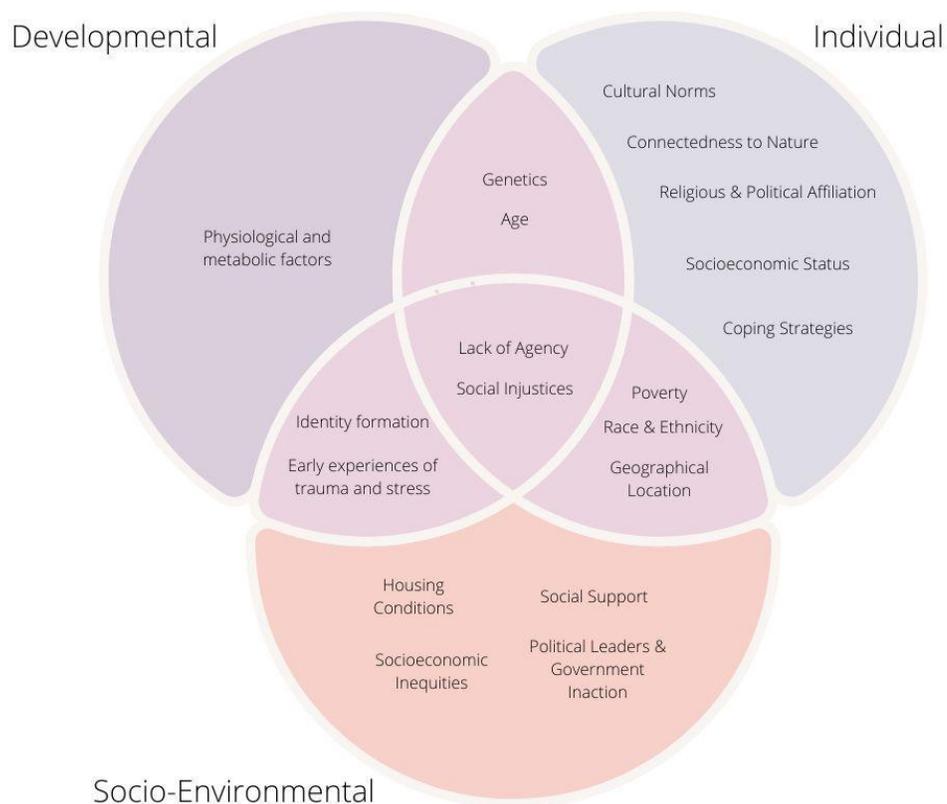
hopelessness (Coffey et al., 2021; Hogg et al., 2021; Schwartz et al., 2022). However, there is debate about whether eco-anxiety is truly an anxiety disorder or simply a justifiable reaction to the climate crisis. Eco-anxiety shares similar characteristics with the Diagnostic and Statistical Manual of Mental Disorders (DSM) definition of Generalized Anxiety Disorder (GAD). For example, Schwartz and colleagues (2022) found that functional impairment and cognitive-emotional impairment associated with climate change anxiety were significantly associated with GAD symptoms. Even though these data were collected from adults, they indicate that GAD symptoms can appear in climate change-induced anxiety. From the various definitions listed in Table 1, I believe Usher (2019) best encapsulates the symptoms and experiences of eco-anxiety because this type of anxiety is specific to the climate crisis, and describes how climate change has manifested itself in our physical environment and everyday lives. From a behavioral health perspective, recognizing a person's behaviors and attitudes towards an idea or issue is how we can better understand their concerns and work towards appropriate treatment options.

Most eco-anxiety research has focused on adults, but given the multiple and potentially severe impacts of the climate crisis on young people, eco-anxiety should not be dismissed as a mental health concern for adolescents. Future research should focus on eco-anxiety among young people and explore potential differences between youth and adults in risk and contributing factors, symptomatology, and outcomes.

The kids aren't all right: The disproportionate effect of climate change on adolescent mental health

Adolescents are disproportionately impacted by climate change due to their critical developmental stage and lack of agency and control over their environment (Cox et al., 2019; Ma et al., 2022). These factors intersect with other developmental considerations, individual factors, and socio-environmental influences that place adolescents at a greater risk of mental health concerns (Figure 1).

Figure 1. Developmental, Individual, and Socio-Environmental Factors of Climate Change on Adolescents



Developmental Factors

Physiological and metabolic factors can make young people more vulnerable to the direct effects of climate change than adults. Children and teenagers are less able to thermoregulate and therefore less adaptable to climate-related exposures and climate variability compared to adults (Lawler & Patel, 2012). Early experiences of trauma and stress, such as those caused by climate change and severe weather-related events, can also impair a child's ability to regulate emotions, leading to potential learning and behavioral concerns during childhood and later in life (Burke, Sanson, & Van Hoorn, 2018).

Individual Factors

Individual-level risk factors for adolescent eco-anxiety include genetic predisposition, pre-existing conditions, various demographic factors, and connection to the natural world. Genetic predisposition to mental health disorders such as PTSD, depression, and anxiety has been linked to children's susceptibility to developing these conditions following a natural disaster (La Greca et al., 2013; Sheerin et al., 2019; Marchese, 2022). La Greca and colleagues (2013) found that children displaying higher markers of brain-derived neurotrophic factor (BDNF) reported greater symptoms of PTSD after hurricane exposure or hurricane-related stressors. For adolescents with pre-existing conditions, climate change and extreme weather changes can impact the effectiveness of psychiatric medications, as well as make many chronic conditions more difficult to manage (van Nieuwenhuizen et al., 2021; D'Amato et al., 2020). Many psychiatric medications affect the body's ability to thermoregulate and place adolescents at an increased risk of hyperthermia. Demographic factors including but not limited to socioeconomic status (SES), age, race and ethnicity, religious and political ideologies, cultural norms, connectedness to nature, and education can affect the onset and severity of eco-anxiety

(Clayton et al., 2017; Patnaik et al., 2020; Sachdeva, 2016; Ma et al., 2022; Hellden et al., 2021). Climate-related disasters and severe weather patterns can cause economic stress on low-income individuals because of inadequate infrastructure, lack of proper insurance, and limited access to resources (Patnaik et al., 2020; Cianconi et al., 2020). More specifically, the climate crisis disproportionately impacts low-income and marginalized youth due to societal disadvantages including but not limited to access to healthcare, proximity to environmentally dangerous structures (e.g., landfills, industrial sites, freeways), and fewer green spaces. Sachdeva notes that religion can serve as a coping mechanism and that religiosity can shape individual environmental concerns and actions (2016). Lastly, people who care more about environmental issues and feel a deeper connection to the natural world, notably young people and Indigenous groups, tend to be more vulnerable to developing eco-anxiety (Clayton & Karazsia, 2020; Coffey et al., 2021). Indigenous youth are 3 to 6 times more likely to die of suicide than youth in the general population (Kirmayer, Simpson, & Cargo, 2003).

Socio-environmental Factors

Socio-environmental factors play an important role in determining the prevalence of eco-anxiety in adolescents. The geographical location of their home can increase stress and anxiety due to direct exposure to climate change-related disasters, pollution, and extreme temperatures. The location of residence intersects with an adolescent's socioeconomic status and race/ethnicity because studies reveal that communities of color and low-income populations are more likely to live in areas with higher pollution and warmer temperatures (Chalupka, Anderko, & Pennea, 2020; Pratt et al., 2015; Baird, 2008; Evans & Kantrowitz, 2002). Homes in low-income neighborhoods may also lack proper infrastructure, which is more prone to destruction during climate-related events. Furthermore, low-income communities are more likely

to live closer to industrial facilities, placing them at higher risk of exposure to toxic chemical spills and leaks (Patnaik et al., 2020).

Another key component of an adolescent's environment is their social support network. Social support contributes to an adolescent's ability to build resilience and cope with climate change (Abel et al., 2020; Xu et al., 2019; Ma et al., 2022). Adolescents rely heavily on their social environment for emotional stability. When a climate-related event occurs, young people can be exposed to family stress and displacement, putting them at risk for developing mental health concerns such as PTSD, anxiety, sleep disorders, and substance abuse (Burke, Sanson, & Van Hoorn, 2018).

Societal injustices perpetuate exposure to climate change-related events and mental health conditions. Systemic inequities have disproportionately placed communities of color in undesirable locations with limited access to viable resources. Combining with individual social determinants of health such as poverty can multiply the negative effects of climate change. Poverty disproportionately affects children, communities of color, and communities of lower socioeconomic status (Levy & Patz, 2015). According to Ragavan, Marcil, and Garg (2020), climate change is more likely to impact people experiencing poverty, and climate change further exacerbates poverty.

Young people are notably disadvantaged because of their age and powerlessness associated with their minor status. In addition to basic freedoms, adolescents have to rely on adults for decisions about climate change and resources to protect themselves against its effects (Cox et al., 2018). Hickman and colleagues (2021) conducted a global survey of 10,000 young people (ages 16 to 25) and found that young people were most distressed when they believed the government's response to climate change was inadequate. Because youth are at greater risk for

eco-anxiety and other adverse health outcomes from the climate crisis, there is a pressing need for youth-focused mental health resources. Eco-anxiety also has been named a motivating factor for activism, which can lead to positive outcomes for youth (Coffey, 2019). Lack of agency and government inaction has led adolescents to participate in activism and other forms of civic engagement, which may help reduce eco-anxiety among youth while combatting climate change.

A true (natural) disaster: The cost of ignoring climate change as a public health crisis

According to the latest IPCC report, the world is set to reach 1.5°C within the next two decades (2022). With humans as the main drivers of climate change, drastic cuts in carbon emissions are the only way to prevent serious environmental disasters such as deforestation and rising sea levels. The United States has struggled to take such drastic measures due to the polarizing political divide and the spread of misinformation (Basseches et al., 2022). In particular, the climate denial movement funded by the fossil fuel industry and other conservative entities cast suspicion on the severity of anthropogenic climate change. These funds are funneled to conservative think tanks and the associated scientists, who often lack relevant credentials. According to Dunlap and Jacques (2013), the scientists' findings are amplified by Republican politicians, and these scientists disproportionately participate in congressional hearings.

The overbearing stress of climate change and extreme weather events have created challenges for mental and behavioral health professionals. The mental health effects of climate change are poorly researched, but with climate change garnering more attention in the media and health professionals recognizing the severe implications of climate change on human health, the

research pool is slowly building. Hickman (2021)'s global survey of 10,000 young people revealed that two-thirds of participants felt sad, afraid, or anxious about climate change.

Underneath the harmful layer of climate change lies the estimated costs of ignoring climate change as a public health crisis. The current fiscal risk of climate inaction is estimated at \$2 trillion per year (Vahlsing and Yagan, 2022). According to the NRDC (2020), the health costs of climate change far exceed \$800 billion per year. However, these health costs are difficult to quantify because of limited data, inadequate health surveillance, and climate change's massive impact on every institution (Limaye et al., 2020). Federal investments in climate-resilient infrastructure and other institutional changes (e.g., income equality, tackling environmental racism) could eventually lead to better health outcomes for all. With the unbelievably high burden of climate change, supporting adolescents' mental health is more important than ever.

A new prescription: Activism

Ballard and Ozer (2016) define youth activism as the “organized efforts of young people to address the root causes of problems in their local, national, and global communities.” Hickman's global research implies that young people are frustrated with their elected officials for failing to protect their generation from the growing threat of climate change (2021). It is no surprise that young people feel the need to pressure their elected officials into passing climate legislation, as many youth activists do not meet voting age eligibility requirements. With social media and digital platforms making activism easier and more accessible, youth are involved in many forms of activism and civic engagement, from smaller individual actions (e.g., signing petitions, changes in consumption behaviors) to larger organizational actions (e.g., lobbying, community organizing, conservation projects, lobbying for sustainable changes at schools).

The literature point to youth activism as a potential solution to mental health concerns. Youth organizing, which refers to “a youth-led form of community organizing that typically engages adolescents between the ages of 12 and 18 years and embeds youth development strategies into political education, social support programming, and collective change campaign,” is associated with positive development outcomes that support feelings of self-esteem and agency (Conner et al., 2021). Youth organizing and activism can also be used to promote radical healing by building relationships and developing critical consciousness within the context of a caring community (Ginwright, 2010). Activism can shape a person’s identity and give them a sense of purpose, leading to positive health behaviors and outcomes for themselves and their communities (Ballard & Ozer, 2016). In a longitudinal study on youth activists during the 1985 peace movement in Germany, Boehnke and Wong (2011) found that activists had better mental health trajectories across adulthood compared to non-activists.

However, activism can be a double-edged sword. While activism can have protective effects on health and well-being, activism potentially can be detrimental to health. Activism takes time, effort, and resilience to setbacks (Ballard & Ozer, 2016). Even with social media providing increased access regardless of socioeconomic status, participating in activism can reflect one’s privilege, especially in youth. We cannot expect activism to positively affect all adolescents’ health and well-being, as there are multiple mediating factors to consider. The logistical barriers to youth engagement in activism include transportation, inability to skip work or school, and parental permission. In a study about the mental health effects of student activism among college students, Conner et al. (2021) found that 60% of their participants felt a negative impact on their mental health partially due to the labor-intensive and time-consuming nature of activism.

Nevertheless, more research is needed to understand the interaction between youth climate activism and eco-anxiety, as well as the plethora of factors that can mediate these effects. First, research needs to be more inclusive of Indigenous points of view, as they have been at the forefront of the climate justice movement (Coffey et al., 2021; Tysiachniouk et al., 2020). Indigenous communities also are one of the most vulnerable communities when it comes to climate change, despite having a greater connection to the natural world. Similarly, research should expand to more diverse regions, such as remote and rural areas where communities are likely to be more affected by climate change (Martin et al., 2022). Third, there are very few studies that look at other mediating factors such as political and religious affiliations which could offer interesting evidence demonstrating how these ideologies can promote climate activism and climate resilience - the ability to mitigate and adapt to the impacts of climate change. Third, Gislason, Kennedy, and Witham (2021) discuss using Cognitive Behavioral Therapy (CBT) as a tool to help adolescents adapt to challenging life changes and build resilience. Future studies on CBT should explore the combination of CBT and activism as a means of helping adolescents cope with their eco-anxiety. Fourth, we need more studies investigating how activism can alleviate various forms of climate-related mental health concerns, including eco-anxiety, eco-anger, and ecological grief. Lastly, research needs to further explore the mental health detriments of activism on adolescents specifically so we can “prescribe” the appropriate amount of activism, monitoring their symptoms and changing the “dosage” as needed.

By addressing these gaps and increasing our understanding of eco-anxiety in adolescents, we can assess how healthcare systems can integrate climate-related mental health services with

their current offerings. We can inform public health practices and policies as climate change becomes more evident in our everyday lives.

Recommendations

The purpose of this scoping review is to identify the gaps in the research on activism as a “treatment” for eco-anxiety in adolescents. Eco-anxiety is still a novel mental health concern with a variety of definitions but presents similarly to Generalized Anxiety Disorder. The main difference is the cause of the onset of symptoms - eco-anxiety is induced by the stress associated with environmental changes and our knowledge about these changes. Throughout my literature search, I was surprised to see how many ways environmental distress could be defined, from solastalgia (the distress that is produced by environmental change impacting people while they are directly connected to their home environment) to eco-angst. The growing pool of definitions reflected the eagerness to understand this phenomenon with the increasing threat of climate change on society and ecological systems. However, climate activism and its interaction with eco-anxiety have not received as much attention. While there is a substantial amount of research on general youth activism and its effect on youth, research on youth climate activism has barely scratched the surface.

Given the scarcity of research on this topic, I will break down recommendations for future research and how this research can inform effective health programming and public policy.

Research

The interaction between youth climate activism and eco-anxiety, as well as the mediating factors, are still under-researched. Addressing these research gaps is the first step in supporting youth as they face challenges related to climate change. These challenges include understanding eco-anxiety in diverse populations, such as Indigenous groups, low-income and rural communities, and other populations living in environmentally vulnerable regions. Exposure to environmental stressors can lead to mental health concerns including anxiety and depression, but with climate change as the umbrella cause of these stressors, climate-specific mental health treatments need to be created. Lastly, more research on the use of activism as a treatment for eco-anxiety is needed because the activism “dosage” can affect youth mental health. For all of these areas of research, the primary focus should be youth, since much of the existing literature on these topics focus on adults.

Research is essential for building health programming and practices, as well as creating policies that lead to societal change. Currently, several gaps exist in eco-anxiety research due to the novel nature of this type of anxiety. Studying diverse, youth populations that are disproportionately impacted by climate change will give researchers more insight into the true nature of eco-anxiety and how it negatively affects these communities. These populations include Indigenous youth, youth in rural and remote regions that are typically underserved and impoverished, and youth living in heavily industrialized regions. Youth must be the focus of this research because not only are they disproportionately impacted by climate change, but they are also the future and need protection from environmental harm.

Naming the mental health concerns that are causing environmental distress among youth will help practitioners and other public health professionals understand their emotions and

determine the proper treatment and practice. Researchers need to establish a concrete definition of eco-anxiety with specific diagnostic criteria. Other forms of anxiety, such as social anxiety, panic disorder, and Obsessive-Compulsive Disorder, have been well-researched due to the growing concern about their prevalence in society. If climate change is truly a threat to society's mental health and well-being, then eco-anxiety needs to be taken more seriously in academic research. Furthermore, treatments for eco-anxiety should also be explored. Cognitive Behavioral Therapy (CBT) for eco-anxiety could be an effective tool to help youth adapt to climate-related life changes (Pihkala, 2020). Equipping youth with the cognitive skills to handle these challenges will allow them to be more resilient as the Earth's atmosphere continues to change.

Beyond CBT, activism is another important tool to build resilience to climate change and allows youth to connect with their peers and broader communities. However, activism can present benefits and drawbacks that can influence how much youth engage in it. If research can find the proper "dosage" of activism, then this can inform how much activism health practitioners and professionals "prescribe" their youth patients as an eco-anxiety treatment.

By expanding the body of research on these areas, public health can build appropriate programming and practices that can support youth who are eco-anxious.

Practice

As eco-anxiety becomes a more prominent mental health concern among youth, formulating various types of programs and practices to support youth is critical. Designing and implementing effective public health programs and practices requires a variety of evidence, whether it arises from research or input from community members and other stakeholders. As the

body of research on eco-anxiety and the effects of activism on mental health grows, so must public health programming.

Youth are greatly influenced by their social support networks and rely on their social environments for emotional stability. Youth support groups provide space for youth to express their environmental distress with others who share similar experiences. Specifically, climate-focused support groups can connect youth who want to be involved in climate activism while still being able to express their concerns about climate change and the effects climate change has on their health and well-being. The Good Grief Network, based in the United States, coordinates support groups for eco-anxiety (Good Grief Network, 2022). However, these groups are currently only for adults. By holding space for youth to express concerns about eco-anxiety while combating climate change, youth can feel empowered and supported by those around them.

A family-based intervention is also recommended to promote collective action, pro-environmental behaviors, and strengthen family relationships. Leger and Pruneau (2012) conducted a case study on climate mitigation behavior in three suburban families, finding the following major themes: collectively applied competencies (e.g., self-efficacy), shared ecological values among family members, and collaborative family dynamics. Based on this study, a family-based climate intervention program can target the family's values, whether they are rooted in personal values or spiritual values, to strengthen their intrinsic motivation to participate. The first two steps in planning this type of intervention are determining the family's priorities and setting goals for supporting their children with eco-anxiety while combatting climate change. For example, families may want to reduce costs on home utilities (e.g., electricity, water) or prevent the onset of genetic diseases (e.g., heart disease, cancers) by

adopting a healthier lifestyle. Examples of goals include reducing water consumption, composting, planting drought-resistant plants, and eating more plant-based meals. It is important to note that sustainable actions are part of climate activism. By focusing on improving their children's mental health, families will not only improve their children's health and well-being but also adopt sustainable, planet-friendly goals.

Lastly, mental health professionals cannot diagnose adolescents with eco-anxiety if it is not listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM). Eco-anxiety can be a subsection of Generalized Anxiety Disorder (GAD), helping mental health professionals determine the specific cause of an adolescent's anxiety. Increasing the awareness of eco-anxiety in adolescents can also lead to creating a diagnostic tool to assess eco-anxiety in adolescents to inform health professionals. Eco-anxiety is a legitimate and potentially severe mental health concern among youth, so there needs to be greater attention to eco-anxiety in the mental health community.

While public health programming and practices work at the interpersonal and community levels, the greatest systemic change occurs at the policy level.

Policy

The policy level presents opportunities to address research and reporting gaps, government regulations, decisions about laws and other types of legislation, and government investment. Currently, there are a few policies and initiatives to increase access to mental health services for adolescents, such as the Department of Education's "Supporting Child and Student Social, Emotional, Behavioral, and Mental Health," Connecting Kids to Coverage's campaign focused on mental health access, and the State of Oregon's Project ECHO. As of July 16th, 2022,

the Suicide and Crisis Hotline number changed to 988 (Table 2). However, many of the existing policies and programs do not address climate-related adolescent mental health disparities.

Table 2. Programs that Address Climate Education for Adolescents and Healthcare Systems

Program	Website
Department of Education’s “Supporting Child and Student Social, Emotional, Behavioral, and Mental Health”	https://www2.ed.gov/documents/students/supporting-child-student-social-emotional-behavioral-mental-health.pdf
Connecting Kids to Coverage	https://www.insurekidsnow.gov/campaign-information/index.html
State of Oregon’s Project ECHO	https://www.oregonechonetwork.org/#:~:text=ECHO%20is%20an%20interactive%20educational,the%20convenience%20of%20video%20connection.
Suicide and Crisis Hotline number (988)	https://988lifeline.org/current-events/the-lifeline-and-988/
Medical Students for a Sustainable Future	https://ms4sf.org/
Climate & Health Program at the University of Colorado School of Medicine	https://medschool.cuanschutz.edu/climateandhealth
Alliance for Nurses for Healthy Environment	https://envirn.org/
American College of Physicians Climate Change Toolkit	https://www.acponline.org/advocacy/advocacy-in-action/climate-change-toolkit
UCLA’s Fielding School of Public Health Center for Healthy Climate Solutions	https://ph.ucla.edu/research/centers/ucla-center-healthy-climate-solutions#:~:text=The%20UCLA%20Center%20for%20Healthy%20Climate%20Solutions%20focuses%20on%20protecting,economy%2C%20environment%2C%20and%20health.
Stanford School of Earth, Energy, & Environmental Sciences’ Climate Change Education Project	https://earth.stanford.edu/climate-change-ed#gs.8t6tt6

Integrating climate curriculum into primary, secondary, and tertiary education can help students understand the mechanics of climate change, how climate change impacts societal and environmental systems, and the importance of addressing the climate crisis with an equity lens. In the Fall of 2009, the Stanford School of Earth, Energy, & Environmental Sciences collaborated with local Bay Area schools to develop a climate change curriculum for middle and high school students. A 2014 study on Stanford's *Global Climate Change: Professional Development for K-12 Teachers* found a statistically significant gain in students' content knowledge and a shift in their opinions about climate change (Holthuis et al.). While knowledge alone is not enough to change behaviors, curriculums can include hands-on experiences with activism and pro-environmental behaviors. Climate literacy, or understanding the climate's influence on oneself and society as well as individual influence on climate, allows people to lower their carbon footprint and build the necessary behavioral skills as we continually adjust to the changing climate (Miler & Sladek, 2011). Schools and educators will also need support weaving climate change into their curricula. By providing more resources for schools and their educators, such as involving local climate activism groups and local universities, educators do not have to stress about building and learning a new curriculum for their students. However, the research on climate change curriculums is still limited, so further investigation is needed.

In healthcare systems, climate education for physicians and other health professionals mend the training gap in mitigation, adaptation, and policymaking around climate change to prepare for future climate- and health-related events (e.g., extreme weather events, COVID-19 pandemic) (Goshua et al., 2021). Thankfully, there are medical institutions that have already started climate education for physicians, including Medical Students for a Sustainable Future, the Climate & Health Program at the University of Colorado School of Medicine, Alliance for

Nurses for Healthy Environment, the American College of Physicians' Climate Change Toolkit, and UCLA's Fielding School of Public Health Center for Healthy Climate Solutions. These solutions teach physicians how to recognize, diagnose, and treat victims of climate-related events and environmental injustices, as well as become advocates for climate mitigation policies. If physicians and healthcare professionals can be better advocates for the environment, they can also pass these advocacy practices on to their adolescent patients.

While advocating for more education for youth and healthcare professionals, we also must protect native, Indigenous lands and ensure that Indigenous youth have environmental security for their future. Reparations for Native Americans are not only a societal priority but also an environmental priority. Indigenous youth should be able to live on their native lands without having to worry about environmental harm and federal manipulation.

By investing more resources in research and addressing climate-specific mental health disparities through programming and policies, the government can create comprehensive climate change responses that are more inclusive and equitable to adolescents, and protect and restore native lands.

Implications and Discussion

The current literature on eco-anxiety and activism is scarce, yet provides context as to the potential severity of climate change on adolescent mental health. Understanding the intersection between climate change and public health is critical because the environment is a major determinant of health. The literature points to several ways in which climate change has contributed to physical and mental health concerns among youth. Climate change has also perpetuated societal injustices and inequities which are linked with the white power structure and

systemic racism. Solutions for these issues may feel impossible given the United States' political polarization, but with more attention to the intersection of climate change and systemic racism, there is the hope of repairing the country's complex issues. Youth are facilitating this sense of hope by fighting for climate justice among other social injustices, despite the systemic barriers they face.

This scoping review provides suggestions on how research can extend to more diverse communities, such as Indigenous communities, low-income and rural communities, and communities living in environmentally-vulnerable regions. Inclusive research allows us to identify the critical issues in these communities that help us create more effective health programming and inclusive, equitable policies. The research recommendations also suggest using existing mental health treatments, as well as activism, to ease eco-anxiety symptoms. The body of research on climate activism needs to consider how youth activism can benefit society at multiple levels, from the individual to the policy level.

Youth are the focus of this research because they are leading the fight against climate change to protect their future. Public health has a particularly large role in addressing this concern because they have the tools and knowledge to inform public opinion and persuade elected officials. By engaging research and other educational institutions in climate-focused research, we can build a greater understanding of the effects of climate change on various aspects of adolescent health. Furthermore, diving deeper into climate change and adolescent health can help enhance diagnostic tools for health professionals, leading to improved mental health outcomes for youth. Specifically, creating a diagnostic tool to assess eco-anxiety in adolescents will expose the potentially concerning relevance of eco-anxiety and inform health professionals about the importance of addressing eco-anxiety in clinical settings.

However, there are potential pitfalls to using activism as a “treatment” for eco-anxiety in adolescents. Aside from the limited research on youth climate activism, the effects of activism on overall adolescent mental health are still not understood. If we want to encourage youth to partake in climate activism, we must understand the extent to which activism is effective in lessening eco-anxiety symptoms and whether too much involvement in activism can worsen eco-anxiety symptoms. This is especially important for adolescents who have a strong identity as climate activists. If they are too involved in climate activism, they may face burnout and fatigue, but insist on maintaining their activism as part of their sense of self. This limitation can be particularly concerning for healthcare providers and parents of activists because while they want to support their involvement in activism, they may be concerned about their eco-anxiety worsening.

Nevertheless, the cost of ignoring the issue is greater than solving it. By not addressing the effects of climate change on youth mental health, we are denying their right to a safe and environmentally sound future. Climate change is not only costing trillions of federal dollars but also costing human lives, transforming the crisis into a human rights issue rather than solely an environmental issue. The research on eco-anxiety in youth and the effects of activism can act as a catalyst for more policies and laws on environmental protection and environmental justice. For a country that says they are highly concerned about its youth, we do a poor job of protecting them from harm. Historically, environmental legislation has created domestic institutions and programs to protect society from the climate crisis and further damage to the atmosphere. While most of these legislations have focused on infrastructure, natural resources, and ecosystems, public health-focused legislation is the next action for addressing the climate crisis.

Conclusion

Through this scoping review, I identified gaps in the current literature about eco-anxiety in adolescents, various determinants of adolescent mental health as they relate to climate change, and the benefits and drawbacks of activism. I provide recommendations for future research that includes addressing the interaction between youth climate activism and eco-anxiety, collecting data on diverse communities, and understanding eco-anxiety as a diagnosable disorder. The practice recommendations comprise social support-based interventions and adding eco-anxiety to diagnostic manuals. Policy recommendations support the need for climate education for youth and healthcare professionals, as well as land reparations for Indigenous youth. As we shift our focus to the societal impacts of climate change, it is critical that we elevate the issue of eco-anxiety and protect young people and the future.

References

- Abel, M. R., Vernberg, E. M., Lochman, J. E., McDonald, K. L., Jarrett, M. A., Hendrickson, M. L., & Powell, N. (2020). Co-remiscing with a caregiver about a devastating tornado: Association with adolescent anxiety symptoms. *Journal of Family Psychology, 34*(7), 846–856. <https://doi.org/10.1037/fam0000683>
- Albrecht, G. (2012). Psychoterratic conditions in a scientific and technological world. In P.H. Kahn & P.H. Hasbach (Eds), *Ecopsychology: Science, Totems, and the Technological Species* (pp. 241–264). MIT Press
- Baird, R. (2008). *The impact of climate change on minorities and indigenous peoples*. (Brief). http://www2.ohchr.org/english/issues/climatechange/docs/submissions/Minority_Rights_Group_International.pdf?
- Ballard, P. J., & Ozer, E. (2016). The implications of youth activism for health and well-being. In J. O. Conner & S. M. Rosen (Eds.), *Contemporary youth activism* (pp. 223–243). ABC-CLIO.
- Basseches, J.A., Bromley-Trujillo, R., Boykoff, M.T., Culhane, T., Hall, G., Healy, N., Hess, D.J.,... & Stephens, J.C. (2022). Climate policy conflict in the U.S. states: A critical review and way forward. *Climatic Change, 170*(32). <https://doi.org/10.1007/s10584-022-03319-w>
- Baudon, P., & Jachens, L. (2021). A Scoping Review of Interventions for the Treatment of Eco-Anxiety. *International Journal of Environmental Research and Public Health, 18*(18), 9636. <http://dx.doi.org/10.3390/ijerph18189636>
- Boehnke, K., & Wong, B. (2011). Adolescent political activism and long-term happiness: a 21-year longitudinal study on the development of micro- and macrosocial worries.

Personality & social psychology bulletin, 37(3), 435–447.

<https://doi.org/10.1177/0146167210397553>

Bullard, R.D., & Johnson, G.S. (2002). Environmentalism and public policy: Environmental justice: Grassroots activism and its impact on public policy decision making. *Journal of Social Issues*, 56(3), 555-578. <https://doi.org/10.1111/0022-4537.00184>

Burke, S.E.L., & Sanson, A.V., Van Hoorn, J. (2018) The psychological effects of climate change on children. *Curr Psychiatry Rep*, 20(5),1–8. doi: 10.1007/s11920-018-0896-9.

Cianconi, P., Betrò, S., & Janiri, L. (2020). The Impact of Climate Change on Mental Health: A Systematic Descriptive Review. *Frontiers in psychiatry*, 11, 74.

<https://doi.org/10.3389/fpsy.2020.00074>

Chalupka, S., Anderko, L., & Penne, E. (2020). Climate change, climate justice, and children’s mental health: A generation of risk? *Environmental Justice*, 13(1).

<https://doi.org/10.1089/env.2019.0034>

Charlson, F., Ali, S., Benmarhnia, T., Pearl, M., Massazza, A., Augustinavicius, J., & Scott, J.G. (2021). Climate change and mental health: A scoping review. *Int. J. Environ. Res. Public Health*, 18(9), 4486. <https://doi.org/10.3390/ijerph18094486>

Clayton, S., Manning, C. M., Krygsman, K., & Speiser, M. (2017). *Mental Health and Our Changing Climate: Impacts, Implications, and Guidance*. Washington, D.C.: American Psychological Association, and ecoAmerica.

Clayton S. (2020). Climate anxiety: psychological responses to climate change. *Journal of Anxiety Disorders*, 74, 102263 –102263. doi: 10.1016/j.janxdis.2020.102263.

Clayton S, & Karazsia, B.T. (2020). Development and validation of a measure of climate change anxiety. *J Environ Psychol.*, 69, 101434. doi: 10.1016/j. Jenvp.2020.101434.

- Coffey, Y., Bhullar, N., Durkin, J., Islam, M. S., & Usher, K. (2021). Understanding Eco-anxiety: A Systematic Scoping Review of Current Literature and Identified Knowledge Gaps. *The Journal of Climate Change and Health*. <https://doi.org/10.1016/j.joclim.2021.100047>
- Comtesse, H., Ertl, V., Hengst, S.M.C., Rosner, R., & Smid, G.E. (2021). Ecological grief as a response to environmental change: A mental health risk or functional response? *Int J Environ Res Public Health*, 18(2), 734. doi: [10.3390/ijerph18020734](https://doi.org/10.3390/ijerph18020734)
- Conner, J.O., Crawford, E., & Galioto, M. (2021). The mental health effects of student activism: Persisting despite psychological costs. *Journal of Adolescent Research*, 1-30. <https://doi.org/10.1177/07435584211006789>
- Cox, R. S., Hill, T. T., Plush, T., Heykoop, C., & Tremblay, C. (2019). More than a checkbox: engaging youth in disaster risk reduction and resilience in Canada. *Natural Hazards*, 98(1), 213-227.
- D'Amato, G., Chong-Neto, H.J., Ortega, O.P.M., Vitale, C., Ansotegui, I., Rosario, N., Haahtela, T.,... & Annesi-Maesano, I. (2020). The effects of climate change on respiratory allergy and asthma induced by pollen and mold allergens. *Allergy*, 75(9), 2219-2228. <https://doi.org/10.1111/all.14476>
- Dockett, L. (2019). The rise of eco-anxiety. *Psychother. Netw. Mag.*, 43, 11–14.
- Doherty T.J., & Clayton, S. (2011). The psychological impacts of global climate change. *Am Psychol*, 66(4), 265-275. doi: 10.1037/a0023141.
- Dunlap, R.E., & Jacques, P.J. (2013). Climate change denial books and conservative think tanks: Exploring the connection. *Am Behav Sci*, 57, 699-731.

- Evans, G.W., & Kantrowitz, E. (2002). Socioeconomic status and health: The potential role of environmental risk exposure. *Annu. Rev. Public Health, 23*, 303-331. DOI: 10.1146/annurev.publhealth.23.112001.112349
- Gifford, E., & Gifford R. (2017). The largely unacknowledged impact of climate change on mental health. *Bulletin of the Atomic Scientists, 72*, 292-297. doi: 10.1080/00963402.2016.1216505
- Ginwright, S. (2010). *Black youth rising: Activism and healing in urban America*. Teachers College Press.
- Gislason, M.K., Kennedy, A.M., & Witham, S.M. (2021). The interplay between social and ecological determinants of mental health for children and youth in the climate crisis. *International Journal of Environmental Research and Public Health, 18*, 4573. <https://doi.org/10.3390/ijerph18094573>
- Good Grief Network*. (2022). Good Grief Network. <https://www.goodgriefnetwork.org/>
- Goshua, A., Gomez, J., Erny, B., Burke, M., Luby, S., Sokolow, S., LaBeaud, D.A..., & Nadeau, K. (2021). Addressing climate change and its effects on human health: A call to action for medical schools. *Academic Medicine, 96*(3), 324-328. doi: 10.1097/ACM.0000000000003861
- Hellden, D., Andersson, C., Nilsson, M., Ebi, K.L., Friberg, P., & Alfven, T. (2021). Climate change and child health: A scoping review and an expanded conceptual framework. *The Lancet Planetary Health, 5*(3), E164-E175. [https://doi.org/10.1016/S2542-5196\(20\)30274-6](https://doi.org/10.1016/S2542-5196(20)30274-6)
- Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, E. R., Mayall, E. E., ... & van Susteren, L. (2021). Young people's voices on climate anxiety, government betrayal and

moral injury: A global phenomenon. *Government Betrayal and Moral Injury: A Global Phenomenon*.

Hogg, T.L., Stanley, S.K., O'Brien, L.V., Wilson, M.S., & Watsford, C.R. (2021). The Hogg eco-anxiety scale: Development and validation of a multidimensional scale. *Global Environmental Change*, 71. <https://doi.org/10.1016/j.gloenvcha.2021.102391>

Holthuis, N., Lotan, R., Saltzman, J., Mastrandrea, M., & Wild, A. (2014). Supporting and understanding students' epistemological discourse about climate change. *Journal of Geoscience Education*, 62(3), 374-387. <https://doi.org/10.5408/13-036.1>

Intergovernmental Panel on Climate Change. (2022). IPCC WGII Sixth Assessment Report. <https://www.ipcc.ch/report/ar6/wg2/>

Kirmayer, L., Simpson, C., & Cargo, M. (2003). Healing traditions: culture, community and mental health promotion within Canadian Aboriginal peoples. *Australasian Psychiatry*, 11, S15-23. <https://doi.org/10.1046/j.1038-5282.2003.02010.x>

La Greca, A.M., Lai, B.S., Joormann, J., Auslander, B.B., & Short, M.A. (2013). Children's risk and resilience following a natural disaster: Genetic vulnerability, posttraumatic stress, and depression. *Journal of Affective Disorders*, 151(3), 860-867. <https://doi.org/10.1016/j.jad.2013.07.024>

Lawler, J., & Patel, M. (2012). Exploring children's vulnerability to climate change and their role in advancing climate change adaptation in East Asia and the Pacific. *Environmental Development*, 3, 123-136. <https://doi.org/10.1016/j.envdev.2012.04.001>

Lazarus, R., & Zdeb, S. (2021, January 5). *Environmental Law & Politics*. American Bar Association.

https://www.americanbar.org/groups/public_education/publications/insights-on-law-and-society/volume-19/insights-vol--19---issue-1/environmental-law---politics/

- Leger, M.T., & Pruneu, D. (2017). Changing family habits: A case study into climate change mitigation behavior in families. *International Electronic Journal of Environmental Education*, 2(2), 77-87. <https://files.eric.ed.gov/fulltext/EJ1057557.pdf>
- Levy, B.S., & Patz, J.A. (2015). Climate change, human rights, and social justice. *Ann Glob Health*, 81(3), 310-322, doi: 10.1016/j.aogh.2015.08.008.
- Limaye, V.S., Max, W., Constible, J., & Knowlton, K. (2020). Estimating the costs of inaction and the economic benefits of addressing the health harms of climate change. *Environmental Health*, 39(12), 2098-2104. doi: 10.1377/hlthaff.2020.01109
- Ma, T., Moore, J., & Cleary, A. (2021). Climate change impacts on the mental health risk and wellbeing of young people: A scoping review of risk and protective factors. *Social Science & Medicine*, 301. <https://doi.org/10.1016/j.socscimed.2022.114888>
- Marchese, S.N. (2022). *The relative roles of genetics and environment in posttraumatic stress disorder* (Doctoral dissertation). Icahn School of Medicine at Mount Sinai ProQuest Dissertations Publishing.
- Martin, G., Reilly, K., Everitt, H., & Gilliland, J.A. (2022). Review: The impact of climate change awareness on children's mental well-being and negative emotions - a scoping review. *Child and Adolescent Mental Health*, 27(1), 59-72.
- Milér, T., & Sládek, P. (2011). The climate literacy challenge. *Procedia Social and Behavioral Sciences*, 12, 150-156. <https://doi.org/10.1016/j.sbspro.2011.02.021>
- Patnaik, A., Son, J., Feng, A. & Ade, C. (2020). Racial Disparities and Climate Change. PSCI. <https://psci.princeton.edu/tips/2020/8/15/racial-disparities-and-climate-change>

- Pihkala, P. (2018). Living with the wicked problem of climate change. *Zygon*, 53(2), 427–442.
doi: 10.1111/zygo.12400.
- Pihkala, P. (2020). Anxiety and the ecological crisis: An analysis of eco-anxiety and climate anxiety. *Sustainability*, 12(19), 7836. <https://doi.org/10.3390/su12197836>
- Pratt, G.C., Vadali, M.L., Kvale, D.L., & Ellickson, K.M. (2015). Traffic, air pollution, minority, and socio-economic status: Addressing inequities in exposure and risk. *Int. J. Environ. Res. Public Health*, 12(5), 5355-5372. <https://doi.org/10.3390/ijerph120505355>
- Ragavan, M.I., Marcil, L.E., & Garg, A. (2020). Climate change as a social determinant of health. *Pediatrics*, 145(5), e20193169. <https://doi.org/10.1542/peds.2019-3169>
- Sabherwal, A., Ballew, M.T., van der Linden, S., Gustafson, A., Goldberg, M.H., Maibach, E.W., Kotcher, J.E., & Leiserowitz, A. (2021). The Greta Thunberg effect: Familiarity with Greta Thunberg predicts intentions to engage in climate activism in the United States. *Journal of Applied Social Psychology*, 51(4), 321-333. <https://doi.org/10.1111/jasp.12737>
- Sachdeva, S. (2016). Religious identity, beliefs, and views about climate change. *Oxford Research Encyclopedia of Climate Science*.
<http://dx.doi.org/10.1093/acrefore/9780190228620.013.335>
- Schreiber, M. (2021). *Addressing climate change concerns in practice*.
<https://www.apa.org/monitor/2021/03/ce-climate-change>
- Schwartz, S. E., Benoit, L., Clayton, S., Parnes, M. K. F., Swenson, L., & Lowe, S. R. (2022). Climate change anxiety and mental health: Environmental activism as Buffer. *Current Psychology*. <https://doi.org/10.1007/s12144-022-02735-6>
- Sheerin, C.M., Kovalchick, L.V., Overstreet, C., Rappaport, L.M., Williamson, V., Vladimirov, V., Ruggiero, K.J., & Amstadter, A.B. (2019). Genetic and environmental predictors of

adolescent PTSD symptom trajectories following a natural disaster. *Brain Science*, 9(6), 146.
<https://doi.org/10.3390/brainsci9060146>

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

To, P., Eboreime, E., & Agyapong, V.I.O. (2021). The impact of wildfires on mental health: A scoping review. *Behavioral Sciences*, 11(126). <https://doi.org/10.3390/bs11090126>

Tysiachniouk, M.S., Horowitz, L.S., Korkina, V.V., & Petrov, A.N. (2021). Indigenous-led grassroots engagements with oil pipelines in the U.S. and Russia: The NoDAPL and Komi movements, *Environmental Politics*, 30(6), 895-917, DOI: [10.1080/09644016.2020.1851534](https://doi.org/10.1080/09644016.2020.1851534)

Xu, W., Jiang H, Zhou, Y., Zhou, L., & Fu, H. (2019). Intrusive rumination, deliberate rumination, and posttraumatic growth among adolescents after a tornado: The role of social support. *J Nerv Ment Dis.*, 207(3), 152–6.

Usher, K., Durkin, J., & Bhullar, N. (2019). How thinking about climate change-related environmental decline is affecting our mental health. *International Journal of Mental Health Nursing*, 28(6), 1233-1234. <https://doi.org/10.1111/inm.12673>

Vahlsing, C., & Yagan, D. (2022). *Quantifying risks of the federal budget from climate change*. <https://www.whitehouse.gov/omb/briefing-room/2022/04/04/quantifying-risks-to-the-federal-budget-from-climate-change/>

Van Nieuwenhuizen, A., Hudson, K., Chen, X., & Hwong, A.R. (2021). The effects of climate change on child and adolescent mental health: Clinical considerations. *Current Psychiatry Reports*, 23(88). <https://link.springer.com/article/10.1007/s11920-021-01296-y>

Appendices

Appendix A: MPH Core Competencies

Competency	Capstone
Public Health & Health Care Systems	
6. Discuss the means by which structural bias, social inequities, and racism undermine health and create challenges to achieving health equity at organizational, community, and societal levels	Explore the disproportionate effects of climate change on adolescent mental health
Planning & Management to Promote Health	
7. Assess population needs, assets, and capacities that affect communities' health	Understand how inequities cause varying levels of eco-anxiety in adolescents
Policy in Public Health	
14. Advocate for political, social, and economic policies and programs that will improve health in diverse populations	Discuss research recommendations that can help inform public health programming and policies
Communication	
19. Communicate audience-appropriate public health content, both in writing and through oral presentation	Encourage youth activism as a mitigation strategy for eco-anxiety
Behavioral Health Competencies	
4. Formulate strategies for mental health and substance abuse prevention and treatment in community settings.	Use youth activism and environmentally positive acts as a preventive measure and treatment for eco-anxiety in adolescents