Souza et al. (2024) Journal of Mental Health and Climate Change
http://doi.org/10.5281/zenodo.13776973

JMHCC

Understanding Eco-Emotions in Adolescents and Young Adults

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ABSTRACT

As young people continue to experience a changing planet, they will also process and cope with the emotions that arise from this change. Eco-emotions, as defined by the environmental theologian Panu Pihkala, are emotions which are significantly related to ecological issues. First popularized by environmental philosopher Glenn Albertch in the early 2000s, research regarding eco-emotions is rapidly growing, but necessitates greater depth and expansion. This literature review aims to compile survey data studies, conference proceedings, meta-analyses, ethnographic studies, and a policy report to identify the various eco-emotions and how they impact adolescents and young adults as individuals and collectives. This paper aims to contextualize their existing landscape of young people's eco-emotions through their intersectional identities, as well as, pre- and post-transformative coping strategies as theorized by Maria Ojala and Panu Pihkala. The spectrum of emotions that may be experienced in adaptive or maladaptive ways ultimately impact climate action. The key findings of this literature review include a call for a diversity of methodologies and approaches to address the heavy reliance on survey-data, a better consensus on the intersection of eco-emotions to address the current inconsistencies in research, and an uplifting of voices of the most affected people and places (MAPA) to the forefront of research and action.

Keywords**:** *eco-emotions, climate emotions, eco-anxiety, eco-anger, eco-sadness*

INTRODUCTION

Climate change is one of the most complex, multi-generational, global ecological crises that humanity has faced. The corresponding emotional experience in response to this problem is just as complex and impactful. Young people around the world are emotionally experiencing some of the most challenging

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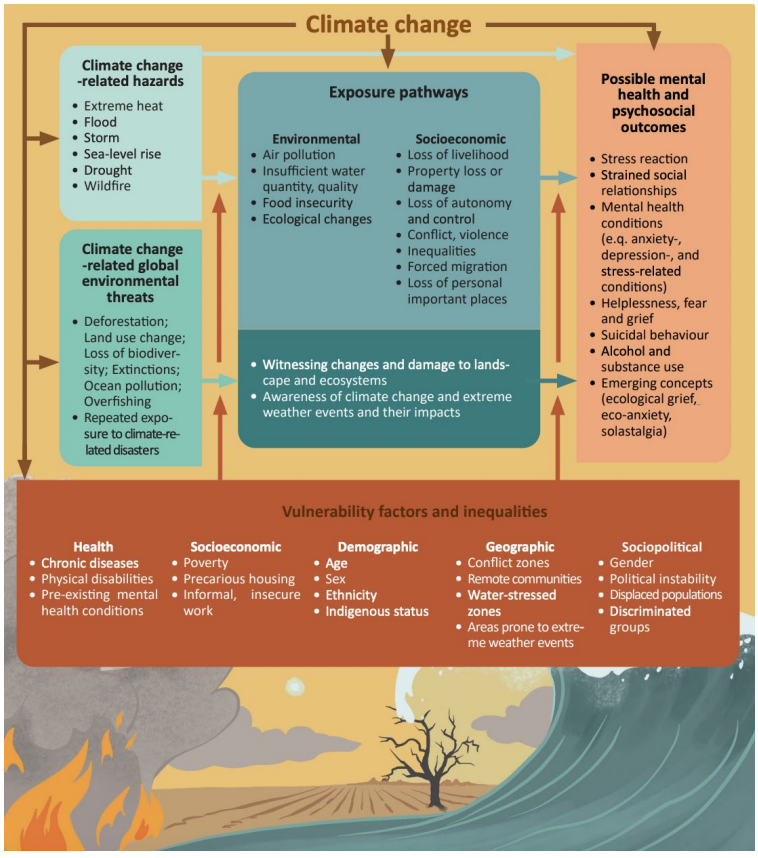
realities due to their environment and perception of collective action, yet research is novel regarding the topic. A 2021 Lancet Planetary Health survey reviewed climate anxiety in 10,000 16–25-year-olds in ten countries across the globe and found, "59% were very or extremely worried and 84% were at least moderately worried…More than 45% of respondents said their feelings about climate change negatively affected their daily life and functioning…Climate anxiety and distress were correlated with perceived inadequate government response and associated feelings of betrayal" (Hickman et al., 2021, p. 1). Within this study the authors noted that young people, depending on where they lived in the world, felt varying degrees of worry. Those in "countries expressing more worry and a greater impact on functioning tended to be poorer, in the Global South, and more directly impacted by climate change" (Hickman, et al., 2021, p. 1). While many of the studies in this paper utilize various terms to describe countries of the Global South and marginalized communities, this paper will utilize the term MAPA, or Most Affected People and Areas, since this term is self-proclaimed by MAPA activists to indicate all the demographics most affected by climate and ecological issues (Reyes & Calderón, 2021). At the same time, we recognize that not all the articles this paper draws on which refer to the "Global South" or developing countries reflect the encompassing definition of MAPA, which is not defined by national boundaries or ethnicities. The term "Global South" has been generalized terminology assigned to MAPA by the Global North, so this literature review has noted the importance of utilizing the self-proclaimed terminology (Reyes & Calderón, 2021).

Figure 1. Mental health and Climate Change: Policy Brief, World Health Organization.



To better understand the ways mental health has impacted individuals internationally, both within and outside of MAPA, the World Health Organization has compiled current observations of climate change interactions with mental health. **Figure 1** demonstrates all of the main interlinkages between climate change and mental health (World Health Organization, 2022). This figure illustrates the ways in which mental health of humans impacts the physical and general health of humans, non-human beings, eco-systems, economies, social networks, and socio-political relationships. The inclusion of this figure highlights how the understanding of eco-emotions impacts more than the understanding of mental health, rather the understanding of these interconnected aspects of society. The discussion section will detail the intersectionality of eco-emotions, but this information grounds this research in a greater conversation regarding mitigation and adaptation to the climate crisis.

Despite there being clear evidence that environmental threats harm the lives of young people, there is a disconnect between the understanding of eco and climate emotions, and actually living and coping in an ecological crisis. Young people, whether or not they are aware of their eco and climate emotions, are not always empowered towards action (Hickman et al., 2021). Young people do not all process climate change and ecological crises in the same way. This paper aims to understand young people's emotional experiences regarding ecological crises through an extensive literature review and an accompanying discussion that demonstrates the importance of the awareness and balance of eco-emotions for adolescents and young adults. The psychopathology of eco-emotions within this study aims to communicate the importance of eco-emotions, not only for research, but for young people to contextualize the information as pertinent to their own understanding.

Emotions v. Feelings

While feelings and emotions are typically used interchangeably, this paper will utilize existing research to distinguish between the two as related but not identical concepts (Allyn, 2022). One definition (and the definition this literature review uses as the basis for this paper) understands emotions as reactions to the present reality while feelings are reflections based on the events of the past and fears for the future (Allyn, 2022). However, the definitions of feelings and emotions are not consistent across the medical, scientific, and language communities. The lack of consensus on this terminology stems from some scholars identifying emotions through people's ability to perceive, thus lending the terms emotions and feelings to be more interchangeable because perception requires awareness of the present and past (Pihkala, 2022a). "[The] concept of emotion broadly [describes] a wide array of feelings, including both unconscious bodily feelings and conscious experiences of feelings" (Pihkala, 2022a). This study will focus on emotions instead of feelings but acknowledges that feelings are connected to emotions and are sometimes discussed in conjunction or interchangeably with eco-emotions in the literature of this paper.

Eco-Emotions v. Climate Emotions

Eco-emotions and climate emotions are terms that are generally used interchangeably, but the acknowledgment of their distinction is important to understanding the entire emotional experience of young people. Since the climate crisis is a type of ecological crisis, climate emotions are emotions regarding this specific ecological crisis, climate change (Pihkala, 2022a). "Climate emotions are defined as affective phenomena which are significantly related to the climate crisis, even though there may be many kinds of factors influencing people's emotions at a certain moment—such as the general situation in one's life, one's temperament, daily events, social dynamics, and climate change impacts" (Pihkala, 2022a). Climate emotions, which concern the planet's climatic changes, can be understood as a type of eco-emotion. Eco-emotions are emotions concerning ecological crises as a whole, with the potential

for a more localized understanding of one's environment (e.g. toxic waste affecting local water supply), as opposed to global climatic changes (e.g. global sea level rise) (Pihkala, 2022a). Some scholars have identified a more complex distinction for eco-emotions which:

> *Often include phenomena [that] are not exactly 'emotions' (i.e., strong feelings) but rather mental states (i.e., global and relatively constant mental conditions, which include more than emotions, such as thoughts and behaviors) and mental health syndromes (i.e., conditions characterized by a group of symptoms), making classifications a bit confusing and not always easy to compare (Cianconi et al., 2023).*

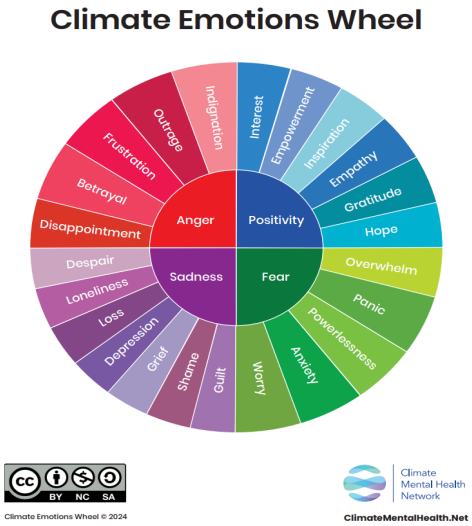
In other words, this broader comprehension of the emotional experience includes conscious and unconscious understandings of one's environment and the comprehension of the collectively shared environment. Within the context of this paper, eco-emotions are understood as an umbrella term with climate emotions being closely related and falling under that umbrella. This literature review does not focus on the implication of these various terms themselves, rather the actual data regarding the experience of eco-emotions within young people. This paper will categorize eco-emotions as understood by current research which will include, but not be limited to, climate emotions, and discuss how different demographics process eco-emotions.

METHODS

The following portion of the article will summarize the various eco and climate emotions experienced by young people and categorized according to The Climate Emotions Wheel, which allows people and psychologists to visualize and better understand eco-emotions. The Climate Emotions Wheel was based on Panu Pihkala's theoretical framework: "Coping With An Ecological Crisis". The Climate Emotions Wheel is sectioned into four categories: Anger, Sadness, Fear, and Positivity (Pihkala, 2022a). Each category then has its own set of emotions that the literature review explains in-depth. While this wheel specifically refers to climate emotions, the research found in this literature review refers to the same categorization of eco-emotions. The selection of these key emotions reflects their prevalence in current eco-emotions research (Pihkala, 2022a). However, as depicted in **Figure 2**, there are nuanced forms of these broader emotions.

Despite the separate categories of emotions, eco-emotions manifest in a conjunction of multitudes, resulting in complex emotional experiences with various combinations of emotions (Pihkala, 2022a). Young people typically process multiple eco-emotions at once, as opposed to a siloed emotion. For example, in a study in the United Kingdom, students felt uncertain about the future, with sadness being either replaced or combined with other emotions, such as worry and frustration (Marks et al., 2023). Additionally, strong feelings of helplessness and powerlessness are often discussed in conjunction with strong anxiety and depression (Pihkala, 2022a). External factors, such as culture, social norms, and religion, influence the type of emotions experienced (Pihkala, 2022a). There is also a strong positive correlation between eco-emotions and other mental health outcomes, such as depression, anxiety, and stress (Stanley et al., 2021). These different influences on an individual's experience with eco-emotions suggest that the combination of various eco-emotions and their varying intensities drive unique emotional experiences for young people. Each section of the literature review has at least one sub-section dedicated to MAPA perspectives and experiences to demonstrate diversity of current scientific research, as well as, critiques of methodologies cited and suggestions for future areas of research.

Figure 2. Climate Emotions Wheel, Climate Mental Health Network.



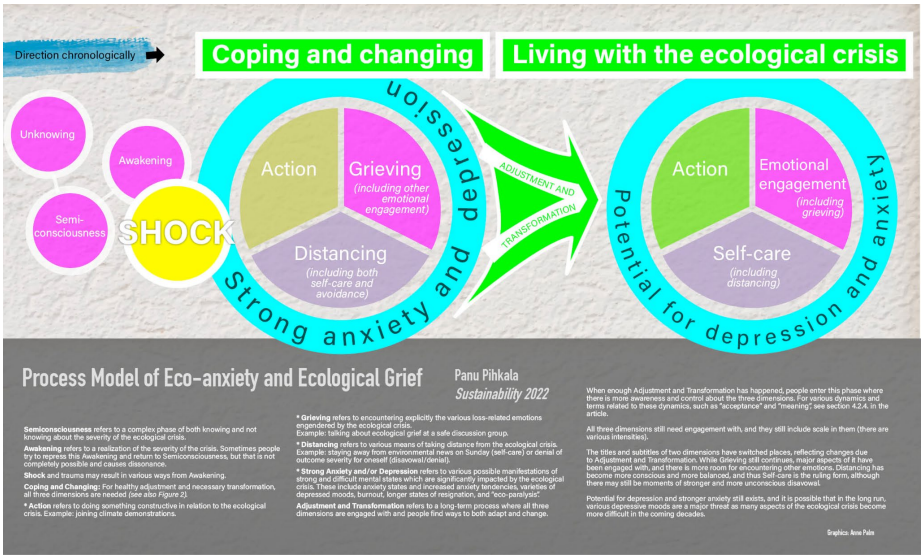
To understand eco-emotions, the following theoretical frameworks are referenced as the foundation for this literature review for contextualizing the experiences of young people. People's experiences of eco-emotions are fluid and dynamic, changing and fluctuating over time due to each person's understanding of their environment (Pihkala, 2022b). Coping with climate change and the ecological crises includes cognitive and behavioral attempts to manage internal and external demands (Agoston et al., 2024). As evidenced in Figure 3, coping is not a linear process. Rather, coping is cyclical, as Pihkala demonstrates an idea of fluctuations and oscillations in how people engage differently and nonlinearly with the coping process (Pihkala, 2022b). With nuanced and unique emotional experiences, people's coping mechanisms and processes to understanding their emotions also differs. **Figure 3** depicts the journey from strong eco-emotions being transformed into a state of awareness and engagement. This figure, and Panu Pihkala's theory, functions as the theoretical framework this literature review uses for understanding coping with ecological crises.

Pihkala's diagram illustrates how someone begins in a stage of unknowing and becomes semi-conscious of an ecological crisis (Pihkala, 2022b). The shock abruptly awakens someone to the gravity of the crisis, leading to heightened anxiety and depression (Pihkala, 2022b). Processing these emotions includes grieving, action, and distancing, where one can teeter between the different dimensions or engage in one. Grieving may include dysfunctional, paralyzing, and maladaptive levels of eco-emotions (Pihkala, 2022b). Action includes both individual and collective action with the intention of aiding in ecological efforts (Pihkala, 2022b). Distancing includes de-emphasizing, denial, avoidance, and self-care (Pihkala, 2022b). It is also often possible that an individual does not leave this cycle of maladaptation and reach transformation. Adjustment and transformation happen over time, by including more balance and awareness of how all the elements of adaptive coping may be reframed for their benefit (Pihkala, 2022b). After adjustment and transformation, eco-emotions are still prevalent but are processed in nuanced forms of previously strong emotions. Post-adjustment and transformation change an individual's experience with eco-emotions by allowing for greater control and awareness;

however, there is potential for strong eco-emotions even after the transformation process. This manifests into a larger capacity for the following:

1. Action by addressing the ecological crisis through individual and collective means.
2. Self-care by distancing oneself from the issue for personal benefit, as well as one's functionality for future emotional engagement or action.
3. Emotional engagement with better regulation of emotions while acknowledging the potential for anxiety, depression, and a spectrum of emotions.

Figure 3. Coping with an Ecological Crisis, Panu Pihkala



Ideally, young people would engage with all three dimensions in the transformative cycle, but it is possible for individuals to only engage with what is most relevant to them. With each individual's distinct coping strategy with eco-emotions, there is no linear progression from one dimension of the cycle to the next or to adjustment and transformation. As a result, the cyclical model of coping resembles Pihkala's idea of fluctuations and oscillations in coping.

Specific coping strategies fall under three categories: meaning-focused, emotion-focused, and problem-focused, as determined by research by Richard Lazarus and Susan Folkman. Maria Ojala's ethnographic study contextualizes these concepts in her findings. Meaning-focused coping is defined as activating both positive and negative emotions to inspire action [12, while emotion-focused coping, or the de-emphasization of the seriousness of climate change, decreases anxious and depressive emotions but may arise from a feeling of powerlessness (Ojala, 2012). Problem-focused coping, or searching for information about action for climate change, can both positively and negatively affect young people. Problem-focused coping can increase pro-environmental behavior (PEB), but the study's findings suggest how problem-focused coping increases negative emotions, and therefore has a negative effect on children's wellbeing (Ojala, 2012). However, other studies suggest how young people experiencing negative emotions, such as anxiety and sadness, lead to greater action (Agoston et al., 2024). These contradicting findings between studies indicate the complexities of the eco-emotional experiences and coping strategies with potential for adaptive and maladaptive behaviors in all three of

these strategies. This points to how the findings vary by context, which are key to understanding how young people process ecological crises.

When relating Ojala's findings to Pihkala's cyclical coping graphic, there is a clear connection between the different adjusted and transformed dimensions, and the three coping strategies. The action dimension aligns with meaning-focused and problem-focused coping, as environmental action stems from being inspired by emotions as well as looking for something to do in order to address an ecological crisis. Similarly, the self-care and distancing dimension aligns with the emotion-focused and problem-focused strategies. The de-emphasizing of the seriousness of an ecological crisis in addition to searching for what to do relates to the need for distancing and self-care, in order to have replenished energy and improved functionality in the future. Lastly, grieving and emotional engagement align with meaning-focused and emotion-focused coping, as experiencing the full spectrum of emotions can both inspire action and de-emphasize the gravity of an ecological crisis.

The following methodologies were used across the data represented in this literature review in order from most to least used: survey data, case studies, interviews, ethnographies, meta-analyses, and policy reports. The sources cited within this review were selected due to their discussion of eco-emotions (self-defined within studies), their analysis of young people (self-defined within each piece of literature), and their relevance. Relevance was decided upon by the authors of this study as the most recent, up-to-date understanding of the particular topic said literature discusses. Any materials not included in this literature review are due to the limitations of the researchers and not specifically excluded unless due to insufficient meeting of aforementioned criteria. The following subsections describe the specific ways young people experience eco-fear, eco-anger, eco-sadness, and eco-positivity with the various coping strategies as understood by Pihkala, Ojala, as well as Lazarus and Folkman.

RESULTS

Fear

Defining Fear and Eco-Anxiety in Young Adults and Adolescents

Fear is an emotion to protect an individual from threats and risks (Pihkala, 2022a). With ecological crises threatening people's sense of safety, eco-fear is a reaction to these ecological threats. As detailed in the Climate Emotions Wheel (Figure 2), emotions such as overwhelm, panic, powerlessness, anxiety, and worry fall under the category of fear. However, this is not a definitive list of emotions arising from fear, and instead is based on current research. As evidenced in surveys, ethnographic data, and other research, anxiety is the most extensively studied eco-emotion within the category of fear, and interacts with other emotions within and between categories in the Climate Emotions Wheel. For example, anxiety interacts closely with powerlessness, helplessness, depression, guilt, and shame ("Climate Anxiety", 2024). Because of the interactions between anxiety and other eco-emotions, its influence on different PEB suggests the complexity of fear as an eco-emotion in young adults. More generally, anxiety emerges when dealing with uncertainty and feeling a lack of safety or protection (Pihkala, 2022a; "Climate Anxiety", 2024). Therefore, anxiety is an adaptive response to a changing environment and ecological crisis ("Climate Anxiety", 2024), especially when loss and grief are at play: "If grief is not recognized, it can manifest itself as anxiety…Anxiety is borne of encountering problematic uncertainty" (Pihkala, 2020a). The interconnectedness of various emotions positions eco-anxiety as a malleable, unique emotional experience among individuals.

Young people feel increased eco-anxiety and worry, which impacts their daily lives (Hickman et al., 2021; Ágoston et al., 2024; Ogunbode et al., 2022). In determining whether adolescents experience eco-anxiety, worry is a large indicator (Léger-Goodes et al., 2022). Those experiencing the impacts of

climate change or who are concerned about the future state of the planet, particularly due to biodiversity loss and pollution, are worried in their daily lives (Léger-Goodes et al., 2022). A high level of worry contributes to eco-anxiety, hopelessness, and pessimism, which manifests as fear for the future, anger due to the need for their generation to solve ecological problems, and panic attacks (Léger-Goodes et al., 2022). Other characteristics, including identifying as female, having a strong connection to nature or land, belonging to indigenous communities, and not being satisfied with government action, are related to increased levels of worry (Léger-Goodes et al., 2022).

Environmental Stress, Climate Change Stress, and Eco-distress

While there are physical environmental stressors, such as pollution, noise, and nuclear waste, environmental stress refers to the physical and psychological stress humans undergo when exposed to such stressors (Cianconi et al., 2023). Other environmental conditions, such as housing quality, traffic congestion, and crowding, stem from both physical and social impacts that bring psychological stress (Cianconi et al., 2023). These stressors are a result of injustices and inequalities which are, "often overlooked in established attempts to address climate change that target individual behaviour change and technological solutions" (Adams, 2021). Climate change stress and eco-distress are similar: climate change stress refers specifically to climate change, and eco-distress refers to ecology as a whole. These two terms relate to a spectrum of emotions that involve the difficulties of stress without a specific diagnosis, given that emotional stress is often a healthy response to physical environmental stressors (Cianconi et al., 2023; Marks et al., 2023). Eco-sadness may be experienced in conjunction with environmental stress, climate change stress, and eco-distress, all of which, collectively or separately felt, leads to higher emotional concern (Marks et al., 2023). Young people who experience higher emotional concern will also demonstrate higher behavioral engagement, but when there is maladaptive eco-distress, there is a negative behavioral influence (Ojala, 2012). Some studies contradict this by concluding how eco-emotions can indicate high PEB, which leads to adaptive coping (Cianconi et al., 2023; Marks et al., 2023). The various eco-emotions associated with stress are felt in conjunction with eco-anxiety, eco-guilt, and eco-sadness for example, but do not have a direct correlation to one particular coping strategy. However, the interactions between other eco-emotions and stress dictate how young people engage with one or more coping strategies.

Eco-Anxiety and its Influence on Action and Pro-Environmental Behavior

Experiencing eco-anxiety relates to the observation of ecological problems and reacting to uncertainties (Pihkala, 2022b). As a result, eco-anxiety can manifest in different ways, such as through a paralyzing form that inhibits action or a practical form that inspires action and behavioral change (Pihkala, 2020b). "Practical" eco-anxiety is adaptive and causes individuals to seek new information and rethink behavioral choices, such as adopting more sustainable lifestyles (Pihkala, 2022b; Pihkala, 2020b). In contrast, "paralyzing" anxiety is maladaptive, as strong worry and concern can lead to burnout and inhibit action (Pihkala, 2022b).

The terms action and pro-environmental behavior are closely related yet distinct, which will be key in understanding how young people engage with eco-emotions. Action can be defined as the proactive and constructive undertaking of an activity to address environmental challenges, through both individual and collective means (Pihkala, 2022b). Pro-environmental behavior (PEB), on the other hand, are individual actions that reduce the negative human impact on the natural environment (Ágoston et al., 2024). As a result, all action can be considered PEB, but not all PEB is action. PEB specifically regards efforts to reduce human impact, while action is a broad term to address environmental challenges due to human and non-human impact. These terms are integral to

understanding the coping strategies for eco-emotions. However, in current studies, PEB is a term seen mostly when discussing eco-anxiety and eco-positivity, with its absence in discussions on eco-anger and eco-sadness.

Related to Ojala's problem-focused coping strategy, practical anxiety increases action and the adoption of PEB. In a study examining climate anxiety in various geographical contexts, a paper or online questionnaire was sent to 12,246 participants in 32 countries with questions ranging from mental wellbeing, environmental activism, and climate anxiety (Ogunbode et al., 2022). As a result, the study concluded that climate anxiety has a significant positive relationship with PEB and activism in 25 of the 32 countries examined (Ogunbode et al., 2022). Examples of PEB include saving energy, using public transportation, and minimizing food waste (Ogunbode et al., 2022). The study's findings support the common discourse of eco-anxiety as a motivator for action and for action to help cope with eco-anxiety. However, as described by Mary-Jayne Rust, "Taking action is frequently suggested as a helpful response to eco-anxiety, yet it may take time for the emotional responses to be unpacked and digested. If action comes too soon, from a place of 'should' rather than from the heart, this can be a recipe for burnout" (Rust, 2020, p. 62). Taking action can help alleviate eco-anxiety, but Rust indicates the complex relationship between eco-emotions and action. As Pihkala exemplifies, those ill-prepared to find a balance in managing eco-anxiety and everyday life may experience burnout due to the difficulties in finding that balance (Pihkala, 2022b). This indicates how reaching adjustment and transformation, as indicated in Figure 3, is key for sustained action and PEB.

In a study conducted by Ágoston et al., 4,685 participants in Hungary completed questionnaires about PEB, eco-anxiety, eco-guilt, and ecological grief (Ágoston et al., 2024). The study's results found that young people have a high probability of experiencing high levels of worry, moderate to high anxiety, and moderate to high guilt and grief, compared to older generations (Ágoston et al., 2024). Additionally, the study's findings of how people with higher environmental awareness or worry are seen with higher PEB directly align with other findings of how worry and eco-anxiety guide individuals toward PEB (Ágoston et al., 2024; Innocenti et al., 2023). Ágoston et al. concludes how older adults may lack the same severity in experiencing eco-emotions because of the lack of time and energy available to spend on issues outside of everyday obligations (Ágoston et al., 2024). Rather, young adults may experience greater eco-emotions and engage in PEB, due to increased exposure to the world and ecological issues (Ágoston et al., 2024).

However, contradicting findings of how eco-anxiety inhibits action and PEB reiterate how eco-emotions are unique emotional experiences to the individual. Eco-anxiety is an activating emotion, meaning the individual behaviorally tries to lessen the threat through "fight or flight" mechanisms (Stanley et al., 2021). An Australian study used surveys to understand the participants' experiences with eco-emotions (including eco-depression, eco-anxiety, and eco-anger), mental health, and pro-climate behaviors (Stanley et al., 2021). From the results, Stanley et al. concludes how anxiety inhibits and lowers collective action, while also decreasing engagement with the pro-climate movement (Stanley et al., 2021). As a result, by comparing studies from Stanley et al., Ágoston et al., Ogunbode et al., the findings suggest how the relationship between eco-anxiety and PEB ranges among individuals.

Eco-Anxiety in MAPA

Mainstream and current research on eco-emotions centers the experiences and perspectives of Western societies, though MAPA also experiences climate threats and consequences (Ogunbode et al., 2022; Reyes & Calderón, 2021). In a study examining the emotional, cognitive, and functional responses to climate change of young people around the world, MAPA expressed greater worry, while tending to be of lower socioeconomic status and being exposed to direct climate change impacts (Hickman et al.,

2021). In addition, eco-anxiety is strongly linked to PEB in individualistic societies, wealthier countries, and privileged groups, such as those with high socioeconomic status (Ogunbode et al., 2022). Acknowledging how different contextual factors allow an individual to engage in action or PEB is essential. As external factors can influence the intensity of the eco-emotions experienced, these same factors may easily allow or restrict an individual from engaging in action (Ogunbode et al., 2022; Pihkala, 2022a). For example, MAPA may be unable to engage in action or PEB due to financial constraints, political barriers, or the lack of access to knowledge or opportunities (Ogunbode et al., 2022). As a result, the eco-emotional experiences of MAPA can differ greatly from the Global North. This suggests how contextual factors shape how young people process eco-emotions, which will be expanded on in the discussion section.

Looking at the Philippines as an example, the country is highly susceptible to climate change and ecological disasters, as typhoons, extreme heat, and rising sea levels threaten the population (Bollettino et al., 2020). Though the Philippines is an understudied country for eco-emotions, 83% of the Filipino youth population is eco-anxious (Hickman et al., 2021). This high rate of eco-anxiety is correlated with increased direct exposure to ecological crises. In a study conducted to understand Filipino undergraduate students' experiences of climate change and mitigation behaviors, those who experience climate change consequences, such as typhoons and drought, also experience high levels of worrying or negative emotions, like eco-anxiety, and therefore increased climate mitigation behaviors and PEB (Simon et al., 2022).

Eco-anxiety results in complex and different emotional experiences, in which young adults' experiences with eco-anxiety can be either adaptive and maladaptive. Current research has contradicting findings, as some emphasize how eco-anxiety leads to greater PEB while others demonstrate how eco-anxiety lowers PEB. The case study from the Philippines supports how individuals in MAPA can experience eco-emotions differently from Western societies due to varying socioeconomic and cultural factors (Ogunbode et al., 2022). Further, the described studies utilize surveys that include measurements on other eco-emotions, in addition to eco-anxiety (Ágoston et al., 2024; Stanley et al., 2021). The difficulties in isolating eco-anxiety in various studies' surveys reiterates how eco-emotions are interconnected, which contributes to the holistic eco-emotional experience. As anger stems from fear (Thagard, 2018), exploring eco-anger is pivotal to further understanding eco-emotions. As a result, the next section will explore eco-anger and related eco-emotions in more detail.

Anger

Defining Eco-Anger in Young Adults and Adolescents

Utilizing the Climate Emotions Wheel from Figure 2 as a basis, the following emotions fall under the category of eco-anger: indignation, outrage, frustration, rage, betrayal, and disappointment. The truth is that anger as an emotion can include many more subcategories (Pihkala, 2022a). Moreover, anger can and often does overlap with other emotions such as fear and sadness. Pihkala, for instance, points out that "anxiety often breeds anger" (Pihkala, 2020c, p.10). In this case, anger may intersect with or be born from feelings of anxiety and grief. Similarly, anger can motivate actions that lead to positive emotions such as joy and hope (Kleres & Wettergren, 2017; Pihkala, 2020c).

However, focusing specifically on anger as a distinct eco-emotion is valuable when analyzing different eco-emotions youth are experiencing and how that affects their response to the ongoing ecological crisis. While there is rapidly growing research on the impact of eco-anxiety and eco-grief, fewer studies explore anger as an eco-emotion in and of itself. The interchangeable use of eco-anger, eco-rage, climate anger, and climate rage can also make it difficult to isolate eco-anger. Moreover, many studies conflate anger with multiple other eco-emotions such as depression, worry, and fear

(Hickman et al., 2021; Tsevreni et al., 2023; Martin et al., 2021), even though research shows that different eco-emotions have differential relationships with overall wellbeing and climate action behaviors (Stanley et al., 2021). For example, in a study examining the unique relationships between different eco-emotions and participants' experiences of depression, anxiety and stress, Stanley's research found that eco-anxiety and eco-depression correlated with increased levels of reported depression, anxiety, and stress, while eco-anger correlated to lower levels of those experiences (Stanley et al., 2021).

In addition to the relative lack of literature on eco-anger, another underlying challenge in isolating eco-anger as a distinct eco-emotion derives from how a majority of the data comes from surveys. Current quantitative and statistical analyses of eco-anger is based on self-reported surveys due to the nature of evaluating emotions, with an overrepresentation of data from Global North countries. As such, there are limitations in this paper's ability to standardize the definitions and experiences of eco-anger or to validate the statistical significance between eco-anger and action. Recognizing that eco-emotions are not felt as siloed experiences and that there is no one standardized, consistent understanding of eco-anger, this section of the paper will explore definitions of eco-anger, what population of youth are experiencing and expressing eco-anger, and the impacts of eco-anger on youth behavior.

In a study of the most relevant eco-emotion terms in the psychological and psychiatric field, Cianconi et al. compiled the following definition for eco-anger:

> *Anger at those perceived as responsible for the ecocide or at leaders and structures that failed to respond effectively to it, often accompanied by frustration and usually unleashed among those who feel they must protest and act for a change. It can be considered an adaptive response that encourages engagement in both personal and collective pro-climate behavior more than other eco-emotions, and seems to be less associated with negative effects on well-being (Cianconi et al., 2023).*

Other definitions of eco-anger are emerging, although they have not been widely adapted into mainstream literature or media. The term terrafurie, created by Australian environmental philosopher Glenn Albrecht, describes eco-anger in relation to social systems:

> *Terrafurie expresses the extreme anger unleashed within those who can clearly see the self-destructive tendencies in the current forms of industrial- technological society but feel unable to change the direction of such tierracide and ecocide. The anger is also directed at challenging the status quo in both intellectual and socio-political terms. Terrafurie is anger targeted at those who command the forces of Earth destruction. I think of it as a protective anger, not one that is aggressive (Albrecht, 2017).*

In these two definitions of eco-anger, the emotion includes a target of anger (i.e. those responsible for the ecological crisis or for not preventing its exacerbation), and involves other emotions such as frustration and helplessness. Beyond the emotion of anger, we see that eco-anger includes a dimension of targeted blame, can be experienced both collectively and individually, and is associated with a sense of self-protection or well-being.

In drawing up a taxonomy of climate emotions, Pihkala notes that anger plays a key role in many eco-emotion frameworks (Pihkala, 2022a). In the context of climate change, eco-anger has been contextualized as a moral emotion (often linked to outrage) (Pihkala, 2022a), a negative condemning emotion (feelings of betrayal) (Landmann, 2021), an emotion that is aimed both inwards and towards others (feelings of disillusion and disgust), and more (Pihkala, 2022b). As such, an important part of better comprehending different expressions of eco-anger is understanding the general sources of the

emotion. Gregersen et al. uses existing categories of anger to explore how and why eco-anger is felt in the climate space. By establishing that anger is an emotion based on "perceived injustice and to experiencing that an obstacle (someone or something) is blocking a desired goal," Gregersen outlines three main ways that eco-anger is felt: moral anger, empathetic anger, or personal anger (Gregersen et al., 2023).

1. **Moral anger**: associated with moral violations and is considered a "moral emotion." Moral emotions (such as anger, guilt, and compassion) are based in morality and can arise from events that do not directly impact oneself
2. **Empathetic anger**: a reaction to the unfair treatment of someone you care for
3. **Personal anger**: reaction to being treated unfairly.

This framework of how anger is felt can provide an important, if inconclusive, foundation to better understand later how eco-anger influences action. According to Gregersen et al., the element of targeted blame in eco-anger "is founded on a belief that the agents could have chosen to act differently" (Gregerson et al., 2023), thus providing a sense of tangible action to retaliate against. Beyond the moral sense of injustice, Gregersen identifies in instances of empathetic or personal anger, "the desire to protect one's interest and punish the perpetrator," emphasizing the protective nature of anger as a potentially adaptive response (Gregersen et al., 2023).

Ultimately, while eco-anger can be difficult to define, what has been established is that eco-anger encompasses many emotions that can fall under anger, such as betrayal and indignation. At times, these feelings of anger may overlap with eco-emotions such as anxiety, grief, and joy. Within this framework, we can delve deeper into literature that explores who is experiencing eco-anger among youth. This foundation allows us to explore how and why eco-anger is experienced, and in doing so better understand its impact on youth and climate action.

Understanding who is Feeling Eco-Anger in Youth Populations

There is no comprehensive study on how youth on a global level are experiencing eco-anger. Commonly cited barriers and limitations to conducting one include a lack of standardized understanding of eco-emotions (and more specifically eco-anger), difficulty in reaching out to and being inclusive of MAPA voices, and the ongoing rapid development of climate change impacts (Hickman et al., 2021; Martin et al., 2021). However, research studies, global surveys, and accounts from interviews have displayed patterns that this paper extrapolates from.

The first finding is that youth around the world are experiencing greater rates of eco-anger and other eco-emotions than their generational counterparts. Through a nationwide survey in Australia administered in 2016, Patrick et al. found that even though youths from 18-24 only made up 5% of the sample data, this age group made up almost 25% of people who reported feeling eco-anxiety (Patrick et al., 2019). In one Australian state, half of the youths between the ages of 15-29 reported extreme feelings of frustration, fear, sadness, and outrage, and 15% felt they could not mentally cope well with climate change (Patrick et al., 2019). In another study, younger generations in the United States more frequently reported feeling eco-anger (Swim et al., 2022); between 2010 and 2019, only younger generations (defined as GenZ and Millennials born after 1981) reported increased feelings of eco-emotions such as worry, anger, and guilt (Swim et al., 2022).

The second finding has to do with how eco-anger is felt and expressed differently across youth groups. A thesis in 2022 explored how eco-anger is felt by youth climate activists in the Global North by observing eco-emotions in youth from the Netherlands who participated in Fridays for Future (FFFN), a

youth-led movement that began in August 2018 after Greta Thunberg and other young activists sat in front of the Swedish parliament to protest against the lack of action on the climate crisis (Moes, 2022). Anger was a common emotion widely shared among the participants. One of the prevalent reasons for anger among all youth participants in the report was, "being angry about the inaction of the government, older generations and large polluting companies and their contribution to the climate crisis." This anger is aimed at both individual and structural targets.

For example, Julia, one of the students involved in FFFN, specifically placed blame on the national government of the Netherlands: "I would really like to have a better climate agreement in the Netherlands and a government that actually gives a shit about fighting climate change. So, my hope is really that motions will be taken and laws will be adjusted by the new formation, which can actually bring about systemic change nationally" (Moes, 2022). Another participant, Floris, said, "the anger is mostly towards people who can do something or could have done something about this, but have done nothing for so long. And also that still too little is happening. It is also a kind of anger [toward] the system and capitalism. That nature is being exploited for money. I can get very angry about that (Moes, 2022)." There is a moral element to their anger as well, fueled by recognition that it is important to protect the rights of MAPA because "these are mostly countries of the global South who thus have a small ecological footprint and are the first victims and cannot defend themselves." In addition to anger about climate change impacts and inaction, FFFN members also expressed anger at not being heard and feeling like the government does not care about them. In some cases, this has shifted their focus of action outside of political engagement. One student, Mila, explained, "Since I strongly feel [the government] does not listen, I would really like it if it would become the social norm to be climate friendly" (Moes, 2022).

A global survey by Hickman et al. broadens the scope of youth eco-emotions by looking at a range of eco-emotions among youth (defined as ages 16-25) from 10 different countries: Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the UK, and the USA (Hickman et al., 2021). While the study focused on "climate anxiety," other emotions such as anger, worry, and fear were also included based on participant responses. One trend this study demonstrated was the difference in breadth and intensity between eco-emotions being experienced by youth from countries in the Global North and MAPA. The countries that reported the most youth feeling "extremely worried" or "very worried" were, in order from greatest to least: the Philippines, India, Brazil, Portugal, France, Australia, Nigeria, the UK, the USA, and Finland. These statistics are clearly tied to direct climate change impacts (Hickman et al., 2021). Youth from the top three countries reporting the greatest levels of worry also reported the highest rates of climate change having a negative impact on their ability to function on a day-to-day basis, with both the Philippines and India scoring a 74 out of 100 (Hickman et al., 2021).

It is important to note that this pattern does not apply to all countries. Portugal, for instance, scored higher in youths feeling "extremely" or "very" worried than Nigeria did, even though almost double the number of Nigerian youths in the survey reported climate change impacting their ability to function compared to Portuguese youth (Hickman et al., 2021). This could be due to a lack of distinction between different eco-emotions in the survey or variations of climate experiences within the same country. As Hickman et al., reports, "Limitations of this study include the use of non-standardised measures to investigate the experience of climate anxiety… The construct of climate anxiety itself is new and complex, with varying definitions across the literature." While this study's definition of climate anxiety does not explicitly look at eco-anger, the data provides an important understanding of how eco-emotions, including anger, disproportionately impact MAPA communities based on the correlation of climate anxiety and direct climate impact.

Another report conducted through qualitative interviews with climate activists from Denmark, Sweden, and the UNFCCC Conferences of Youth explores a distinction between how eco-anger is processed both individually and collectively among activists in the Global North and MAPA. Kleres and Wettergren found that eco-anger is treated more cautiously by activists in the Global North as an emotion to be pacified or transformed, with a narrative that rejects guilt and blaming (Kleres & Wettergren, 2017). According to one youth activist: "[When] we talk about climate change, it's always negative like 'oh no this is bad oh don't choose your car it's so bad.' […] There are other ways to talk about it and I think we have to show how to contribute in this positive talk about it" (Kleres & Wettergren, 2017).

Activists from MAPA, in comparison, have a different approach. Eco-anger was identified as one of the emotions utilized in conjunction with hope and guilt to manage acute fear felt by individuals participating in the Conference of Youth. One interviewee shared, "...Since [the Global North] contributes [to climate change] they should [pay] developing countries, because we don't have the resources we don't have what it takes to adapt…" (Kleres & Wettergren, 2017). Another participant shared,

> *"We don't stop, activists don't stop, we keep going we keep going, that's activism, you won't stop until you [achieve the mission] so we'll keep going […] We want to see the change in this [area, and] we want to stop climate change and we need climate justice, so why should I stop, considering where I came from?" (Kleres & Wettergren, 2017).*

In both of these narratives is a tone of fear, but also anger towards the perceived perpetrators of the crisis to take responsibility. The first quote directly states what actions the Global North should do in relation to what MAPA are unable to do themselves. In the second quote, emotions such as anger fuel a need for action while referencing unfair circumstances due to geographic location and background. Based on these interviews, Kleres and Wettergren argue that "hope and action are tightly tied to one another and energized by anger at the (guilty) other" (Kleres & Wettergren, 2017).

It is worth mentioning that a few generational studies of eco-emotions in Global North countries (the U.S. and Norway) have shown that anger is less prevalent than some other eco-emotions (Gregersen et al., 2023; Swim et al., 2022). While younger people in the U.S. experience greater degrees of worry, anger, and guilt about climate change compared to their older counterparts, in 2019, youth were also reporting more substantial rates of worry compared to guilt and anger (Swim et al., 2022). A study among the Norwegian population also showed that eco-anger was ranked second-to-last among a range of eco-emotions Norwegian residents reported feeling, with only guilt ranking lower (Gregersen et al., 2023). While this study does not specifically focus on youth and in fact only surveys residents older than 18, it still provides valuable context of dominant eco-emotions, especially as a recent report indicated that Norwegians "worry about climate change but typically consider it to be a distant global problem that could be solved by technological solutions" (Gregersen et al., 2023). This mindset indicates that "anger" as felt in many Global North countries is a moral emotion based on a perceived injustice rather than personal anger, and that this emotion is experienced less among younger people compared to non-moral emotions such as eco-sadness and eco-anxiety.

Eco-Anger and its Impact on Youth and Youth Behaviors

Eco-anger is often conflated with other emotions such as eco-grief and eco-anxiety. However, research has shown that eco-anger can have a very different impact on youth behavior than eco-fear or eco-grief. While there is no hard consensus, the existing literature and research indicates many similar

patterns that will be explored in this section: that eco-anger can be a catalyst for taking action, but can also be expressed in ways that are maladaptive.

Eco-Anger Can Be Key for Action

A study based in Australia explores how eco-emotions are related to mental health outcomes (Stanley et al., 2021). One of the factors influencing outcomes is activation and deactivation, or "how much an emotion energizes or inhibits action" (Stanley et al., 2021). According to the study, deactivating emotions tend to lead to disengagement from a perceived threat, while more activating emotions are correlated with behavior that works to lessen the threat, either by approaching or avoiding the situation (i.e., fight or flight). By surveying and analyzing participants' eco-emotions and self-reported action, Stanley et al.'s research found general patterns of how eco-anger, eco-depression/grief, and eco-anxiety are related to mental health outcomes, measured through depression, anxiety, and stress levels.

On its own, each eco-emotion appeared to contribute to lower wellbeing and greater action (Stanley et al., 2021). However, when analyzed together, these results change. In observing the impact of a single eco-emotion by holding the results of the other two emotions constant, eco-anxiety and eco-depression were found to have negative effects on wellbeing, while eco-anger predicted lower depression, anxiety, and stress (Stanley et al., 2021). Moreover, eco-anger was the only significant predictor of action, suggesting that "more intense experiences of frustration and anger in relation to climate change are associated with greater attempts to take personal actions to address the issue," (Stanley et al., 2021). Finally, eco-anger correlated strongly with greater engagement in collective action.

Another research by Gregersen et al., which studies the relationship between anger and climate change engagement among the Norwegian public, found that out of all the eco-emotions, eco-anger was the strongest emotional predictor of climate activism (e.g. attending a protest) and policy support, while other eco-emotions were stronger predictors for changing individual behavior (Gregersen et al., 2023). However, Gregersen et al. mentions other research that demonstrates how eco-anger is connected to individual action (e.g., turning off lights and using public transport) but not directly related to climate change policy support. The study also indicated that not all types of anger in the study correlated with all kinds of engagement. Eco-anger as a result of human qualities (e.g. selfishness) and human actions (or the lack of) led to climate change engagement, while referring to responsible external actors did not lead to any specific outcomes of action (Gregersen et al., 2023). Overall, individuals who exhibited stronger intentions to engage in climate action, whether through individual behavior, policy support, or activism, reported greater indicators of eco-anger (Gregersen et al., 2023). While the relationship between anger and climate change engagement is not definite and at times contradictory, it is clear that anger plays a defining role in motivating action. In this sense, anger can be understood to contribute to meaning-focused coping, or an emotion that inspires action (Ojala, 2012).

Other case studies demonstrate more qualitatively how eco-anger plays a key role in youths who are already participating in climate action. One study explores how eco-emotions from youth participating in FFFN manifest and shape social climate movements for climate action. Repeatedly, anger is mentioned to be the main driver of FFFN, with multiple participants mentioning that feeling angry or disappointed was a good motivator for action (Moes, 2022). As Sophie, one of the student participants of FFFN, stated: "we are very angry. We are not understood" (Moes, 2022). According to the study, "it is not only their voices and opinions that are not heard, but also their feelings of eco-anxiety and fear about the future that is not taken seriously by the people in power, which makes them even more angry" (Moes, 2022). Another student explained that "she turns to activism when feeling

angry or disappointed as a result of bad climate news, and how this creates the urge to immediately want to do something about it," (Moes, 2022).

Through these interviews, several forms of anger are demonstrated—moral anger for systems that lead to climate change impacts, and a sense of empathetic and personal anger for their own eco-emotions being dismissed. In this way, anger is connected to several different eco-emotions, such as powerlessness, frustration, and anxiety (Moes, 2022). In the case of FFFN, young people from the Global North experience and express eco-anger towards their politicians as a meaning-focused coping mechanism to urge change.

It is important to note that almost all of these studies take place in Global North countries (Australia, Norway, the Netherlands, etc.) and as such are less likely to be from MAPA perspectives (Moes, 2022; Gregersen et al., 2023; Patrick et al., 2019). Many of these studies (Landmann, 2021; Gregersen et al., 2023; Swim et al., 2022) also do not focus specifically on youth, and as such may be skewed in representing youth opinions. Moreover, the eco-anger measured by Gregersen's study, which predicts climate action, may only reflect moral anger rather than empathetic or personal anger. This aligns with Kleres and Wettergren's research on different approaches to eco-anger between youth from Global North countries and MAPA. Kleres and Wettergren indicate that anger at external actors responsible for the ecological crisis drives both hope and action, and that "hope in these southern narratives lies in the power ascribed to the other/north to do something, and arguably in their own albeit limited capacity to enforce this. Hope and action are tightly tied to one another and energized by anger at the (guilty) other" (Kleres & Wettergren, 2017). Interviews from youth from the Global South participating in the Conference of Youth (COY) further reflect this:

> *The only solution I have for now is [to] engage in activism cause I don't have the money to like work on climate change activities, so for now the only solution is to engage in activism. If I speak out if I work as a team with others we can [yield] something, like for example here at COY (Kleres & Wettergren, 2017).*

The sense of fear from the interviewee is present and accompanied by an eco-anger that falls more in the category of empathetic and personal anger at those whom the activists feel they need to speak out against. According to Kleres and Wettergren, this sense of fear is managed by placing responsibility for the situation in the North, thus giving rise to anger and an imperative need for collective action (Kleres & Wettergren, 2017).

Based on the above case studies and research, it is evident that eco-anger plays a key role in climate action, even though the relationship between the two is not fully clear. This is made even more difficult to define when we further disaggregate how eco-anger relates to action. However, there is a broad consensus that eco-anger is tied to climate action, whether on a collective or individual level. Moreover, most in-depth research on eco-anger's prediction of action has been conducted in Global North countries, while preliminary and broader research that includes MAPA voices seems to indicate that eco-anger is a key component of collective organizing and action.

The relative lack of MAPA perspectives on eco-anger in comparison to data from the Global North suggests that how eco-anger is experienced, demonstrated, and reported by MAPA youth is underrepresented in the existing literature. As such, there is a need for more research to be conducted that is actively inclusive of diverse geographical and cultural perspectives in exploring the link between eco-anger and action. Through a more inclusive outreach methodology, there is an opportunity to research and explore the causes of eco-anger and how it is experienced, whether as a moral, empathetic, or personal emotion, or even aimed inwards at one's self (Gregersen et al., 2023; Kleres &

Wettergren, 2017). While not under the purview of this literature research, doing so could lead to important insights into how eco-anger plays a role in public outreach, policy-making, and climate change engagement.

Eco-Anger Can be Maladaptive

In social movements, feeling continuous anger over a long period of time can lead to burnout, overwhelming feelings of guilt, and internal conflicts that lead to the decline of a movement (Kleres & Wettergren, 2017). Self-directed anger is also a form of eco-anger that is similar to emotions such as shame and guilt. While Kleres and Wettergren use a case study in the Animal Rights Movement to demonstrate how combining guilt and anger can act as a powerful driver of movements and solidarity, self-directed anger has been shown to have less effective outcomes as well (Kleres & Wettergren, 2017). Self-directed anger has been related to withdrawal from social movements (Ellsworth & Tong), while anger aimed at an unfairly advantaged in-group (such as politicians of the country you reside in) has led to a desire for compensation and self-correction (Gregersen et al., 2023). Eco-anger can also result in maladaptive or avoidant behavior when the emotion is paired and reinforced with a sense of helplessness and lack of efficacy. Gregersen et al.'s study reveals that while anger is positively correlated with action, people who reported feeling angry due largely to a lack of control did not exhibit any trends towards climate change engagement (Gregersen et al., 2023).

A telling example of when eco-anger can be either adaptive and maladaptive is through a pattern recorded by a FFFN member, who shared that in the face of lack of progress in FFFN's goals, members either start participating in more extreme forms of climate activism or simply quit (Moes, 2022). These demotivational feelings are in response to perceived lack of progress or continuous setbacks. According to Sophie, an FFFN participant, that is why it was important for her to focus on local victories, because "trying to reach [FFFN's] goals on national level feels like they are not getting any closer and she therefore feels quite hopeless" (Moes, 2022) whereas she has maintained some optimism in their achievements on the local level (Moes, 2022).

It is valuable to consider how self-directed anger and lack of efficacy are connected and can result in maladaptive outcomes, such as personal withdrawal and disengagement from climate actions with no immediate plans for re-engagement. One study describes the importance of understanding how one's "sphere of influence" can help ground actions and contextualize the potential and limitations of one's agency, while encouraging feelings of pride and satisfaction in one's environmental efforts (Coppola & Pihkala, 2023). Coppola and Pihkala argue that not establishing one's spheres of influence can lead to self-directed anger at the lack of agency or to a sense that one's efforts do not result in change, contributing to a feeling of helplessness (Coppola & Pihkala, 2023). Gregersen et al. also notes that self-directed anger shares similarities with shame and guilt, and has been related to withdrawal (Gregersen et al., 2023). As climate anger has been related to moral anger (Pihkala, 2022a), self-directed anger may be perceived as a personal failing of morals, and in this way have a strong connection to eco-sadness. Coppola and Pihkala thus caution against an overly individualized approach to climate change that puts the onus of responsibility on the individual. This can result in constant self-directed anger that easily leads to feelings of inadequacy, burnout, and cynicism (Coppola & Pihkala, 2023).

On the other hand, Gregersen also states that self-directed anger, when aimed at an unfairly advantaged in-group (e.g., recognizing the privileges of the group you are in) can lead to "a wish for compensation and self-correction" (Gregersen et al., 2023). Coppola and Pihkala call for a similar framework to avoid maladaptive expressions of eco-anger, stating:

We suggest that there is a possibility of collectivizing feelings of inadequacy in order to relieve some of the individual burdens felt by these active participants. This could help in strengthening the

empowering emotional impacts of climate activism, which have also been often noted in studies about young climate activists (Coppola & Pihkala, 2023).

These different expressions of anger reflect further nuances in Pihkala's coping mechanism model (*Figure 3*), demonstrating how anger, cynicism, shame, hope, and other emotions are part of an ongoing process in coping with eco-emotions. Several factors can impact how self-directed anger is experienced, from being aimed inward as an individual or more outwardly to a collective group one belongs to (Gregersen et al., 2023; Coppola & Pihkala, 2023). Understanding how eco-anger can be maladaptive and achieving a balance between self-directed anger, feelings of efficacy, and identifying one's sphere of influence can play a key role in fostering engagement and avoiding maladaptive outcomes of eco-anger. As such, this paper highlights the need for more research to understand the nuances of eco-anger, especially among MAPA groups.

A final note on eco-anger is that, as mentioned above, there is a particularly strong correlation between eco-anger and eco-sadness, frequently expressed as shame, guilt, paralysis, and other emotions (Martin et al., 2021; Gregersen et al., 2023). As eco-sadness has its own unique set of outcomes in youth mental health, it is important to consider how sadness and anger interact to influence behavior.

Sadness

Eco-sadness, which may be experienced as eco-depression, eco-grief, etc., does not necessarily have to be processed in maladaptive ways. In fact, eco-sadness is an important aspect of processing ecological loss and can go hand in hand with eco-joy. Eco-sadness is an aspect of eco-grief, which involves coping and changing as we live in ecological crises (Cianconi et al., 2023). "Grief and sadness arise out of caring," in other words, eco-sadness and eco-emotions arise in individuals that are aware of environmental impacts (Marks et al., 2023). Utilizing the Climate Emotions Wheel from Figure 2 as a basis, the following emotions fall under the category of eco-sadness: Eco-shame, Eco-guilt, Environmental Melancholia, Environmental Grief or Climate Grief or Ecological Grief, Climate-related Despair or Environmental Despair or Eco-despair, Climate Depression or Eco-depression, Eco-nostalgia, Solastalgia, and Ecological Trauma or Environmental Trauma or Climate Trauma or Climate-related Trauma or Eco-trauma and Eco-PTSD and Climate-related Pre-traumatic Stress Disorder (Pre-TSS) (Cianconi et al., 2023).

Eco-guilt and Eco-shame

Eco-guilt and eco-shame are intertwined because maladaptive levels of eco-guilt lead to eco-shame. Eco-guilt refers to the realization that one's potentially negative environmental behavior defies a personal or social standard, while eco-shame means that one rationalizes their negative environmental behavior as a character flaw, as opposed to an instance (Mallett, 2012). Eco-guilt, often linked to eco-anxiety (Cianconi et al., 2023), leads individuals to increased levels of action, while eco-shame leads to denial and decreased levels of action (Mallett, 2012). Eco-guilt is negatively correlated with age, so young people experience greater levels of eco-guilt in comparison to older generations, thus supporting the understanding that young people feel greater levels of eco-anxiety as a result of eco-guilt (Ojala, 2012). Maria Ojala's study on coping strategies for a changing climate described how, "problem-solving strategies were positively related to both stress and measures of pro-environmental behavior, while an emotion-focused strategy in the form of denial of guilt was negatively associated with stress and pro-environmental behavior" (Ojala, 2012). Meanwhile, eco-psychotherapist Mary-Jane Rust explains that environmental action that stems from eco-guilt will be more likely to lead to burnout (Rust, 2020). When eco-guilt leads to eco-shame, it prevents the process of eco-grief, which is necessary for personal

and collective coping with loss (Rust, 2020).

To understand how adaptive and maladaptive eco-guilt manifests, some scholars have identified eight different types of eco-guilt (Agoston et al., 2022). The following two types of eco-guilt are experienced adaptively due to mentions of eco-friendly behavior and sense: Prophetic individual responsibility and Self-criticism, self-examination, self-blame (Agoston et al., 2022). Prophetic individual responsibility includes recognizing humanity's or one's environmental impact, while self-criticism, self-examination, and self-blame not only recognize the impact, but assign negative consequences to that realization (Agoston et al., 2022). Individuals that exhibit these forms of eco-guilt are linked to higher levels of action (Agoston et al., 2022). The other six are considered to be maladaptive: guilt/individual responsibility criticism, dissatisfaction with one's own actions, feeling guilty about one's past, system maintenance guilt, dilemma of harm, and guilt for one's existence (Agoston et al., 2022). Guilt/individual responsibility criticism refers to individuals that do not see eco-guilt as a motivator for action, but rather believe that individuals have the responsibility to pressure companies to take responsibility for their actions (Agoston et al., 2022). Dissatisfaction with one's actions are those who focus on their negative emotions and are not linked to increased engagement with action (Agoston et al., 2022). Feeling guilt about one's past is found in individuals that do not feel their PEB makes any impact, causing them to focus on their negative emotions (Agoston et al., 2022). System maintenance guilt refers to individuals that internalize learned helplessness where they identify the systems in power as "bad," but they participate in this system with no control over making it "better" (Agoston et al., 2022). Dilemma of harm, similar to eco-paralysis, refers to when individuals are unable to identify if their actions are positive or negative environmental behavior (Agoston et al., 2022). Finally, guilt for one's existence, or eco-shame, means an individual considers their personhood to be pointless and harmful to the environment (Agoston et al., 2022). These six forms of eco-guilt and eco-shame are considered maladaptive (Agoston et al., 2022), and do not link individuals to increased levels of action or adaptive means of coping.

Climate Grief, Melancholia, and Solastalgia

Eco-grief, environmental melancholia, eco-nostalgia, and solastalgia are similar to eco-guilt and eco-shame in the sense that they are emotions focused on the past, but each of the former is less centered on the self and more concerned with the planet, ecology, and environment. Environmental grief, climate grief, and ecological grief may be experienced in three climate-related ways, with the first one being (Cianconi et al., 2023):

> *[Association] with loss of environmental knowledge and identity, especially when personal and collective understanding of self-identity are constructed in relation to the land (ie, for people who retain close living and working relationships with the natural world), and when they are no longer confident in their traditional ecological knowledge which is getting lost, along with a cultural system that was passed through generations, possibly accompanied by sense of failure, responsibility, guilt, and self-blame because of the inability to prevent the loss (Cianconi et al., 2023).*

Sheila Watt-Cloutier, Inuit Circumpolar Council's former chair and Cochran's predecessor as the international chair, speaks about Inuit youth and brings to light their grief which aligns with this understanding: "I think that some people have not fully come to understand that there is no disconnect between the suicide rates in our communities and climate change. There is no disconnect there. Environmental issues–it's all connected" (Callison, 2015, p. 49). This grief manifests for Inuit youth as a loss of connection to not just their environment, but their traditions, culture, and way of life. With the

climatic changes impacting their ability to hunt, they cannot come of age in the same way generations prior have, which impacts their identity, knowledge, and mental health (Callison, 2015, p. 49). This form of grief relates heavily to complicated grief, which is often experienced with anxiety, depression, and adjustment disorders, and is understood as intense, unresolved, and debilitating (Pihkala, 2024). Grief over loss of environmental knowledge and identity is not exclusively tied to the Inuit community and is part of a larger discussion of eco-grief among various indigenous populations around the world.

There is also grief related to physical ecological loss that typically occurs after a disaster, crisis, or ecological change, but is proportional to the assigned value of said ecological loss (Cianconi et al., 2023). This term has also been understood as bereavement-like grief where a disaster that has been linked to climate change impacts an individual or collective (Pihkala, 2020a). This form of grief, as well as others, may be felt with strong intensity or in milder forms; the intensity is dependent upon the other emotions felt in conjunction with grief (Pihkala, 2022b). Stress, anxiety, and anger are eco-emotions tied to eco-grief and may lead to the intensification of eco-grief (Adama, 2021). In MAPA where people are exposed to multiple ecological disasters at a time, eco-grief may be experienced maladaptively, preventing individuals from coping (Cianconi et al., 2023). On the other hand, just as eco-anxiety is considered “practical” (Pihkala, 2020b), eco-grief in response to ecological loss is reasonable and can motivate action (Cianconi et al., 2023).

The third and final understanding of the grief is anticipated future loss including ecological, environmental, cultural, and physical well-being (Cianconi et al., 2023). This grief stems from previous experiences and projected future change (Cianconi et al., 2023). This loss is often tied to a sense of individualized consequence, not only related to one’s own future, but to the knowledge that future generations will experience loss due to the actions of current generations (Marks et al., 2023). Grief concerning anticipated future loss also relates to chronic sorrow, the understanding that humans will continue to process loss as climate change continues to affect loss (Pihkala, 2024). This grief stems from anticipatory anxiety, anxiety for a changing future, and develops acutely and chronically, which is likely to increase in younger generations over time (Mallett, 2012). What challenges young people who experience anticipatory grief, especially climate grief, is that the loss is ongoing, with no concrete end. To navigate this, William Worden and Thoms Attig suggest that “relearning the world” reframes grief as a way to process and help young people adjust…[and] to start this process requires naming these emotions and emotionally engaging with them and with others to build emotional resilience (Pihkala, 2020a). This understanding of grief combats disenfranchised grief, or grief that has been deemed socially unacceptable, which results in maladaptive coping (Cianconi et al., 2023). There is insufficient data to determine which demographics are more likely to experience the various kinds of grief.

Grief may also be experienced under four frameworks tied to ecological loss, not just climate-related loss, which include: tangible/intangible loss, ambiguous loss, nonfinite loss and shattered assumptions (Pihkala, 2024). These frameworks overlap with some of the information detailed above, such as tangible and intangible loss equating to loss of environmental knowledge and identity, but may also include loss of connection to others, social status, intrapsychic, system, meaning, faith, or hope Pihkala, 2024). While these losses may be more intangible and primarily felt by younger generations, there are also similarly tangible losses more often felt by older generations, such as material, functional, role, and relational (Pihkala, 2024). Ambiguous loss, which may intersect with tangible and intangible loss, refers to uncertainty as related to loss, whether that is uncertainty of loss as a whole or in parts (Pihkala, 2024). Nonfinite loss closely relates to intangible loss and distress, given that this type of loss is concerned with continually living with loss and is considered global ecological grief (Pihkala, 2024). Finally, shattered assumptions loss refers to processing the loss related to one’s comprehension of the

world (Pihkala, 2024). These various forms of loss relate to not only understandings of grief, but to environmental melancholia, eco-nostalgia, and solastalgia as well.

Environmental melancholia refers to melancholy related to "non-human" loss, such as natural elements and settings (Cianconi et al., 2023). This emotion prevents individuals from engaging with protest, anger, care, and concern because apathy conceals the ability to critically emotionally engage (Cianconi et al., 2023). Eco-nostalgia, similarly experienced as melancholy, refers to a person's desire to return to a biophysical location that has been altered due to physical loss or climate change (Cianconi et al., 2023). Finally, solastalgia (combination of solace, nostalgia, and desolation) refers to a person's distress and grief as a result of climatic or human-caused degradation upon one's home (Cianconi et al., 2023). Glenn Albertch was the first scholar to coin this term, and described it as homesickness due to environmental change (Pihkala, 2020a). Solastalgic individuals report feeling betrayed and disillusioned (Pihkala, 2022a). The potential for these emotions to be experienced in their maladaptive or adaptive forms relates to whether grief is felt maladaptively or adaptively (Pihkala, 2024). There is insufficient data to determine which demographics are more likely to experience the various forms of melancholy. Solastalgia, the more common term out of the three, is sometimes interpreted as eco-anxiety (Pihkala, 2022a). To better understand the emotional and psychological mechanisms that lead to these eco-emotions researcher Panu Pihkala claims, "[The] distinction of these emotions are valuable, the interchangeability of the terms stem from the interconnected nature of the emotional experience. "We need more vocabulary of the various forms of climate grief, and we need more thinking about the tasks and stages of grief in relation to them" (Pihkala, 2020a, p. 3). To understand therapeutic approaches to addressing these eco-emotions, please reference the resources listed in the conclusion.

Climate-related Despair

The eco-emotions related to despair overlap with climate and eco-depression, but the differences between them are key. The various forms of despair are closely tied to the process of grief [35], since emotions such as solastalgia are reported to be felt as despair (Mallett, 2012; Cunsolo & Ellis, 2018). While grief has also been reported to be experienced with depression (Pihkala, 2024), despair appeared more often in explanations and definitions of eco-grief, environmental grief, and climate grief. Regardless of whether the despair is tied to the climate, one's environment, and/or ecology, the symptoms of emptiness, loss, and meaninglessness are tied to the respective subject (Cianconi et al., 2023). Those that experience eco-emotions of despair do not typically feel guilt, self-loathing, and worthlessness and are able to feel joy about other topics (Cianconi et al., 2023). However, there are scholars that disagree, and report climate and eco-depression to be felt in conjunction with guilt, shame, and powerful despair (Pihkala, 2022a). This is because despair as a "mood", or short-term experience of an emotion, is linked to depression, while despair as a feeling may be a motivator for action (Pihkala, 2022a). In fact, young people who regularly engage in action, such as climate activists, report feeling strong despair (Pihkala, 2022a). Collective emotional engagement has been proven to lower levels of climate-related despair in young people (Marks et al., 2023). To combat eco-emotions of despair and anxiety, scholars Doherty and Clayton suggest coping strategies that are aimed at "personal renewal" or action and emotion focused work (Pihkala, 2022b). Other scholars such as William Worden offer other frameworks of grief that indicate despair as a necessary step towards re-organization, recovery, and empowerment (Pihkala, 2022b). In fact, despair replaces depression in this model (Pihkala, 2022b), to address the debilitating nature of clinical depression (Cianconi et al., 2023). Additional research regarding this eco-emotion may include how despair manifests differently in individuals depending on their emotional engagement with ecological issues.

Climate and eco-depression may stem from clinical depression since the experience of nature loss and human destruction have a possibility to manifest as this psychological struggle (Cianconi et al., 2023). It is important to note that the study of climate and eco-depression is relatively recent (Pihkala, 2020a), within the last twenty years. Feelings of sadness, emotional pain, overwhelm, grief, intense sorrow, and tearfulness are common even if the climate and/or eco-depression is not clinical (Cianconi et al., 2023). Scholars also report feelings of low-self esteem and inadequacy as intertwined with guilt and shame as related to depression within their research (Pihkala, 2022a). Eco-depression is considered deactivating or action-inhibiting, and contributes to or co-occurs with poor mental health (Stanley et al., 2021). This is especially true when depression is experienced over long periods of time, as opposed to just experiencing depressive feelings over certain periods of time (Pihkala, 2022a). When eco-depression is felt with eco-anxiety, it is considered debilitating (Stanley et al., 2021). Those who experience adaptive levels of climate and eco-depression are more likely to engage in collective action behaviors (Latkin et al., 2022). Being outside, specifically in nature, green spaces, and natural light, has been shown to help with mild to moderate depression through stress reduction, body-mind relaxation, and affect regulation (Rust, 2020). Mary Jane-Rust describes various clients that owe their emotional wellbeing to their relationship with green spaces (Rust, 2020). As previously mentioned, in all forms of coping (distancing, denial, action, and emotional engagement), there is potential for strong levels of anxiety and depression (Pihkala, 2022b). These intense experiences of eco-anxiety and eco-depression have potential for burnout, especially when exclusively engaging in action, as opposed to other dimensions of coping (Pihkala, 2022a). Scholars, such as Panu Pihkala, note that eco-depression and climate depression should be studied further to gain deeper understandings of these experiences and terms (Pihkala, 2022a).

Climate-related Trauma

To understand ecological, environmental, climate, climate-related, and eco-trauma, there must be a clear understanding of the current research on trauma, the best definition of this term, and how it impacts the brain's and body's responses. Trauma, as defined by the American Psychological Association, is an emotional response to an event (e.g. accident, natural disaster, etc.) with typical immediate responses being shock and denial and long term responses being unpredictable emotions, flashbacks, strained relationships, and physical symptoms (e.g. headaches, nausea, etc.) (American Psychological Association, 2023). However, trauma has also been described by Bessel A. van der Kolk as psychological, emotional, and physical responses and changes, such as increase stress hormone activity, recalibration of the brain's nervous system, alterations in how the brain filters relevant and irrelevant information, physical and embodied hypervigilant feelings, capacity for joy and intimacy, and even biological and immunological responses (Van der Kolk, 2024, p. 1-3). Trauma induces a form of "inescapable shock" which means that once a person experiences trauma, they are less likely to experiment with options to heal from the fear produced by the traumatic event (Van der Kolk, 2024, p. 30). This shock stems from the brain's reaction to trauma (Van der Kolk, 2024, p. 42). Even years after a traumatic event, the brain activates the fear center, or the amygdala, which triggers stress hormones, nerve impulses, elevated blood pressure, heart rate, and oxygen intake when reminded of a traumatic event (Van der Kolk, 2024, p. 42). The implications of how trauma impacts and changes an individual's body and mind are under-reported in scientific literature related to ecological, environmental, climate, and climate-related trauma, PTSD, and Pre-TSS.

As previously mentioned, trauma can result from events such as natural disasters, which is where environmental, ecological, and eco-trauma can come from acute stress disorders and PTSD (Cianconi et al., 2023). Similar to other forms of trauma, this can cause an individual to be hypervigilant,

extremely sensitive, etc. to reminders of said traumatic event (Cianconi et al., 2023). Climate trauma, climate-related trauma, and climate-related pre-traumatic stress disorder present a new challenge, since the climate crisis is ongoing, so is the experience of trauma (Cianconi et al., 2023). Since the climate crisis is an issue that extends over generations, collective trauma or the trauma experienced by groups of people, has been found to impact younger generations and their ability to process the climate crisis (Pihkala, 2024). "The traumas of previous generations can alter current generations' expressions of DNA that manifest as certain health issues, anxieties, PTSD, and more, which means that what an individual feels at the level of the self may be a result of collective traumas inherited from generations prior" (Souza, 2024). Climate trauma does not leave sufficient time for recovery, reflection, and healing (Cianconi et al., 2023), thus resulting in these long-term consequences. Processing these forms of trauma are likely to include self-isolating behavior with strong levels of depression, anxiety, guilt, sadness, grief, and anger (Pihkala, 2022a). Pre-traumatic stress disorder stems from shattered assumptions and anticipatory emotions, thoughts, and mental states that have similar symptoms of PTSD (eg. flashforwards, nightmares, fear-induced dissociations, etc.) (Cianconi et al., 2023) This disorder is most commonly found among young people, women, indigenous populations, and MAPA as a whole (Cianconi et al., 2023). Collective trauma is specifically found among MAPA (Voşki et al., 2023), but is under-studied across current scientific literature. Grief and anger are also found among MAPA, with anger being an under-researched emotion stemming from Eco-PTSD (Voşki et al., 2023). To better comprehend these forms of trauma, researchers call for the study of traumatic grief (the connection between trauma and grief), chronic sorrow, nonfinite loss, and complicated grief (Mallett, 2012).

Many experts call for more research regarding trauma to better understand its impacts on individuals and collectives (Pihkala, 2024), especially post-traumatic stress from natural disasters (Voşki et al., 2023). "Most scholars discuss trauma reactions as one possible aspect of the process, while some scholars link the whole process strongly with trauma" (Pihkala, 2022b). Some scholars even cite the possibility of post-traumatic growth, or the ability to develop resiliency as a result of processing climate and ecological trauma (Pihkala, 2022b). Eco-psychological experts such as Mary-Jane Rust and Linda Buzzell-Saltzman offer therapeutic practices that address the complex emotional landscape, but additional community-orientated solutions are necessary for various groups with varying needs to cope with ecological crises. As humans, and especially young people, continue to grow and process ecological crises, there must be a continued awareness of how to hold space for eco-sadness and its related mental states and the other eco-emotions, such as positivity.

Positivity

Utilizing the Climate Emotions Wheel from Figure 2 as a basis, the following emotions fall under the category of eco-positivity: interest, empowerment, inspiration, empathy, gratitude, and hope. Positive emotions play a significant role alongside negative emotions. According to Sjoberg, positive emotions such as interest, satisfaction, and optimism were found to be stronger positive predictors of attitudes toward nuclear waste repositories than negative emotions. Additionally, interest accounted for a substantial proportion of variance in attitude toward various other risk issues, including "mad cow" disease, background radiation, and high-voltage power lines. Sjoberg argued that despite perceiving risks as threatening, individuals are often motivated to experience hope and interest in exploring options to mitigate the threat. Another study by Hoijer examined how the Swedish media communicated emotions in the social construction of global warming risk and found that hope and compassion were utilized as emotional anchors to facilitate public understanding of projected climate impacts. These findings suggest that many individuals do not solely perceive hazards as something to

avoid; rather, interest and hope may drive them to seek further understanding of the hazard and to take or support mitigation or adaptation measures (Leiserowitz, 2014).

Based on the literature available, it seems that the primary focus of this literature review should not be on the effectiveness of sadness avoidance, but rather on how to engage with eco-emotions to promote pro-environmental attitudes and behaviors. In this context, sadness and fear appeals that take into account the specific circumstances and foster a sense of hope or empowerment appear to be the most successful approaches. The growing recognition of the significance of comprehending and tackling mental health promotion encourages us to contemplate more broadly the influence of climate change on the broader determinants of mental health (Kurth & Pikhala, 2022).

Within the context of mental health, the complex nature of climate change can inspire a range of negative and positive emotions. While some may feel anger, fear, and sadness in response to it, others feel hopeful, joyful, and calm which may motivate them to take adaptive actions. For some, expressing concern over climate change may seem counterproductive and lead to personal turmoil, but for others, it is a powerful expression of their eco-consciousness. Psychological research has shown that feelings of shame, guilt, powerlessness, and confusion tend to result in lower levels of action, whereas concern, anger, and hope tend to inspire higher levels of action. Furthermore, it is imperative for practitioners and researchers to deliberate on the development of messages that effectively captivate individuals on various emotional levels. This involves emphasizing positive emotions such as hope and compassion, while also ensuring the retention of other forms of emotional engagement, including anger, sadness, and fear (Myers et al., 2023).

Recent research by Bas Verplanken explores the nature of worry and its relationship with global warming, personal issues, and the COVID-19 pandemic. Their findings suggest that worry can be pathological and may stem from a baseline level of general anxiety, leading to specific worries about personal concerns and broader fears about the world and the future. The researchers also found that worry about climate change remained unaffected by the COVID-19 pandemic. The study further explored how the COVID-19 context influenced worry, replacing 'worry about the world economy' with 'worry about the coronavirus'. Moreover, the study indicates that worry about global warming was linked to both immediate and long-term threats and was positively correlated with factors promoting PEB. Chronic worry about global warming was also associated with positive emotions, a pro-ecological worldview, pro-environmental values, past PEB, and a green self-identity (Verplanken et al., 2020).

Numerous scholars, such as J. Zelenski and Jessica E. Desrochers, have proposed that developing a stronger connection with nature could enhance well-being and promote sustainable behaviors to combat climate change. While research supports this concept, there is limited research on the specific hypothesis that positive emotions, particularly self-transcendent emotions like awe, compassion, and gratitude, can directly impact PEBs. These self-transcendent emotions, often triggered by nature, have been linked to fostering prosocial behaviors, which align with most pro-environmental actions. While recent studies have shown that self-transcendent emotions can influence PEB, the overall results are mixed (Zelenski & Desrochers, 2021).

There are differing perspectives on concerns about global warming. Some view it as unproductive and tied to personal issues, while others see it as a positive response aligned with an environmentally friendly self-image. Those in the latter group may consider worries about global warming as "macro worries," focusing on larger entities like society or the world at large, and connected to values of self-transcendence such as universalism and benevolence. Within this perspective, positive emotions associated with global warming have been reported as well, such as interest, hope and optimism (Zelenski & Desrochers, 2021).

An academic analysis of people's emotional states towards climate change in southern Ecuador aimed to compare the most common emotions identified in European countries and the United States with those of the Ecuadorian population, and analyzed concern, guilt, powerlessness, anger, confusion, optimism, calm, happiness, indifference, and skepticism. Notably, the publication emphasizes the connection between the cultural and environmental setting and the climatic emotional arousal, and found that "optimism", "happiness", and "calm" are aroused by sentiments of hope that people will change their attitudes and become more climate responsible. Furthermore, hope emerges as a much more significant predictor of PEB, particularly a form of "constructive" hope that is linked to a high degree of self-perceived efficacy. Moreover, it highlights the importance of understanding emotions related to climate change in designing effective communication campaigns and actions and suggests the need for further research and cross-cultural studies. Their findings indicate that positive emotions, such as optimism, happiness, and calm are triggered by the hope that individuals will change their attitudes and take more responsibility for addressing climate change. People also express confidence that future technology and knowledge will aid in mitigating the causes and impacts of climate change. These positive emotions are considered to prepare the individual for challenging situations, facilitating the development of flexibility, creativity, and problem-solving abilities (Iniguez-Gallardo et al., 2021).

Similar findings were registered in a qualitative study with climate activists from Sweden, Denmark, and MAPA. The authors Kleres and Wettergren found that both hope and guilt can act as catalysts, transforming potentially paralyzing fear into action-oriented anger (Kleres & Wettergren, 2017).

An interesting perspective from pastoral care was visible in research by Panu Pihkala, illustrating that eco-anxiety is a multifaceted emotional response that stems from concerns about environmental challenges, such as climate change and biodiversity loss. Various emotional methodologies, including emotion-focused therapy and eco-emotional methodologies, can provide valuable support for pastoral care providers. It is crucial to cultivate a positive attitude towards all emotions. Additionally, ecopsychology and ecotherapy methods offer significant resources for pastoral care providers to explore their own environmental identity and engage with literature that encourages therapists to work with their relationship to nature. Outdoor and indoor eco-psychological activities, along with creative and radical methodologies, can effectively address various eco-emotions. Furthermore, spiritual practices can assist in navigating ecological grief and anxiety. Individuals may experience eco-anxiety as existential, since it raises profound questions about the meaning and purpose of life in the face of environmental degradation. Therefore, eco-anxiety challenges individuals to confront their values, beliefs, and responsibilities towards the natural world (Pihkala, 2022b).

The article "Can Positive and Self-Transcendent Emotions Promote Pro-Environmental Behavior?" by John M. Zelenski and Jessica E. Desrochers explores how positive and self-transcendent emotions may influence individuals to engage in environmentally friendly actions. The authors examine potential mechanisms through which these emotions may motivate PEB such as emotional contagion, moral elevation, and expanded self-identity. They also review empirical studies and propose hypotheses regarding the impact of positive and self-transcendent emotions on various aspects of PEB. Their work contributes to an understanding of the role of emotions in driving environmentally responsible actions and highlights the importance of cultivating positive and self-transcendent emotions to promote sustainable behaviors (Zelenski & Desrochers, 2021).

Various perspectives have been put forth on how to deal with eco-anxiety. Some advocate for a "realistic" approach that acknowledges the suffering and empathizes with it, while others emphasize "radical hope," meaning they cling to hope even without knowing how to save the situation. In the context of the interplay between hope and hopelessness, two significant manifestations of hope have

surfaced: "Reasonable Hope" and "Radical Hope." "Reasonable Hope" is characterized by agency and pathway thinking, encompassing the adaptive adjustment of goals and pathways without tethering hope to a specific outcome. It asserts the openness, uncertainty, and influenceability of the future. Conversely, "Radical Hope" emerges when the inability to articulate a positive future arises due to a deficiency in language conveying meaningful aspirations. Both manifestations of hope offer avenues for maintaining a hopeful disposition in the face of ostensibly bleak circumstances (Lewis et al., 2020). Another study of how to deal with eco-anxiety comes from the institute of psychiatry at John Hopkins University. A group of young people from fifteen countries agreed that the way anyone can help them to cope is by showing genuine care for their wellbeing, offering them spaces to share their feelings without judgement, and taking the crisis seriously in their own professions. The study also presented four main hopes that could help the world move forward: climate action, climate-related mental health support, intergenerational collaboration and a radically more compassionate world, built on systems that value protection of the people and the rest of the natural world (Diffey et al., 2022). Climate action, climate-related mental health support, and intergenerational collaboration are essential components of a compassionate world, where inclusivity, humility, altruism, and collaboration are valued (Moore et al., 2021).

In the context of long-term community perspectives on climate change, the intertwining of hope and morale with mental health promotion is a critical consideration. Balancing community pessimism with optimism about the future needs a holistic comprehension of the implications of climate change and viable courses of action. As predictions from esteemed scientists grow increasingly dire, stakeholders in mental health promotion should carefully examine the nexus of evidence, hope and actionable strategies (Fritze et al., 2008).

DISCUSSION

Contradictions Found in Current Research

The complexities and nuances of the emotional experience leads to difficulties in various studies coming to a consensus on how young people experience eco-emotions. Though both quantitative and qualitative research methods are used, many studies in this field rely on survey data, which has several limitations. Primarily, subjectivity cannot be avoided, as the individuals participating in the survey may interpret the questions differently from the intended way and then the researcher may have their own interpretation of the individual's answers (Farnsworth, 2019). In addition, there is a lack of standardization in surveys potentially due to inconsistencies in definitions and measurements of various eco-emotions, as well as data across geographic and cultural variations (Farnsworth, 2019; Hickman et al., 2021). Collecting data about emotional responses is difficult, given how feelings are the mental assessment of emotions (Allyn, 2022). As a result, our understanding of the emotional experience in its entirety is limited, and despite the attempt to understand eco-emotions through surveys, factors such as subjectivity and standardization affect the reliability and validity of the findings. Researchers should consider exploring alternative methodologies to tackle subjectivity challenges. Qualitative research methods, such as ethnography, could help address subjectivity, even when interpretation is involved. Researchers should often critically evaluate their reasoning and involvement, documenting and working through any assumptions or difficulties they may encounter. This introspective process is known as critical reflexivity, as defined by the Office for Health Improvement and Disparities of the United Kingdom government (Office for Health Improvement and Disparities, 2020).

Further, because eco-emotion surveys do not generally contextualize the coping cycle illustrated in Figure 3, there are difficulties in measuring pre and post adaptation and transformation. When examining the figure, both the pre- and post-periods are reflections of each other. However, the post-period is with greater awareness and control of the eco-emotions and the dimensions of the cycle. There are slight nuances between the corresponding dimensions of the pre- and post-periods, in addition to the non-linear pathway between coping mechanisms. As a result, measuring the difference in emotional experiences pre- and post-adaptation and transformation is difficult to distinguish in survey data research, presenting limitations in understanding the emotional experience in its entirety.

A lack of mixed methods when conducting eco-emotions research stems from this field's relative newness and its complexities in operationalizing and interpreting quantitative and qualitative data. Therefore, this calls for an even greater need for diverse and balanced methodologies for a holistic, well-rounded understanding of eco-emotions in young people. However, due to the limitations of survey data, the complexities of the individual experience, as well as the definitions and conceptualizations of eco-emotions, a degree of contradictions in the findings and interpretations are bound to persist. In the difficulty of capturing the intricacies of the coping cycle and transformation of eco-emotions over time, investigating alternative methodologies, such as longitudinal studies and cross-cultural studies, could offer a more compelling case for enhancing research designs in the field of eco-emotions.

As evidenced in all four emotion categories, the interconnectedness of multiple eco-emotions results in contradictory interpretations. Iterated in studies from Panu Pihkala, Kleres and Washington, Hickman et al., and Matthew Adams, eco-emotions often intersect each other, which can lead to an intensification of the emotional experience or influence certain actions or coping mechanisms. As previously described, eco-guilt is linked to eco-anxiety and eco-grief (Cianconi et al., 2023; "Climate Anxiety", 2024), and eco-anxiety is linked to powerlessness, helplessness, depression, guilt, shame ("Climate Anxiety", 2024). The more intensely eco-emotions are felt, the harder it is to determine how these emotions influence action, PEB, and coping (Ogunbode et al., 2022; Pihkala, 2022a). Though a majority of studies regarding eco-anxiety determine that eco-anxiety and worry lead to higher levels of PEB (Innocenti et al., 2023; Ojala, 2012), other studies indicate how eco-anxiety lowers PEB (Stanley et al., 2021). Similarly for eco-anger, there is no consensus as to whether eco-anger drives individuals to action or not, as outlined in different studies (Gregersen et al., 2023; Stanley et al., 2021). Even within a singular emotion, specific and nuanced forms of these emotions, such as constructive versus unconstructive worry, lead to different outcomes in terms of action and PEB (Verplanken et al., 2020). As a result, the contradictions in whether certain emotions lead to PEB or not boils down to how PEB is undertaken as a means to cope with eco-emotions (Ágoston et al., 2024).

There is also similarly a lack of distinction between individual versus collective action. In Figure 3, Pihkala identifies how action can be both individual and collective, and other studies support how individual and collective action are routes to cope with eco-emotions. However, despite the acknowledgement that both individual and collective action are observed in various populations, there is little discourse about the differences in how individual and collective action manifest or what causes young people to engage in each form. Rather, current research emphasizes how varying socioeconomic and cultural factors, such as the political landscape, income and wealth, and access to opportunities, can influence whether individuals take action. Calling back to the study in the Philippines, students who experienced the effects of climate change are more likely to take action (Simon et al., 2022). Though current research focuses on MAPA and how these populations engage with action differently from the Global North, greater research on the link between contextual factors and how these translate into

individual or collective action would lead to a larger understanding of eco-emotions and their manifestations into action.

The coping mechanisms outlined by Maria Ojala's survey study also indicate the delicate nature of how adaptive and maladaptive levels of emotion connect to coping strategies. However, the coping mechanisms can also influence the level or intensity of the eco-emotions experienced (Ágoston et al., 2024). Adaptive levels of eco-emotions drive coping, but it is unclear from current research if maladaptive levels of eco-emotions are drivers or inhibitors of coping. The complexity of the relationship between eco-emotions and coping determines how there is no linearity between eco-emotions and coping.

Similarly, in the study surveying Filipino youth, the finding of how those with high levels of anxiety engage in action and mitigation behaviors contradicts previous research on how MAPA are likely to be restricted from taking action (Ogunbode et al., 2022; Simon et al., 2022). This study also explicitly acknowledges the influence of external factors influencing an individual's ability to take action (Simon et al., 2022). Seemingly, various external and contextual factors can affect one's ability to take action. In addition to the complexity of isolating one eco-emotion from another, external factors are difficult to ask in surveys or silo as an influence or factor in one's emotional experience without making large assumptions or generalizations.

In addition, contradictions in current research arise from the differences in how certain terminology, such as eco-anxiety, are understood in Global North and MAPA. In Farhana Sultana's work, BIPOC scholars and activists worldwide were surveyed on their thoughts on coloniality, with trauma, grief, anger, rage, and sadness being some of the emotional responses. Sultana reveals how MAPA experiences collective trauma, grief, and anger (Sultana, 2022). This collective experience is related to climate coloniality, "where Eurocentric hegemony, neocolonialism, racial capitalism, uneven consumption, and military domination are co-constitutive of climate impacts experienced by variously racialized populations who are disproportionately made vulnerable and disposable" (Sultana, 2022).

Hickman et al.'s global study on climate anxiety and children separates the terms anxiety, sadness, anger, guilt, grief, etc. (Hickman et al., 2021). Despite the study defining and separating eco-anxiety from other eco-emotions, the varying definitions and understandings of these different emotions were limitations to the study (Hickman et al., 2021). As a result, the authors surveyed various emotions and analyzed these findings under the context of climate anxiety and other distressing emotions (Hickman et al., 2021). This Westernized take on separating each eco-emotion is in direct contrast to Sultana's idea of MAPA's collective trauma, grief, and anger (Sultana, 2022). Additionally, the lack of anxiety mentioned in Sultana's work compared to the Western authors separating eco-anxiety links to climate coloniality and the differences in how MAPA and the Global North view these concepts.

To decolonize climate means to "rethink and address various institutions and processes at multiple intersecting scales that lead to various entanglements'' (Sultana, 2022). SustyVibes, a Nigerian-based youth sustainability community, has hosted an event titled "Connecting to Our Roots — Decolonising Eco Anxiety" (SustyVibes, 2024). In a survey created to sign up for the event, SustyVibes asks if the participant has heard of eco-anxiety before and defines eco-anxiety as "emotions we feel and experience as a result of direct or indirect impacts of climate change or other environmental problems around us. These emotions can include anger, hope, worry, shame, guilt, numbness and joy" (SustyVibes, 2024). Directly contrasting how the Western studies separate anxiety from the other emotions, SustyVibes makes an active effort to decolonize the term eco-anxiety by acknowledging how eco-anxiety is an amalgamation of various eco-emotions, rather than siloing it. As mentioned throughout the paper, the eco-emotional experience is interconnected and complex. Contradictions

between research findings arise from the differences in how eco-emotions are conceptually understood. Through decolonizing eco-anxiety, the lived experiences of MAPA can be validated and further inform how youth in MAPA experience eco-emotions.

Studies generally fail to address and recognize these nuanced relationships, specifically in coping, but that does not indicate that the researchers are unaware of the subtle differences in these relationships. Rather, the current methodologies of utilizing surveys and unstandardized definitions make the results nebulous and not explicitly clear. The contradictions between studies and findings suggest the limitations in the research methodologies, as current frameworks constrain the analysis of the intricacies of eco-emotional experiences.

Intersectionality of Eco-Emotions and How They Evolve into Action

Lewis J.L. delves into the concept of climate activists as "emotion entrepreneurs" to explore the development of specific emotional responses to climate change. One such response is eco-grief, which encompasses the sorrow felt in response to actual or anticipated ecological losses. The idea of the emotion entrepreneur and the rise of eco-grief are conceptualized through a theoretical and Bourdieusian approach. It is proposed that activists with cultural capital are well-equipped to introduce new emotions, and three mechanisms contributing to the emergence and increasing significance of eco-grief are identified. These mechanisms include objectivation, which involves reflexively assigning names to emotions to transform them into entities with ontological significance; cultivation, which involves establishing social spaces for the experience and management of eco-grief among activists; and diffusion, which encompasses emotional contagion, the creation of emotional vocabularies, and the propagation of activist feeling norms. The study of emotion entrepreneurs goes beyond viewing emotions as drivers of activism, and it highlights the need for further research on emotional dynamics within diverse transnational advocacy coalitions, the impact of language on emotions, and feeling norms in contemporary Western societies (Lewis et al., 2020).

In another context, a pilot workshop was designed to assist young individuals in expressing their emotions about the environment, combating feelings of isolation, and cultivating a sense of optimism in the face of climate change. The workshop featured collaborative activities, storytelling, and opportunities for creative expression. Upon analysis, key themes emerged, including a deep understanding of climate change, its emotional impact, and the potential for climate change to bring communities together. The document draws from research on climate change, education, and mental health, and also delves into the United Kingdom’s Department for Education's strategy for incorporating sustainability and climate change into educational curricula. The importance of nurturing hope, empathy, and the involvement of young people in addressing climate change is underscored (Marks et al., 2023).

The study "Framing Climate Change: Exploring the Role of Emotion in Generating Advocacy Behavior" by Robin L. Nabi, Abel Gustafson, and Risa Jensen examines the influence of emotion on advocacy behavior concerning climate change. The key findings underscore the importance of emotional framing in climate change communication and advocacy. The study indicates that different emotional frames, such as fear, hope, anger, or sadness, can significantly impact individuals' advocacy behavior. Fear and hope are identified as influential emotions in motivating advocacy behavior, while anger and sadness are also highlighted as driving forces. The research emphasizes that individuals may respond differently to diverse emotional frames based on personal values, beliefs, and psychological predispositions. Understanding these emotional drivers can inform the development of more effective communication strategies for promoting climate action. By strategically framing climate change messages to evoke specific emotions, communicators can mobilize support and encourage meaningful

engagement in environmental advocacy efforts. In conclusion, the study underscores the importance of emotional framing in shaping attitudes and behaviors related to climate change advocacy. It highlights the potential of leveraging emotions such as fear, hope, anger, and sadness to inspire action and foster a collective commitment to addressing the climate crisis (Lewis et al., 2020).

Some other ways to treat traumatic disorders and help people cope with trauma could be addressed from three avenues: A top down by talking, reconnecting with others, and processing the memory from the traumatic experience; medication that shuts down inappropriate brain responses and reorganizes how people processes information; a bottom-up approach, having our body experience mental states that contradict the emotional results of trauma, such as helplessness, rage, among others. Similar to coping and changing in a climate crisis, we can combine these three, depending upon each individual.

A new approach is needed, particularly as evidence indicates that sharing eco-emotions and collective engagement can reduce climate distress and despair in young people and engender hope (Hickman, 2020; Ojala, 2007). This chimes with research into hope in healthcare settings (Olsman, 2020), which indicates that inspiring relationships with peers who share your experiences increase hope. This is because hope requires an awareness of, and openness to possible future outcomes, an ability to respond to this creatively, resilience (an ability to endure adversity) and an opportunity to identify meaning and values and act in line with these. This requires a balance between speaking the truth about a threat, expressing emotion and values and finding a way to keep the door open for hope (Olsman, 2020, p.202). Balancing truth and hope in eco-emotions requires engagement with action ('active' or 'constructive' hope; Ojala, 2012). This is different from denial, disavowal, avoidance or apathy, because active hope demands that we hold two competing realisations in mind: (1) the reality of the crises and (2) that change and a sustainable future is possible, if we act together now. Realistic hope can be held alongside the more painful aspects of eco-anxiety, supporting resilience. Hope is essential in enabling individuals to recognise both their capabilities and the opportunities available to them in a way that can help them engage in behavioural change (e.g. COM-B model; Michie et al., 2014). This theory is supported by findings that higher levels of eco-emotions is linked to more climate action and constructive, pro-environmental behaviours, and that this is also associated with environmental identity (Helm et al., 2018; Verplanken et al., 2020; Whitmarsh et al., 2022).

Demographic Data

One of the most apparent and recurring limitations of existing studies around eco-emotions is the uneven representation and lack of diverse, intersectional demographic data. Specifically, these limitations apply to distinguishing MAPA voices and experiences, and disaggregating intersectional data within the broad category of youth, such as age, race, gender, and other demographic factors.

The majority of the research and studies utilized for this paper focus exclusively on the experiences of individuals from the Global North. Countries that received the most in-depth research of eco-emotions were conducted in countries with predominantly white populations, relatively higher GDPs, and more English speakers, such as the U.S. (Coppola & Pihkala, 2023), Australia (Patrick et al., 2019), and Northern European countries (Coppola & Pihkala, 2023; Cunsolo & Ellis, 2018; Gregersen et al., 2023). Many were derived from official surveys with high sample data, such as Stanley et al.'s research using a sub-data set of a national survey of individuals living across every state and territory of Australia, which was nationally representative on age, gender, and location (Stanley et al., 2021). On the other hand, less than a third of peer-reviewed articles covered by this paper focused on countries with high rates of MAPA. Noticeable articles that conducted research on eco-emotions of MAPA include Hickman et al.'s global survey across ten countries (Hickman et al., 2021), Ogunbode's survey across 32

countries (Ogunbode et al., 2022), and Simon's research of climate change anxiety in Filipino youths (Simon et al., 2022). Even then, the sample data of these research were much smaller in scope than national survey data in Global North countries.

There is a clear overrepresentation of data from Global North countries. While these perspectives are important to understanding eco-emotions of youth, the skewed representation of data presents an incomplete picture of how we understand eco-emotions on a global level and for youths. As a result, this can lead to inaccuracies in how we understand climate change's far-reaching impact on youth's emotional and mental health, particularly on youths from frontline communities most impacted by the ecological crises (Hickman et al., 2021). Moreover, the lack of diverse and representative demographic data affects our understanding of effective coping strategies that youth are employing on an individual and collective level.

As a result, this literature review calls for more research to be conducted utilizing diverse methodologies to specifically represent young people from MAPA. As stated above, surveys and interviews were the predominant method of collecting data. Studies that were able to draw from an existing national database or survey automatically had a high sample population that was more representative of the general population of a country. However, many countries with high MAPA rates do not have the resources or capacity to conduct regular national surveys. For many of these countries, a history of being colonized, internal and external conflict, and systemic government corruption can make gathering a population census difficult (Kelly, 2022). Moreover, even in countries with the capacity to administer national surveys, these surveys have been found to consistently under-represent historically marginalized groups, many of which are considered MAPA. This is a result of systemic barriers to accessing surveys, such as lack of internet, media literacy, or reliable transportation access (Stempowski, 2023). While there is no one solution to ensuring MAPA youth are fully and equitably represented in understanding eco-emotions among youth, there are opportunities for more inclusive research methodologies. For example, Hickman's study surveying eco-anxiety among a global population of youth utilized a diverse set of recruitment sources, including "opt-in email, co-registration, e-newsletter campaigns, internal and external affiliate networks, and social media specifically to maximise inclusivity" (Hickman et al., 2021).

Another limitation around existing eco-emotion studies has been the lack of demographic information within surveyed youth populations. To start, there is no one standardized definition of youth. The United Nations, for example, defines youth as individuals between the ages of 15 and 24 (United Nations, 2013). Meanwhile, within the existing literature research, some studies defined it by other age ranges (Coppola & Pihkala, 2023), others made a generational reference (e.g., Gen Z, Millennials, etc.) (Swim et al., 2022), while others worked with youth organization groups, such as participants of the COY, without referring to age (Kleres & Wettergren, 2017). Even within youth categories, there has been controversy over what constitutes youth, and resulting internal divisions over different definitions (Moes, 2022). This makes "youth" difficult to define. However, even within the broad category of youth, there is a noticeable absence of further intersecting demographic analysis, such as race, socioeconomic background, education level, gender, and other demographic indicators. Many studies will include sentences such as the following:

> *"...Although the findings related to socio-demographic factors have been mixed, women, younger age cohorts, those placing themselves to the political left, and people with higher levels of education typically score higher on climate change concern" (Kleres & Wettergren, 2017).*

Within these groups, youth are included as their own category. While other demographic groups are included, their outcomes are rarely correlated. For example, while women may express greater rates of climate anxiety than men (Léger-Goodes, 2022), there is no data demonstrating that these trends hold within youth populations. However, literature reviews clearly show that eco-emotions are experienced across youth differently depending on a variety of factors, such as how directly youth feel impacted by climate change (Patrick et al., 2019). Thus, it is reasonable to assume that other demographic factors could lead to different eco-emotions and coping mechanisms as well. This is particularly important in contextualizing a dynamic model of understanding how eco-emotions, mental health outcomes, and actions are related within Pihkala's diagram of Coping with an Ecological Crisis (Figure 3). It is key to understand how intersectionality contributes to how youth are experiencing eco-emotions in a fluid, cyclical process.

The lack of additional demographic data seems to contribute to contradictory outcomes. For example, some studies indicate that eco-anger among youth leads to more individual action (Stanley et al., 2021), while others indicate otherwise (Gregersen et al., 2023). However, we see that eco-anger is approached differently by youth from the Global North and MAPA youth (Kleres & Wettergren, 2017), indicating that eco-anger and how it influences action could also be different. In addition, while various kinds of eco-grief have been categorized, there is insufficient data to determine which demographics are more likely to experience the various kinds of grief (Léger-Goodes et al., 2022). This could be an indication that there is not enough demographic data being collected to allow for significant disaggregation. Making these distinctions could lead to valuable linkages between different demographic categories and how that impacts youth experience of eco-emotions and coping with climate change.

The lack of diversified and comprehensive demographic data on youth and their eco-emotions leads to certain limitations. Specifically, it makes it difficult to depict a representative, equitable, and accurate understanding of how climate change is impacting youth mental health, or to identify additional demographic variables and factors that affect how eco-emotions influence mental health, coping strategies, and behavioral outcomes within youth populations.

Strengths and Limitations

The strengths and limitations of this literature review are due to the accessibility of the reviewed literature and the scope of the study. This literature review made a conscious effort to incorporate the MAPA perspective found in scientific literature. Not only are eco-emotions in adolescents and young adults an understudied topic, but highlighting the importance of MAPA perspectives research by discussing MAPA knowledge and praxis is unprecedented. This study acknowledges that there may be additional material regarding eco-emotions in adolescents and young adults that were not included due to potential language barriers and limited \access. The researchers conducted this literature review in English and only reviewed material in English. The researchers reviewed largely open-access material and minimal print which may have limited the scope of researched materials. Additionally, the researchers sought online open-access scientific literature by searching key terms such as: eco-emotions, eco-anxiety, climate anxiety, climate emotions. Then, the researchers filtered by studies only conducted on young people as self-defined within each study. The literature review did not strictly define the age of a young person to allow for a broader range of material to be reviewed. Thisapproach may cause discrepancies among reviewed material which may have led to the conclusions of this literature review taking a generalized approach to how eco-emotions affect younger people and not specifying how impacts may vary between ages. To combat this limitation, this study described how the

intersectionality of any one person's identity may impact their understanding and experience of eco-emotions regardless of the specifications of their demographics.

Future Research

Future directions of research could include explorations of attachment theory as related to understandings of eco-emotions for addressing said complexities and intersectionalities. This concept aligns with a call for a greater comprehension of pre- and post-transformative and adjusted coping strategies to properly communicate the nuances of eco-emotions. To achieve true representative data, MAPA-lead research is needed to properly represent the comprehension of eco-emotions. Fortunately, MAPA-lead research has been on the rise and receiving more exposure globally, "[however, climate colonialism] is not about just recognizing the problems, but working towards distributive justice, reparations, and restitution" (Office for Health Improvement and Disparities, 2020). Addressing understandings of climate coloniality are important in and out of research. As young people continue to navigate a changing planet, the decolonization of climate must exist not only in words, but in action, for healing generations of collective trauma and mitigating future climate impacts. Just as eco-emotions are interconnected, so too are the impacts of climate, especially in the form of systemic oppression. Researchers should collaborate with policy makers, educators, etc. to apply the key findings of their research into practical applications that address these systemic oppressions. An awareness of eco-emotions, such as anticipatory grief, can aid climate education and policy for mitigation efforts. The key to empowering young people with adaptive and transformative coping strategies for eco-emotions is the balance and awareness of said emotions and how they intersect with each other. Sharing that balance and awareness in a collective becomes the foundation for an organized movement.

CONCLUSION

Eco-emotions are just one aspect of a person's entire experience of ecological crises, especially the climate crisis. The main takeaway of this literature review is that every person emotionally and physically experiences climate change, as well as localized ecological issues, but the experience isn't necessarily universal. The difference in that experience plays a crucial role in understanding why and how action and other coping strategies are utilized; from systemic to secondary, local to global, and collective to individual there are influences that not only impact young people's experiences, but vice versa. To better understand said influences, this paper calls for a greater diversity of research methodologies and comprehension of intersectional demographics to be used. Currently, survey data is the most used methodology, but even other qualitative methods, such as ethnographies and case studies, are underutilized. While quantitative data does appear in the reviewed literature, there are certain elements missing from the majority of studies, such as sensory calculations, that could offer a way to alleviate some responder bias. Research utilizing Ojala and Pihkala's coping mechanisms as a theoretical framework have the potential to aid in more accurate capture and analysis of eco-emotions. Additionally, an understanding of how young people hold many identities may transform current comprehension of eco-emotions to include the complexities of not only one's personal experience, but the collective experience of the planet.

To learn more and/or connect with others about eco-emotions, please visit the following resources:

- Climate Mental Health Network, https://www.climatementalhealth.net/
- Good Grief Network, https://www.goodgriefnetwork.org/
- Connecting Climate Minds, https://www.connectingclimateminds.org/

- Force of Nature, https://www.forceofnature.xyz/
- SustyVibes, https://sustyvibes.org/
- Climate Psychology Alliance, https://www.climatepsychologyalliance.org/
- Gen Dread, https://www.brittwray.com/gen-dread
- Climate Mama, https://www.climatemama.com/
- Eco-anxiety and Hope blog, https://ecoanxietyandhope.blogspot.com/
- International Community for Ecopsychology, https://www.ecopsychology.org/

DECLARATIONS

ACKNOWLEDGEMENTS

The authors of this paper would like to thank Hailey Basiouny, Lindsey Burke, Linda Buzzell, Hope Lekwa, Ayomide Olude, Svetlana Onye, Panu Pihakala, and Harriet Shugarman for their support in this research.

FUNDING

This research received no external funding.

AVAILABILITY OF DATA AND MATERIALS

No new data was created.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

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Figure 1. Main interlinkages between climate change and mental health. Mental health and Climate Change: Policy Brief. World Health Organization; 2022. License: CC BY-NC-SA 3.0 IGO

Figure 2. The Climate Emotions Wheel. Climate Mental Health Network. climatementalhealth.net; 2023. License: CC BY-NC-SA 4.0

Figure 3. Process Model of Eco-Anxiety and Ecological Grief. Sustainability: MDPI; 2022. License: CC BY 4.0 IGO

COMPETING INTERESTS

All other authors report no competing interests.

PUBLICATION DATES

Received: 20 May 2024
Accepted: 17 September 2024
Published: 19 November 2024

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