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JMHCC

Charting A Path Towards Understanding and Mitigating the Mental Health Impacts of Climate Change: An Introduction to the Inaugural Issue of the Journal of Mental Health and Climate Change

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ABSTRACT

The inaugural issue of the Journal of Mental Health and Climate Change aims to illuminate the complex interplay between climate change and mental health. This issue consolidates research and insights into four principal themes: (1) the need for integrative paradigms in understanding climate-mental health relationships, (2) the exploration of mechanisms for motivation and coping with climate-induced distress, (3) the importance of social connectivity and resilience in mitigating mental health impacts, and (4) the need for equitable responses for key populations. The articles collectively call for a holistic approach that merges socio-cultural, psychological, and environmental perspectives. The issue identifies youth and other marginalized communities as both vulnerable groups and agents of change. It serves as an invitation for further interdisciplinary research and actionable solutions in this pressing public health arena.

Keywords: *Climate change; Mental health*

EDITORIAL

It is a profound honor to introduce the inaugural issue of the Journal of Mental Health and Climate Change. The range of articles presented in this issue exemplifies the multidimensional complexity inherent in the intersection of climate change and our mental, emotional, spiritual, cognitive, and psychological health. We launched this journal to encourage a more interdisciplinary approach to the study of mental health and climate change and emphasize the urgency of this work. The studies

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included here highlight success on this front. Indeed, the contributions to this issue present key perspectives, empirical findings, and innovative intervention strategies. We extend our deepest gratitude to the contributing authors for laying the foundational groundwork of this journal, and acknowledge that much more remains to be discovered and examined.

We were impressed by the messages of these articles. Four key themes stood out to us: (1) the need for interdisciplinary paradigms to understand and address climate-mental health relationships, (2) exploration of key mechanisms driving the association between mental health and climate change, (3) the central importance of connection, community, and resilience to addressing the mental health impacts of climate change, and (4) the pressing need to adopt an equitable climate justice response to reduce or eliminate inequities related to climate change. We discuss each of these four themes in greater depth below:

First, there is a clear need for an interdisciplinary response to address the mental health effects of climate change. **Henley (2023)** emphasises this point noting that an iterative study of causal mechanisms requires an integrated exploration of socio-cultural and psychological factors. This sentiment is echoed by **Joshi et al. (2023)**, who engages Fundamental Cause Theory to elucidate how socio-economic status and mental well-being intersect with climate vulnerabilities. These works signal a departure from conventional siloed perspectives and advocate for frameworks that synthesize socio-cultural, psychological, and environmental determinants. In both instances, the authors call for greater rigor and theoretically informed empirical work to understand the climate crisis. We agree that such work is needed and are confident that, in time, this journal will be a venue in which it is shared.

Second, the studies included in this issue suggest that various psychosocial constructs can function as both drivers for climate action and coping mechanisms for climate-induced stress. **Rhodes et al. (2023)**, for example, develop the Meaning, Awareness, Purpose (MAP) model that focuses on motivational theories for climate action and well-being, while **Syropoulos et al. (2023)**, introduce the notion of 'personal legacy motivation' and 'generativity' as potential psychological scaffolds for climate resilience. Both underscore the need for strategies that link external climate challenges with internal psychological resources, presenting a bidirectional relationship between climate activism and mental health.

Third, multiple articles explore the role of social and relational factors in either exacerbating or mitigating climate-related mental health issues. **Card et al. (2023)**, investigate the association between social disconnection and climate anxiety, suggesting that community-building may serve as an antidote. **Barraclough et al. (2023)** and **Klassen et al. (2023)** delve into youth perspectives, emphasizing that community-centered rituals and educational support can be vital for navigating complex climate emotions.

Fourth, the articles converge on the idea that young people and other marginalized communities are particularly vulnerable to climate impacts and also pivotal agents in forging solutions. For example, **Takaro's (2023)** reflections articulate how climate action, including non-violent civil disobedience, can serve as therapeutic avenues to mitigate mental burdens associated with climate inaction and how Indigenous peoples are uniquely positioned to protect their lands and communities—particularly when appropriately supported by allies and governments.

In sum, these articles collectively argue for a radical reorientation in how we conceptualize, study, address the intersections between mental health and climate change and contribute to the frontline of responding to the multiple mental health impacts of the changing climate. They emphasize the need for integrative frameworks, actionable coping and motivational mechanisms, a renewed focus on social and communal resilience, and the importance of supporting equitable responses to climate

change. Yet, despite these insights, we recognize that there is much yet to be discovered and understood. As such, this issue stands as an invitation for further scholarship and practical application in this critical area.

We hope that these contributions will inspire continued academic inquiry and serve as catalytic agents for transformative change. Thank you to our esteemed authors and readers for embarking on this scholarly journey with us.

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Reflections On Climate Action as Therapy: How I Got to The End of My Rope and Climbed Back Up

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ABSTRACT

The climate emergency demands urgent action to reduce emissions. Meanwhile, people around the world are experiencing the ravages of climate impacts, and all indications are that these impacts will continue to increase. The United Nations continues to remind us that many governments are not responding quickly enough to reduce emissions and future impacts. The magnitude of the problem and inadequate response is a mental burden to many. This commentary argues that climate action, including but not limited to non-violent civil disobedience may help to reduce this mental health burden.

Keywords**:** *Climate Action; Ethics; Collective Action*

PERSPECTIVE

Introduction

As a physician-scientist working on the health impacts of climate change I found myself in an uncomfortable position when, in 2014, my country approved a new pipeline from the Alberta Oilsands under my university and to a neighbouring tidewater terminal in Vancouver. My expertise in epidemiology and toxicology was called upon for several reports about the health impacts of the project that can be anticipated based upon previous events and the infrastructure and technology in the proposed pipeline expansion project. Remarkably, when preparing and writing my reports to the government I was told that the climate-related health impacts would not be considered. This critical factor was removed by the government of then Prime Minister Stephen Harper, who -- not coincidentally is from Alberta, the Canadian province with the largest oil and gas sector in the country. Despite the stacked deck, four years later, support for the project dwindled to such an extent that the Texas pipeline giant, Kinder Morgan considered it too risky to continue and walked away from the

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project. The pipeline project was then 'saved' by the Liberal government of the day under Justin Trudeau, with the justification that all proceeds would go to fund Canada's climate action (CBC 2021). After my reports (Takaro, et al, 2015; Takaro et al, 2018) and a resolution by the Health Officers' Council of BC demanding an "independent, cumulative and comprehensive health impacts assessment" were ignored (HOC 2019), I got to the end of my rope. I knew that evidence was not going to be sufficient in the arguments against the project, and in August 2020 I found myself camped up in a tree blocking construction, and I founded a direct-action group called Protect the Planet. Our non-violent direct-action blockade went on for an additional sixteen months (CBC 2020).

This commentary focusses on climate action in the context of mental health and includes:

(1) a discussion of what mental health related obligations Public Health has in the climate emergency;
(2) exploration of an ethics framework for climate action in public health;
(3) consideration of the role of non-violent civil disobedience in climate action;
(4) an argument that taking action can be individually and collectively therapeutic, and
(5) an examination of some legal tools available to force more timely action on climate change.

Mental health and the climate emergency

It is not surprising that more and more people are reporting distress, anxiety and depression related to the climate crisis. It is clearly an existential threat (Guterres, 2018) that governments like Canada -- who continue to build large new fossil energy infrastructure -- are not addressing seriously enough (IPCC 2023). The fossil energy industry has known since the 1970s that their emissions could cause the current crisis, and instead of acting to reduce emissions, they pursued a disinformation campaign and attempted to shift blame to individual behavior, adding to the pathology (Hickman et al, 2021; Supran et al, 2023). The psychiatric literature describes this category of environmental distress reactions as psychoterratic syndromes that include ecoanxiety, solastalgia (distress caused by loss or degradation of a cherished environment) and ecoparalysis (apathy or limbo due to ecoanxiety) (Cianconi, et al, 2023). They are frequently linked to clinical depression and anxiety as discussed by other papers in this journal. Considering the existential nature of the threat, these responses may be considered a normal reaction to a dire situation. Well-designed actions to mitigate greenhouse gas emissions and build community resilience to climate threats such as active transportation, environmental stewardship, increasing green infrastructure and enhanced social networks can also benefit mental health (Health Canada 2022), so there is a strong rationale for examining therapeutic options for these syndromes.

The evidence that taking action on climate change is therapeutic for eco-anxiety is circumstantial at best. Clearly research is needed to examine whether such action is indeed therapeutic and for whom it is effective. Further, we need to learn what are the most effective actions and how we might intervene to enhance their use if found to be therapeutic. Research in this area requires an understanding of how trauma and stress affects physiology and the mind (McEwen 2012). Therefore, developing modes to increase social support networks, find new meaning and purpose in life and learn methods for calming and focus are all important skills to test for effectiveness for eco-anxiety.

Many mental health professionals support the idea that taking action on climate is effective in the management of depression and anxiety due to climate change. The American Psychiatry Association has issued a recent statement that, "The most effective method to reduce anxiety and depression and sustain hope in the face of the climate crisis is to engage in purposeful action within one's community and take individual action. The latter includes reducing fossil fuel use, making homes more energy efficient, and shifting to diets that are more plant based." (Feder 2022). Recognizing and calling out the

complicity of fossil energy companies may also be therapeutic. I will briefly describe my own climate actions over the past several years to stop a large fossil energy project, the Transmountain Pipeline Expansion Project (TMX) and how I used them to maintain my own mental health.

An ethics framework for climate action

This pipeline was authorized by the Canadian Cabinet the day after Parliament declared a national climate emergency. As noted above, I was an active participant in the government review of the project, leading a research team that produced two extensive reports on the health impacts of the project, but we were forbidden from bringing the climate impacts into these reports. That and our other, reported concerns were not addressed. After my years of research on the health impacts of the project and the ignored request to government from the Health Officers' Council of BC, it was clear that the evidence of harm would not stop TMX. Emissions continued to rise despite promises made by Canada to reduce them (Gov. Canada 2015), especially in the oil and gas sector (Gov. Canada 2022).

As a physician I took an oath to protect the health of people, including a duty-to-care, to "accept a share of the profession's responsibility to society in matters relating to public health, health education, environmental protection, and legislation affecting the health or well-being of the community…" (CMA 1996). Even the relatively conservative American Medical Association is explicit about a physician's ethical duties and the law, "ethical responsibilities usually exceed legal duties…[W]hen physicians believe a law violates ethical values or is unjust they should work to change the law. In exceptional circumstances of unjust laws, ethical responsibilities should supersede legal duties," (AMA 2016).

The role of non-violent civil disobedience

In this case, it was clear that evidence would not sway Government on the project, and all other avenues for dissent had been ignored, so non-violent civil disobedience (NVCD) was the only remaining option for protecting the planet and my patients. After fulfilling the criteria for NVCD as outlined in The Lancet (Bennet et al, 2019, See **Table 1**), I drew upon experience in the civil rights movement of my birth country (USA) and a lifetime of mountaineering experience, to block the project with my body, high in the trees in my hometown, trees that would need to be cut for the new pipeline. The tree-sit became a rallying point for others frustrated by government inaction on climate change and we were able to block the project over 16 months in different trees along the route. Eventually, many of us went to jail with sentences up to 60 days.

NVCD is an effective way to bring about societal change. The IPCC concludes with 'high confidence' that collective action connected to social movements plays a substantial role pressuring governments to create new laws and policy for carbon emissions (IPCC 2022). Meta-analysis of social movements contesting fossil energy projects show non-violent civil disobedience (NVCD) contributes to success over and above other tactics such as petitions, letters-to-the-editors or elected representatives (Thiri et al, 2022), all of which were widely used in the early periods of the campaign to stop TMX before hundreds resorted to NVCD.

Table 1. Criteria That Can Help Justify Non-Violent Civil Disobedience

- Situation is unjust
- NVCD is the last resort
- NVCD is more effective than harmful
- NVCD is the least harmful action
- Sociopolitical situation is considered

Note: Adapted from Bennet et al. (2020)

Taking action can be individually and collectively therapeutic

For me, the direct action on climate change in the fight against TMX has been very therapeutic. In the years leading up to the COVID-19 pandemic, the reports from the Intergovernmental Panel on Climate Change and other evidence-based bodies examining the response of earth systems to global heating, grew increasingly dire. I was a lead author on one of these, Health of Canadians in a Changing Climate: Advancing our Knowledge for Action (Health Canada, 2022). My team worked on the water security chapter. Water is critical for life, and yet we are failing to prepare adequately for the climate future with water quality and quantity threats that are already apparent. Some Indigenous and other rural communities still live without clean water. Stage five water restrictions (the highest level) are becoming more common in the west, and drought destabilizes politically volatile parts of the planet (Health Canada 2022).

This dark picture was emerging prior to the pandemic that shook the globe in spring of 2020. Alberta's Energy Minster, Sonia Savage noted, "Now is a great time to be building a pipeline because you can't have protests of more than 15 people". "Let's get it [TMX] built." (CBC 2020a). Yet we in Protect the Planet were strong and stood tall in the trees in Burnaby and with help from hummingbirds and other protected species whose nesting periods stopped construction, were able to maintain blockades and camps for 16 months, with hundreds of people, while keeping safe with COVID-19 protocols. We all benefited from the community spirit and focus on a common goal.

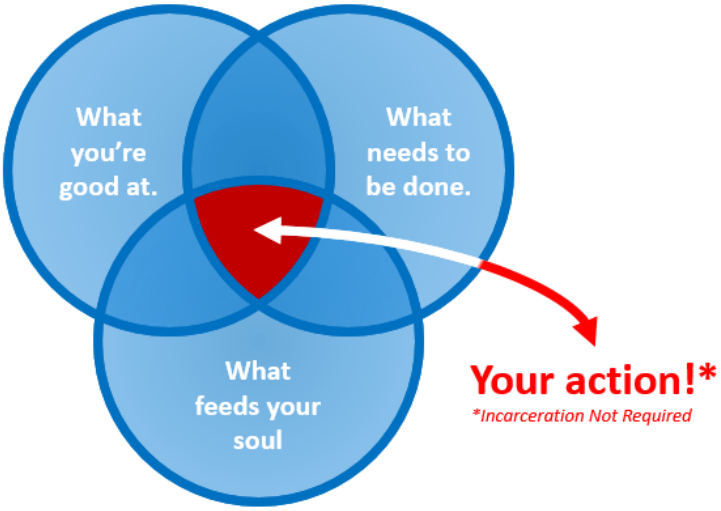
Well planned climate action can lead to opportunities to improve health, equity, and human rights. It provides agency for people previously disempowered. We found that purposeful action with our community, both individual and collective action, was an effective method to reduce anxiety and depression and sustain hope in the face of the climate crisis. We were boosted by the public attention brought to the project. This illumination and the support from colleagues and friends made the dark period easier.

Legal tools available to force more timely climate action

Civil disobedience is public, nonviolent action in breach of the law, which is aimed at changing the law or policies of the government. Such action is an act of conscience, and participants accept possible punishment. It is effective (IPCC, 2022), but sitting in a tree and being arrested is not everyone's calling. We all have gifts to bring to the climate crisis. We can all take actions and these actions vary between individuals and over time. Ayana Elizabeth Johnson provides a useful approach to understanding how one can personally realize effective climate action in **Figure 1** (Johnson AE, 2021).

Finding your place along the spectrum of possible actions may prove therapeutic for you too. I am not Indigenous, but in this struggle I have benefited much from the Indigenous knowledge of my fellow land-defenders who are. Canada has committed itself to the Declaration of the Rights of Indigenous Peoples (DRIPA). They made me ask, what would it mean to realize DRIPA in Canada? The First Peoples on this land made a contract with the salmon thousands of years ago. They would care for the streams, rivers, oceans, trees and all those things that connect, show gratitude and humility in the face of the abundance all around them, and in return the salmon would allow themselves to be fished at the same time every year. The heads and bones are ceremoniously returned to the waters in thanks. It is a reciprocal relationship. Their technology of fish weirs and traps would have permitted them to take many more fish each run, but they did not. In 175 years, the settlers on these lands have nearly wiped out the salmon. We must learn from those who successfully stewarded the land since time-out-of-mind. We have a responsibility to future generations to do this learning, and this is, in part, what DRIPA means.

Figure 1. Ready to take action? Find this sweet spot.



In its reports the UN Intergovernmental Panel on Biodiversity and Ecosystem Services notes that nature is declining less rapidly in Indigenous peoples' land than in other lands. They show that Indigenous governance and customary institution and management regimes that involve Indigenous peoples' and local communities can be an effective way to safeguard nature (IPBES 2019). Indigenous knowledge could lead us out of the moral quandary that we have found ourselves in here in Canada, the quandary where we know it is not right to build new infrastructure locking in future emissions, but we are somehow convinced our increased oil and gas production are justified. Indigenous teachings guide us in our work on the unceded territories of the Coast Salish Peoples here in British Columbia. Here are some additional ways you might take action to collectively reduce emissions:

- Legally, compel industries to account for costs of operations to the planet and future generations, building on Dutch success in their supreme court (Urgenda Foundation v. State of the Netherlands 2015).
- Work with your elected representatives to expand taxation on carbon to include social and health costs of carbon emissions (Rennert et al. 2022).
- Join the Sue Big Oil campaign (grown in British Columbia) (West Coast Env. Law 2022).
- Advance stronger fossil emission reduction legislation, e.g. Green New Deal bill M-1 (Sponsored by MP Peter Julian in Canada 2020)
- Defend future generations using human rights tribunals, e.g. Philippines HR Commission. (Amnesty International 2019)
- Get your municipality to adopt the Fossil Fuel Non-proliferation Treaty (Fossil Fuel Treaty Initiative 2019)
- Follow the money and push fossil energy divestment– U.S. and Canadian banks are major financers of fossil energy projects worldwide (e.g. RBC $9.2 B, JP Morgan Chase $51.3 B in past year,2021-22) (Banking on Climate Chaos 2022). Change to a credit union that invests more ethically than big banks.
- Expose the insurers of fossil projects and risks (18 have dropped Trans Mountain pipeline to date; Stand.earth 2022).

- Block new Canadian fossil energy infrastructure with your body (Protect the Planet 2023).
- Through your family, friends and organizations where you have influence, help realize the Declaration on Rights of Indigenous Peoples (DRIPA) and its inherent protection of the planet (BC Gov 2019)

CONCLUSION

We are in a pandemic of denial on the urgency of the climate emergency, but this denial is treatable. The treatment is education and action. The time for this is now. Where you are at in this moment is the place. Not everyone is inclined to NVCD, but everyone has their gifts to bring to the broad action agenda outlined here. You are one of many voices for change and by taking action, in your own personal way, you can find hope for the future as we all navigate collectively through the climate emergency.

DECLARATIONS

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JMHCC

Mental Health Impacts in A World Disrupted by Climate Change

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ABSTRACT

In this brief commentary the author challenges social scientists whose research includes mental health to recognize that everything from the settings in which they work to the nature of their research is about to be disrupted by the impacts of climate change. The heart of this changing landscape includes the impacts that climate change will have on mental health, already in evidence among younger members of the population. Mental health research needs to incorporate climate change induced causal factors, shift its approach to a more iterative model and understand that socio-cultural, as well as psychological factors drive climate distress.

Keywords: *Climate change impacts; Mental health*

PERSPECTIVE

Linking Climate Change and Mental Health

Based on the findings of scientists worldwide there is every reason to believe that we will face a socially, politically and environmentally disrupted world over the next decades and that this disruption will profoundly impact mental health. Recent evidence presented by the Intergovernmental Panel on Climate Change explicitly acknowledges the link between climate change and mental health, especially in young people (IPCC 2022). A ground breaking survey of 10,000 young people across ten developed nations published in Lancet reflects wide ranging emotional reactivity to the climate crisis correlated with perceived inadequate government response and associated feelings of betrayal (Hickman et al, 2021). Recently published Canadian research confirms these findings, including that young people feel betrayed by government inaction (Galway and Field, 2023). A consistent theme in these studies connects mental health issues such as anxiety and depression to a sense among young people that a climate change impacted future is uncertain and unpredictable and that societal leadership cannot be relied on to protect their well-being.

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Social Scientists Adaptation to a Socially Disrupted World

From the perspective of the frontline of responding to climate change and, in anticipation of a disrupted world, what adaptations are required of social scientists, particularly scientists whose focus includes mental health? Perhaps, the first and most significant adjustment is the most difficult – accepting that research and life in the community of researchers itself will be disrupted. Business as usual in the research and academic worlds by the second quarter of the 21st Century will become impossible. For example, at the time of revising this commentary the University of British Columbia branch in Kelowna was evacuated because of wildfires during the summer of 2023 (Kelowna Fire, 2023). In times of crisis such as war, societies typically redirect their resources to face the immediate threat (Klein 2020). Picturing an upsurge in climate change related mental health issues, researchers and academics will be called upon to design and evaluate immediate interventions on an emergent basis.

Reimagining Mental Health Research in a Socially Disrupted World

In anticipation of a physically and socially disrupted world, research programs and the institutions in which they are situated would do well to begin re-imagining themselves, even though the relatively cloistered environments of most universities have protected them from the initial impacts of climate change to date. The first evidence that universities were accepting the gravity of climate change was a proliferation of graduate programs in the environmental sciences (Borck & Coglianes 2009). However, mirroring the siloed response of many sectors of society many of these programs became highly specialized and began to occupy their own terrain quite separate from other faculties in universities. The specialized language of environmental sciences also makes its findings inaccessible to the wider society. For example, section A.1.2 of the recently released IPCC Summary for Policy-makers reads:

> *The likely range of total human-caused global surface temperature increase from 1850-1900 to 2010-20197 is 0.8°C to 1.3°C, with a best estimate of 1.07°C. Over this period, it is likely that well-mixed greenhouse gases (GHGs) contributed a warming of 1.0°C to 2.0°C8, and other human drivers (principally aerosols) contributed a cooling of 0.0°C to 0.8°C, natural drivers changed global surface temperature by –0.1°C to +0.1°C, and internal variability changed it by –0.2°C to +0.2°C. {2.1.1, Figure 2.1 (IPCC 2023).*

As the scientific evidence pointing to the cascading impacts of climate change, now and in the future, accumulated and extreme weather events worldwide became more frequent, interdisciplinary programs began to show up and recognize the social and cultural implications of climate change, including its intersection with social justice issues such as colonialism, racism and income disparity (Misiaszek 2012).

Covid-19: A Precursor of the Impacts of Climate Change

Covid-19 was a precursor of the impacts of climate change and an example of why responses to disruptive change are often delayed. The COVID-19 crisis provided us with a vivid example of how 'not yet' works. By early in January 2020 COVID-19 was in full swing in Wuhan, China but it was far away. Scientists and government intelligence agencies were frantically ringing alarm bells, but society after society in the developed world hesitated when action could have saved lives and prevented more dire economic consequences. The delay is exemplified in the timeline below:

- *March 7, 2020 – Canada's Chief Public Health official, Theresa Tam reassured Canadians that Covid-19 was 'low risk' on.*

- *March 9,2020 (the day before Italy locked down) – French President Macron strolled the Champs Elysees with his wife touting the vibrancy of the economy.*

We had to wait, to see it, to taste it, to hear the sirens blare and witness a loss of lives. And then we acted, some countries more boldly and definitively than others and with very different results.

Insensitivity to One Another and the Natural World

We are deeply attached to set of values and an economic system that have conferred tremendous material benefits while, at the same time, making us increasingly insensitive to one another and to those less fortunate, less privileged and less endowed, not to speak of our connection to the natural world (Ferguson et all, 2007; Henley, 2021). We tell ourselves that our good fortune reflects our virtue, our cleverness and the fruits of our efforts. The result is a trance like state of persistent self-interest, incessant activity and the pursuit of endless growth and progress that contributes to ignoring the cascading impacts of climate change.

The reticence of societies to wholeheartedly embrace the fundamental change that climate change demands of us is a critical area for research. How is it, future generations will ask, that knowing what we now know that we responded so slowly to the climate driven events that scientists are predicting? I remember vividly talking to some municipal officials about this. Their idea was that the majority of people do not have the *bandwidth* to address climate change in their everyday lives. By the time, they do their job, go to the gym, feed themselves, drive children to extracurricular programs and relax to some degree, there is nothing left over. Cultural theorist, Carolyn Pedwell adds another important dimension (Pedwell 2021). We are very much governed by habits and routines and it is only through the disruption of this highly patterned behaviour that transformation becomes possible. To this I would add that assumptions, beliefs and values *disappear* in habits and routines to the extent that we often don't know why we are doing things. In the meantime, the mental health impacts of climate change are in evidence and increasing, especially among young people, as noted in the studies cited above.

Emphasis on the Efficacy of Interventions

The further adaptation that climate change requires of the social science community is a shift in emphasis from a more purely scientific effort to get our understanding of mental health phenomena right at the outset to the more messy and iterative work of assessing the efficacy of interventions as we go along (Patton, 2011; Dozois et al, 2021). In the near-term future, the public health problems we will face are going to be too painful and widespread to hold back from intervening. We will need more precise and sophisticated developmental evaluation-focused research with the goal of evolving evidence enhanced interventions.

Socio-cultural Factors and the Etiology of Climate Distress

In conclusion, the etiology of climate change induced mental health issues poses some critical theoretical questions related to research and, ultimately, treatment. Clearly, a great deal of the mental anguish that young people are suffering originates in the uncertain future that climate change prescribes and their perception that society's leadership is failing to respond with commensurate urgency. The risk of understanding climate distress within the typical framework of mental health problems is to individualize what is fundamentally a socio-cultural and political problem. Arguably, conceptualization and treatment of climate change induced mental health issues needs to be firmly based in understanding the insanity of cultures that permit the destruction of environments that support life itself.

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Personal Legacy Motivation as A Psychological Mechanism for Increasing Climate Action and Coping with Climate Change Stressors

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ABSTRACT

Climate change requires transformational changes to the ways we relate to one another and our planet, produce and consume resources, and live our lives, both as individuals and collectively. However, engaging in meaningful individual and societal change while facing existential threat is deeply challenging and can feel stressful, hopeless, and overwhelming, making it all too easy to ignore and turn away from. In this commentary, we argue that the concepts of personal legacy motivation and generativity hold underappreciated potential for promoting positive mental health outcomes in the context of climate change, particularly through their capacity to promote active coping with the issue. We describe the ways that these concepts could help individuals withstand the mental health impacts of climate change and conclude by offering important future directions for empirical tests of how personal legacy and generativity could be utilized as tools to promote adaptive coping with the different psychological stressors posed by climate change.

Keywords**:** *Personal legacy; Generativity; Coping; Mental health; Climate change*

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PERSPECTIVE

The Threat of Climate Change

The past decade has witnessed a much-needed increase in attention to and concern for the mental health impacts of climate change (Coffey et al., 2021; Doherty & Clayton, 2011). This newfound attention is justified: global polling has found that most people see climate change as one of the most important threats facing humankind (Atske, 2022; The Global Risks Report 2022, 17th Edition, 2022). In the U.S., recent polling found that a robust majority of Americans were worried about climate change (Leiserowitz et al., 2023). Given the many pathways through which climate change can directly and indirectly harm mental health, this rise in public concern is not surprising (Doherty & Clayton, 2011; Mah et al., 2020).

There is also some evidence that the idea of climate change itself can be stressful, for example through news about climate disasters (Berry et al., 2010). New measures capture climate change-specific emotions such as climate change anxiety (Clayton & Karazsia, 2020), eco-anger, eco-anxiety, and eco-depression (Stanley et al., 2021). Using these and other measures, researchers have found that people are emotionally responding to climate change in ways that could negatively impact their mental health (Feather & Williams, 2022; Latkin et al., 2022; Stanley et al., 2021). For example, people who expressed greater worry about climate change also reported higher levels of climate change anxiety (i.e., cognitive-emotional and functional impairment associated with thoughts about climate change; Feather & Williams, 2022).

Although there are concerns that the harmful psychological impacts of climate change may hinder successful coping, it is crucial to recognize that coping focused on these psychological impacts alone is not enough. It is imperative that individuals engage in behaviors that will aid in mitigating or adapting to climate change (Doherty & Clayton, 2011). Climate change is a legitimate threat to our well-being, and anxiety or fear plays a critical role in motivating necessary protective actions to address this threat. As experts have argued, there is likely an optimal level of climate change concern that can effectively prompt pro-environmental action without paralyzing individuals (Feather & Williams, 2022). Interestingly, climate change distress has been found to positively correlate with engagement in activism, even after controlling for depression and anxiety (Latkin et al., 2022). Consequently, it is a challenge for psychologists to understand how to balance the need for mental health protection with the necessity of collective action on climate change.

Two Key Psychological Mechanisms: Personal Legacy Motivation and Generativity

Here, we propose that the related but distinct psychological mechanisms of personal legacy motivation and generativity can be effectively leveraged to motivate climate action while simultaneously mitigating some of the potential mental health impacts caused by climate change. The concept of personal legacy has been defined as “an enduring meaning attached to one's identity and manifested in the impact that one has on others beyond the temporal constraints of the lifespan” (Wade-Benzoni, 2019). Building on this definition, legacy motivation (i.e., seeking to build a legacy) refers to a person’s attempts and effort to create an enduring identity based on the way they impact others. Scholars have explored this topic by examining people’s concern for their personal legacy (i.e., their legacy motivation) and their generative disposition (i.e., generativity). Generativity refers to a person’s propensity and willingness to engage in acts that promote the well-being of younger generations, often as a means of increasing the long-term survival of the species (Flett, 2018). Although generativity and legacy motivation are distinguishable, they share similarities regarding intergenerational scope. Both

constructs involve a focusing of one's attention towards the impact and beneficence they can bestow on others, whether they are kin or not.

In the sections that follow, we argue that people's legacy motivation and generative disposition could prove to be useful tools for motivating pro-environmental action. We highlight correlational and experimental research which supports this link. We then briefly review research that suggests that generativity and legacy can benefit people's mental health. Considering these two lines of evidence, we then theorize that both wanting to leave legacy and generativity could also aid in promoting adaptive coping with the mental health stressors associated with climate change. Although empirical research on this specific topic is scarce, our argument builds off of well-established theoretical work on both the psychological nature of adaptive versus avoidant coping (e.g., Taylor & Stanton, 2007; Zeidner & Saklofske, 1996) and the role of hope and efficacy in promoting effective engagement with large-scale challenges (e.g., climate change).

Legacy Motivation, Generativity and Climate Action

Previous research has suggested that personal legacy can play a significant role in promoting proenvironmental action. For instance, work by Wade-Benzoni and colleagues found a prosocial effect of legacy motivation in intergenerational decision-making contexts (Fox et al., 2010; Wade-Benzoni, 2019; Wade-Benzoni & Tost, 2009). Other experimental work shows that making one's personal legacy salient increases how pro-environmentally people act in behavioral tasks/paradigms that assess proenvironmental behavior (Bang et al., 2017; Grolleau et al., 2021; Shrum, 2021; Syropoulos et al., 2023a; Syropoulos et al., 2023b; Wickersham et al., 2020; Zaval et al., 2015). Simply making one aware of their own mortality can increase concerns for one's personal legacy, which in turn promotes their generosity towards future generations in a climate change goods game (Hurlstone et al., 2020). These findings suggest that concerns for personal legacy could be a useful lever for encouraging pro-environmental action. It's worth noting, however, that this work stems mainly (if not exclusively) from online (web-based) studies, which limits both generalizability and applicability. Intervention work applying these methods of making one's legacy salient is required to test effectiveness in more ecologically valid settings.

Closely related work on generativity demonstrates a positive relationship with climate change engagement. Recent work, for example, reveals that generativity is associated with elevated environmental concern (Afridi et al., 2021; Pratt et al., 2013). People consider engagement in generative behaviors as an important part of their environmentalist identity (Alisat et al., 2014; Horwitz, 1996; Matsuba et al., 2012). Those who express greater generativity (via self-reports) also report greater pro-environmental attitudes (Jia et al., 2015; Jia et al., 2016; Milfont & Sibley, 2011; Wells et al., 2016) and engage in more sustainable purchasing behaviors (Giménez García-Conde et al., 2016; Shiel et al., 2020; Urien & Kilbourne, 2011).

The American Psychiatric Association (APA) encourages individuals to engage in climate mitigation and adaptation behavior, in an effort to both be better prepared to deal with the impacts of climate change and to respond to these impacts when they occur (see APA, 2023). The aforementioned evidence illustrates that being concerned about one's legacy or being asked to reflect on one's legacy motivates climate action. Thus, relying on existing evidence about the effectiveness of personal legacy (and the related construct of generativity) we theorize that people who think and act on their legacy more often would also be the ones who would be more likely to engage in climate mitigation and adaptation, helping them (and their family) be prepared to deal with the impacts of climate change. We also argue that this focus on leaving a legacy might have heretofore overlooked psychological benefits.

Legacy Motivation, Generativity and Mental Health

Whereas the connection between wanting to leave a legacy and environmental stewardship is both relatively straightforward and well-established in the empirical literature, it is perhaps less obvious how and why concern about one's legacy might be beneficially linked with mental health outcomes. After all, worrying about leaving a positive legacy could simply be yet another source of anxiety in one's life, especially in the face of so many interlocking, massive societal challenges—from climate change to global poverty to food and water shortages to the advent of super-powerful artificial intelligence—that seem to elide individual-level solutions.

Although such concerns are valid, we argue that engaging in legacy-building activities could potentially serve a protective, proactive function for people's mental health, especially in the context of large-scale, collective action problems such as climate change. In part, this builds from the very definition of the concept of legacy provided above (Wade-Benzoni, 2019): "an enduring meaning attached to one's identity and manifested in the impact that one has on others beyond the temporal constraints of the lifespan". In this definition, three things are made apparent: (1) meaning-making is an important activity that is attached to a person's identity which both motivates and helps them built their legacy; (2) wanting to leave a personal legacy focuses on positively impacting other people's lives, and (3) this positive impact lasts beyond the temporal constraints of the lifespan. Taken together, these three components of personal legacy suggest the following: first, personal legacy, through engagement in legacy-building activities, will help people find meaning; second, it will motivate them to engage in meaningful action (as highlighted in the previous section); and third, this action will help people form an enduring identity that could help them deal with existential threats (specific to their own mortality). Also important for this link between legacy motivation, well-being, and action is a sense of hope: without a belief that one can have an impact (i.e., that humanity can address climate change; that an individual can make a difference), such actions may be difficult to maintain. An individual who has developed this enduring sense of identity has likely also developed hope, through their belief that they will impact future others, which should then help them to remain engaged.

Each of the features of legacy motivation (i.e., sense of meaning, motivation for prosocial behavior, protection against existential threat) has direct implications for mental health and well-being. However, research on the association between personal legacy (and legacy motivation) and mental health is sparse. Only one study finds evidence that those who express greater concern for their legacy report feeling more grateful in their life (Syropoulos & Markowitz, 2021), which is an important predictor of mental health (Portocarrero et al., 2020). Aside from this work, there is no research that we know of which explicitly connects personal legacy and benefits to one's mental health.

However, our predictions can be informed by work focusing on generativity. Generativity and legacy motivation are constructs that overlap, as they both focus on attempts made to confer benefits to future generations of people (kin or not). Erikson, who coined the term generativity (Erikson, 1950) argued that at one point in our lives we have this desire to care for those who will come after us. Driven by this desire, we seek to pass values and teachings that will help them live better lives.

Given this overlap between legacy motivation and generativity, we can gain some initial insight into the potential mental health implications of legacy building efforts by exploring extant work on the relationship between generativity and mental health. A small but robust literature has explored this link. Generativity interventions (e.g., Gruenewald et al., 2016), for example, have been found to decrease psychological distress and even pro-inflammatory gene expression (e.g., Moieni et al., 2020). In research on older adults, those who felt more generative also exhibited lower mortality risk (Gruenewald et al., 2007, 2009; 2012). Correlational evidence suggests that adults who report greater

generativity also report greater psychosocial well-being, such as lower levels of depression, or greater feelings of self-efficacy and mastery (Grand et al., 1988; Gruenewald et al., 2007; 2009; McAdams et al., 1993). Aside from associations between generativity and fewer negative mental health consequences, evidence also links generativity to increased life satisfaction and self-reports of happiness (An & Cooney, 2006; Keyes & Ryff, 1998; Serrat et al., 2016). Generativity also helps individuals adjust to new roles in their lives, such as being a grandparent (Thiele & Whelan, 2008), or a retiree (Serrat et al., 2016).

Taken together, the above-referenced empirical and theoretical work strongly suggests that both legacy motives and generativity can serve as productive aides for coping with existential threat. While there is limited research on personal legacy and mental health, studies on generativity highlight a clear benefit to one's mental health which lends support to the proposed link between legacy and wellbeing. Further empirical work is needed, however, to fully explore this potential link.

Coping with Climate Change

People can and do use a variety of coping strategies—some more adaptive and proactive than others—when they feel stressed about climate change (Mah et al., 2020). For example, avoidant coping strategies—which involve distancing oneself or denying the existence or severity of a threat to alleviate psychological stress—may be prevalent amongst some individuals or groups in part because climate change is not a problem which can be resolved by the action of a single person. In contrast, more active coping strategies that work towards addressing the root problem—such as resolving to change one's behaviors to reduce one's own carbon emissions or taking time to prepare one's household for climate impacts (e.g., create a disaster kit for extreme weather)—are also reasonable and likely responses to the threat of climate change.

Adaptive Climate Change Coping Strategies

Adaptive coping refers to the use of coping strategies which promote well-being. Importantly, the strategies which are considered adaptive for any given individual will vary greatly depending on the stressor being dealt with and the resources individuals have at their disposal (Folkman & Moskowitz, 2004). While the adaptiveness of coping strategies depends on the context, coping with climate change should involve a combination of strategies that deal with the emotional aspects and those that involve mitigation and adaptation behaviors (Doherty & Clayton, 2011). Coping which involves thinking about or acting on one's legacy might be a way to achieve this potentially powerful and productive combination of coping strategies.

There is some research which supports the need for multiple kinds of coping. In addition to the kinds of proactive and problem-focused coping strategies people might use to protect their well-being in stressful situations, it is also important to engage in meaning-making coping strategies (Ojala, 2012a, 2012b; Park & Folkman, 1997). This meaning-making coping might involve altering one's perceptions of the stressor or one's responses to it by linking those perceptions and responses to important personal values. Such meaning-making coping strategies are needed in tandem with active coping strategies when dealing with a stressor that cannot be changed simply by individual behavior (e.g., climate change). Only using active coping strategies (i.e., strategies aimed at changing the source of stress) will result in action that is not sustainable; ultimately, the negative emotions that might have initially spurred the action will remain (Feather & Williams, 2022). We believe that personal legacy might be a way to make meaning of one's efforts to cope with climate change.

Benefits of Coping Through Meaning-making

Empirical work has examined the importance of coping via meaning-making. In studies of children and adolescents, Ojala (2012b) found that one way that they cope with their climate stress is by trying to seek out the positives, for example by believing that humanity will come together to address climate change and feeling a sense of trust towards leaders and scientists in their ability to find climate solutions. Research on the relationship between well-being and different coping strategies used for climate anxiety by children suggested that engaging in problem-focused coping strategies—such as doing what one can to help—has a positive association with greater reported negative affect, and with increased worry (Ojala, 2012a). However, there was some evidence that meaning-focused coping can buffer these negative effects: children who engaged in high levels of both problem- and meaning-focused coping reported less negative affect than those who reported low meaning- but high problem-focused coping (Ojala, 2012a).

Other work which examined the role of psychological (in)flexibility in the relationship between concern about climate change and distress (i.e., worry and engagement in the issue and climate change anxiety) also highlights the importance of meaning-making (Feather & Williams, 2022). In this work, the researchers hypothesized that greater psychological flexibility, which includes "identifying one's values and taking committed action in line with those values" (p.139), might attenuate the impacts of being concerned about climate change and experiencing psychological distress. In parallel, they suggest that inflexibility, which includes "lack of contact with values and inaction" (p.139), might increase the likelihood of experiencing distress. They found support for the idea that inflexibility strengthens the relationship between climate change concern and distress (Feather & Williams, 2022). Although this work was cross-sectional, the findings suggest that decreasing psychological inflexibility may represent one way to ensure that proenvironmental engagement does not worsen mental health.

Legacy Motivation and its Potential Influence on Coping with Climate Change

While the research reviewed above does not directly measure legacy, other related work suggests that one's values can be linked to coping strategies. For example, the measures used in Ojala's work did not specifically measure thinking of one's legacy as a meaning-focused strategy but did include a belief that despite the challenge climate change poses, we must have hope (Ojala, 2012a). Linking legacy to proenvironmental behaviors, i.e., focusing on the long-term and additive benefits of these behaviors, could be a useful way to promote hope and avoid the sense that one's actions are insufficient or ineffective. Alternatively, when that sense of meaning is lacking, continuing to engage in proenvironmental behavior could feel like a futile exercise if no change in the stressor itself (i.e., climate change) is observed. People may feel helpless and give up efforts to cope. We might imagine that when people are able to accept their climate change emotions—and act on them in ways that align with their values, including their desire to leave a positive legacy—this could be a way to add meaning to and thus attenuate the potential for negative health impacts of engaging in proenvironmental behavior.

Further, as a psychological construct, legacy motivation is considered a psychological mechanism that helps individuals deal with existential threat (McAdams & Aubin, 1992; Wade-Benzoni & Tost, 2009), that is, one's concerns about their mortality (see literature on Terror Management Theory, TMT; e.g., Greenberg et al., 1997). In fact, scholars have posited that TMT can provide novel insight into people's emotional and behavioral responses to climate change (Smith et al., 2022), as it gives us a perspective of how individuals might react to a specific threat that makes their own mortality salient. Thus, personal legacy may serve as a valuable mechanism to increase engagement in climate action and build resilience in the face of climate change. Legacy can help individuals make sense of their own mortality and potentially cope with it through pro-social actions.

Without confronting and accepting the negative internal states they may be experiencing or finding ways to connect pro-environmental actions to important values, people who are concerned about the environment may experience burn-out and may not successfully cope with the psychological impacts of climate change (Feather & Williams, 2022). While climate change cannot be addressed by any one individual working in isolation from others, many individuals acting together can have a difference. To sustain that action, connecting those individual choices and behaviors to one's legacy might be a viable strategy.

Future Directions

The current investigation highlights how concerns for establishing personal legacy could be a powerful tool to motivate individual climate action, promote constructive and active coping with climate change stressors, and reduce the impact of climate change stressors on mental health. Establishing the associations theorized in this investigation could provide concrete empirical evidence for the positive impact of legacy for coping and well-being. To do so will require new empirical investigations on a number of related fronts.

Focusing on Youth and Young Adults

Because (climate change and proenvironmental) legacy building is a long-term activity that unfolds and evolves over time, longitudinal research is critical. This work should include diverse samples, with a particular focus on younger adults and adolescents. We know that younger generations tend to express greater worry for climate change (Coffey et al., 2021), yet much of the work on generativity focuses on older generations; moreover, the concept of legacy may be relatively less salient in everyday life for younger individuals. Thus, there is a clear need to examine these constructs in younger populations as well. Examining how and when legacy motives form and evolve in early adulthood, how they are expressed at various life stages, and how they affect behavioral and (mental) health outcomes will provide valuable insight into their utility from an intervention perspective. Further, the causal, and perhaps bidirectional, pathways between legacy, active coping, and well-being would be best explored through longitudinal work due to the long-term nature of these various constructs.

Need for Interventions Outside of the Lab

Intervention work is clearly called for in this domain. So far, work intended to promote and/or leverage legacy motivation has focused on intervention at a single time-point, with no evidence for the prolonged effectiveness of legacy interventions. These "single-touch" interventions which leverage legacy could prove useful for behaviors that happen infrequently but have lasting consequences (e.g., a large green purchase or commitment or green voting behavior). However, finding a way to frequently remind individuals of the legacy-building implications of their behaviors could prove particularly effective for sustaining day-to-day proenvironmental behavior and coping. Ecological momentary assessment designs could help us understand how often people think about their legacy. Daily or weekly diary designs could help us examine whether meaningful reflection on one's legacy can sustain the beneficial effects noted in online studies. Randomized control trials that are conducted in different communities could offer causal evidence for interventions that focus on targeting people's legacy. A multi-pronged approach that incorporates ecologically valid study designs is critical for pushing this topic of research forward.

Generalizability or Limitation of Legacy Interventions

Efforts that seek to pinpoint what behaviors and outcomes are most or least impacted by legacy-framing interventions are also worthwhile. Most research to date has focused on economic behaviors or donation tasks (e.g., Shrum, 2012; Zaval et al., 2015), which appears to be impacted by legacy interventions. However, it is not yet clear whether more diverse sets of climate-friendly actions are similarly amenable to change via legacy-based interventions. This becomes of paramount importance as not everyone has the same capacity to engage in climate action. We speculate that even mundane behaviors could be reframed as legacy-building activities. For example, turning off the lights or choosing to buy a green product might seem relatively inconsequential in the fight against global climate change. But, when reframed as part of one's legacy-building efforts, such behavior could be seen as more effective, helping individuals shift their anxiety stemming from climate towards action, while also promoting hope and active coping in day-to-day life. Thus, even for those with relatively limited capacity to engage in climate action, mundane behaviors could be reframed as legacy-building activities and thus be seen as meaningful actions. Moreover, actions that are less frequent, accessible to more people, and hold arguably more influence in promoting sustainability (e.g., voting for a specific pro-climate candidate; engaging in collective action), should also be studied as outcomes of intervention campaigns. Such work could highlight whether well-strategized and timely campaigns before key events (e.g., local and national elections) could also spearhead change.

Need for Consistent, Reliable and Valid Measures

Essential for all aforementioned study designs is the need to have reliable, valid and consistent measurement approaches for capturing legacy, generativity, hope, and coping with climate change. Although there has been no formal review on the measurement properties of legacy concern scales, the most frequently used measure is that used by Zaval and colleagues (2015). However, it is not clear whether this measure reflects a person's trait or state legacy concerns. Further, it is also not clear whether legacy is a unidimensional construct. In fact, evidence from work on people's values differentiates between altruistic and egoistic values (De Groot & Steg, 2009), which could suggest that people similarly may be motivated to leave a legacy for egoistic (caring about being remembered as someone with a good reputation) or prosocial (i.e., caring about their impact on others) reasons.

With regards to measures of coping, while general measures of coping exist (e.g., COPE, Carver & Scheier, 1994), researchers have also created ways of measuring climate-change-specific coping (e.g., Ojala & Bengtsson, 2019). While specific measures as well as qualitative methods of capturing specific coping strategies are useful for understanding what people do about climate change stress, they have disadvantages when it comes to comparing climate change coping to coping with other stressors. Further, there is no single measures of 'climate change coping' which has been widely validated or employed. Researchers should carefully consider what they want to understand about coping and its relations to other constructs to choose an appropriate measure.

Finally, future work should include measures of well-being, including hope. Some work has measured hope about climate change, noting the difference between hope based in denial and constructive hope (Ojala, 2012). While this measure has not been widely employed, it captures important nuances of hope about climate change which have different implications for well-being, which should be considered by anyone interested in hopefulness. There are also measures of hope used in the climate change domain which do not make the distinction between hope based in denial and constructive hope, see Swim & Fraser (2013); Geiger et al. (2019, 2021). Other measures of well-being, including eco-depression and eco-anxiety/climate change anxiety, have been developed and validation studies have found that these are distinct from general anxiety and depression (e.g., Clayton & Karazsia,

2020). Because of this, these more specific measures should be used when studying legacy and coping in this context.

Research on Different Aspects of Mental Health

Research into other related concepts and mental health in the climate change context is also needed. Although the existing research on the two related constructs of personal legacy and generativity was summarized, the review was limited in scope. Other future-oriented constructs could prove helpful and could also be considered as mechanisms that can increase all the aforementioned outcomes. Some of these include future-self continuity (how similar and close to one's future self a person feels; Hershfield & Bartels, 2018), consideration of future consequences (how much one considers the impact and consequences of their actions in the future; Strathman et al., 1994) and long-term orientation (having virtues and values that promote thinking about the future; e.g., Bearden et al., 2006). Examining their impact on well-being, coping and action in the climate change domain could thus prove useful.

Parenthood and Close Relationships

Studying personal legacy within the context of parenthood and other close relationships could also prove useful. A recent review (Shrum et al., 2023) finds that the evidence for the "green parenthood" effect is mixed. However, the same research suggests that future-oriented constructs that focus on impact on others (e.g., generativity and legacy) could be the reason why some positive effects are observed. Understanding how and when parents are motivated to act in ways that will benefit their children, and how they (and their families) can cope with climate change via legacy-building efforts is also important. Much of the work on climate change coping has focused on the mental health of children and youth (Clayton et al., 2023; Ojala, 2012, 2013). Studying family dynamics around climate change in the context of legacy might help us to better understand how to promote their well-being.

More broadly, investigations of the influence of different characteristics of close relationships on people's legacy and generativity might also prove useful in helping us understand how relationships influence coping with climate change and climate action. To the best of our knowledge, there is limited evidence on how relationship quality, satisfaction, conflict or support, as well as more dispositional traits such as a person's attachment style, influence how concerned people are about their legacy, or how generative they feel. Our predictions in this domain can be influenced by existing work which highlights gratitude (e.g., Algoe, 2012; Algoe et al., 2010) as an important part of high-quality close relationships. Since gratitude is a robust predictor of legacy (Syropoulos & Markowitz, 2021) and overall concern for future generations (Syropoulos et al., 2021), we could expect a similar pattern of results for legacy, such that those in environments with healthier relationships and more support also report more concerns for their legacy, and thus might be more likely to act proenvironmentally and cope constructively with climate change.

Hope and Climate Change

From a theoretical standpoint, we want to highlight the importance for more research on the concept of hope in the climate change domain (Geiger et al., 2021; Marlon et al., 2019; Ojala, 2023). As the impacts of climate change are experienced more frequently in daily life, feelings of hopelessness might become more prevalent. It could be the case that simply engaging in climate action does not translate into feeling hopeful for the future. It is also possible that hope on its own might not motivate individuals to engage in climate action in the first place. As the aforementioned findings suggest, personal legacy (and generativity) can both motivate action and benefit one's mental health. It is possible that when

framed as a legacy-building activity, climate action could generate hope, which in the long run could sustain proenvironmental engagement.

Conclusion

Climate change requires transformational changes to the ways we relate to one another and our planet, produce and consume resources, and live our lives, both as individuals and as a society. Yet transformational change in the face of existential threat is deeply challenging, in part because it is stressful and overwhelming to think about, and thus easy to turn away from. Recent research suggests, however, the helping people to develop strong commitments to building a positive legacy for ourselves, future generations and our planet could help support and promote more adaptive responses to the challenge.

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JMHCC

Socioeconomic Status, Climate Change, and Mental Health: An Interdisciplinary Perspective

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ABSTRACT

Given the documented evidence that the relationship to one's physical environment is a determinant of mental health outcomes, it is important to examine how psychological researchers could apply clinical and research expertise to tackle social policy concerns. This paper provides an overview of how socioeconomic factors contribute to mental health disparities, particularly those related to climate change. Fundamental Cause Theory, which discusses the ability of socioeconomic status to influence health through a number of pathways, is used to explain climate-related disparities and examine risk factors that arise due to lower SES on mental well-being, such as increased exposure to environmental hazards. This work discusses the importance of one's ecology and community infrastructure, the impact of unequal access to natural spaces, and additional structural impediments of climate inequalities. After reviewing the literature and highlighting the link between SES and climate-related impacts, this paper suggests policy-focused solutions to achieve climate justice and improve mental health. Moreover, it emphasizes that while green infrastructure, which refers to practices that incorporate nature into communities, will help combat climate-related disparities, it's also important to acknowledge the need to avoid green gentrification, which entails the reproduction of systemic inequities and can alienate or displace certain community residents. Finally, this paper aims to inspire other scholars to create institutional change as a means of serving communities which have been disproportionately marginalized by the impact of socioeconomic inequality during the climate crisis.

Keywords**:** *Socioeconomic psychological disparities; Climate policy*

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INTRODUCTION

Background

The ongoing intersection of the political and the personal requires that psychological researchers actively apply their work to the tackling of social barriers to positive mental health. Psychologists can have a crucial role in influencing policies, especially since policies based on psychological data can affect social behavior (Ruggeri, 2017). With regard to one policy issue — climate change — this paper highlights facets of socioeconomic status and explains, due to its well-encompassing categorical nature, how one's ecological relationship, access to nature spaces, and physical landscape explain climate inequities. More specifically, it asserts that one's socioeconomic status can partly explain climate-related mental health disparities. This work deploys an interdisciplinary perspective to explain psychological inequities through examining and applying Fundamental Cause Theory, which argues that socioeconomic status can be "...associated with a wide variety of resources that can be marshaled to improve health in a diverse and changing environment" (Chang & Lauderdale, 2009). After reviewing the literature, this paper proposes policy-focused climate solutions to reduce socioeconomic climate disparities.

Research Question

Our research question is "Which mechanisms relevant to underlying, socioeconomic status-related causes of health inequity, may contribute to reducing mental health disparities related to climate change impacts?"

PERSPECTIVE

Climate Change and Socioeconomic Status

Overwhelming evidence indicates that climate change remains a threat to many ecosystems, particularly since "specific levels of warming" are tied to the extinction and destruction of certain species and because it has the ability to endanger the health of humans, including those persons who reside within coastal areas (Huggel et al., 2022). Thus, it is documented that besides its ability to endanger individuals' security, climate change also has the potential to harm several organisms and influence one's habitat. In this respect, due to the ways that climate change can impact societies, understanding how it can damage one's mental health and severely alter one's relationship to their environment becomes important to the achievement of social-wellbeing and equity relationships between communities. More importantly, it is imperative to study whether and how people of lower socioeconomic disposition are more vulnerable to worse mental health outcomes because of their increased likelihood to face negative impacts from climate change.

What is Socioeconomic Status (SES)?

While the intersection of one's social identities with the environment plays a role in the impact of climate change, one identity that is especially important to examine in the context of climate inequality is SES. SES includes several components, such as the following: "occupation, education, income, wealth, and residence neighborhood" (Shafiei et al., 2019). More particularly, SES includes objective and subjective measurements, such as individuals' ratings of their placement in the socioeconomic spectrum, and some research has indicated that subjective SES is more strongly associated with well-being compared to objective measurements (Navarro-Carrillo et al., 2020).

In addition to these two metrics, SES is a strong predictor of an individual's morbidity as well as their mortality due to its ability to encompass several variables linked to health outcomes, such as the

ability of income to reflect “spending power, housing, diet, and medical care” (Winkeby et al., 1992). For instance, "the size and reach of people's social networks" usually has a positive relationship with social status they have (Cao & Smith, 2020). Furthermore, individuals often experience better mental health outcomes overall if they have greater social support, and familial or friend support has been demonstrated to moderate adverse stress effects (Bekiros et al., 2022). Similarly, metrics such as occupation measure “prestige, responsibility, physical activity, and work exposures” (Winkeby et al., 1992). Education illuminates one’s skills for acquiring “positive social, psychological, and economic resources'' (Winkeby et al., 1992). Hence, it can be seen that SES is a tool for not just measuring one's position to others, but it also includes several determinants that can influence health outcomes.

When it comes to establishing and utilizing a framework for SES within the context of climate-related mental health outcomes, it is critical to take one’s economic standing and residential status as a guiding tool for studying disparities in psychological well-being. Regarding the impact of SES on climate change, individuals with lower amounts of income are impacted more by the effects of climate change since developing nations might be unable to ensure proper access to resources such as food and water, thus inadequately adapting to alterations in climate at an institutional level (Balasubramanian, 2018). In addition, these socioeconomic disparities will be exacerbated, as indicated by the fact that "up to 90% of low-socioeconomic status individuals with mental health disorders are already not receiving treatment" across the world (Koder el al., 2023). Moreover, from a geographical perspective, persons residing in cities are more likely to experience higher temperatures, increased air pollution, and fewer opportunities to access green space as well as bodies of water due to climate effects, in turn possibly impacting the likelihood of suicide or other mental health problems (Zhang et al., 2021). Indigenous and rural areas may also suffer due to climate-related destruction. For instance, First Nations groups in Australia, which already face socioeconomic disadvantages, will be more prone to undergoing more "devastating experiences of the destruction of the natural environment" (Koder el al., 2023).

Furthermore, there is a link between SES and specific mental health disorders. Broadly speaking, having a lower SES is linked to having more recurrent psychological problems, such as chronic stress, because individuals with lower SES have limited resources to manage threats to their well-being and survival (Kim & Cho, 2020). In turn, events that occur due to one’s socioeconomic disposition before adulthood can result in long-term impacts, and differential exposure towards certain stressors can play a role in producing socioeconomic disparities (Reiss et al., 2019). Among marginalized communities, this issue is exacerbated by experiences of discrimination or social isolation (Macintyre et al., 2018). More importantly, those who are of low socioeconomic disposition may also have "a potentially low capacity to adapt" to climate-related health effects and may not be able to "cope, manage, and recover from new environmental hazards or climate stress" (Ingle & Mikulewicz, 2020). Thus, climate effects exacerbate an already extant relationship between lower SES and mental health.

SES & Fundamental Cause Theory

Because of these aforementioned structural roadblocks, a macroscopic approach towards examining the effect of socioeconomic disposition upon mental health is needed. A persistent question that often arises is how inequalities between social statuses continue to be maintained over time. One theoretical framework that elucidates the link between socioeconomic disparities and psychosocial outcomes is Fundamental Cause Theory, particularly due to its ability to clarify the pernicious ability of SES to be pervasive as a determinant of well-being. For instance, Fundamental Cause Theory asserts that SES is associated with several factors that can impact health outcomes, and despite the fact that this link can persist through intervening mechanisms, resources such as knowledge and prestige can be used to

shield one's health from risk factors (Phelan et al., 2010). In other words, even though SES is linked with multiple disease pathways that can affect the likelihood of the development of disease, the differential availability of supports, such as social ties and power, can limit the impact of risk factors (Phelan et al., 2010). This is especially important because disadvantages based upon differential power might illuminate barriers to interventions and other roadblocks that might prevent at-risk behaviors from being developed. Since these supports aren't equally available to all people, the means by which climate change exacerbates those differences must be examined.

More specifically, regarding the application of Fundamental Cause Theory to climate-related mental health disparities, the physical environment and ecology are mechanisms through which socioeconomic and psychosocial inequities can persist. For instance, hot weather could lead to a higher rate of heat-induced stress and illness, which can reduce labor productivity and lead to economic loss (Matsumoto, 2019). Climate-associated losses can also be experienced due to weather changes, as seen in the case of "ecological grief" that can occur in response to environmental alterations, such as ecosystem loss (Cunsolo & Ellis, 2018). Moreover, climate-related impacts have the potential to cause strong mental health responses, such as hopelessness or anxiety, due to the close relationships that some individuals may have with their natural surroundings (Cunsolo & Ellis, 2018).

In addition to one's economic productivity and ecological connection, there is also the need to discuss how inequality of access to natural spaces affects mental health. For instance, research has indicated that feeling psychologically connected to one's natural environment, such as "feeling part of nature or seeing beauty in natural things," has a positive association with positive well-being, although this link needs to be investigated further (White et al., 2021). However, even if individuals may express an interest in utilizing nature spaces, one paper on access to green space in the United Kingdom during COVID-19 lockdowns suggested that there may be an inadequate supply of these spaces in certain residential communities (Lee et al., 2023). This can have drastic implications, as one paper asserted that "those living in regions with the lowest number of parks and green areas had 16–27% greater odds for depression and suicidal indicators" (Nieuwenhuijsen, 2021). There are multiple pathways through which greenspace mediates mental health, such as being able to "absorb noise from the environment", thus improving residents' mental health and their sleep quality (Chen et al., 2021). More significantly, green space has a "buffering effect on stress", as residents "who lived in neighborhoods with more green space were less affected by stressful life events than those who lived in neighborhoods with less green space" (Chen et al., 2021).

Even though the presence of green spaces is especially important because people residing in urban communities with greater green spaces are more likely to have lower mental distress and anxiety, it is critical to understand that individual self-selection, which is defined as movement towards green spaces, might also influence mental health (Barton & Rogerson, 2017). Nonetheless, it has been demonstrated that greenspace can affect well-being, as a review of literature found that "low-SES groups showed greater health benefits if they lived in a greener neighborhood, relative to other populations" (Rigolon et al., 2021). In addition, properly constructed, outdoor green areas can also help mitigate crime, and natural spaces can offer opportunities for interpersonal engagement (Joshi, 2022). Ultimately, while having greenspace within one's surroundings is associated with "lower income-related health inequality" (Barton & Rogerson, 2017), the quality of the greenspace's amenities, along with its facilities, is also important (Hoffimann et al., 2017). For instance, in regards to specific greenspace qualities, "positive mental health was associated not only with parks with a nature focus but also with green spaces characterized by recreational and sporting activity" (Nieuwenhuijsen, 2021).

On the other side, fenceline communities, which usually include low-income minority individuals, are uniquely impacted by air pollution and experience compounded effects due to

environmentally hazardous situations, such as infrastructural failures (Fos et al., 2021). More significantly, socioeconomic vulnerability can be paired with the effect of ecological issues in the case of environmental displacement, especially because class disparities influence the ability of individuals to adapt to environmental impacts, sustain their lifestyles, or cope with climate events (Jayawardhan, 2017). In turn, it can be seen that socioeconomic inequities can exacerbate problems that originate ecologically.

While ecological contexts and environments play a role in psychosocial well-being, there are climate-aligned policies and several policy recommendations that can tackle the link between socioeconomic status and climate change. For instance, one intervention would be to diversify economic opportunities and strengthen physical infrastructure, thus improving adaptation and giving communities their own tools to fight stressors (Jayawardhan, 2017). Another method can be to encourage community-wide initiatives aimed at improving mental health among low-income people and enhance psychological service accessibility, particularly for coastal communities or rural areas that may be more susceptible to experiencing disasters (Liu et al., 2020).

More specifically, community-wide steps can include empowering communities locally with the resources and tools they need to tackle climate impacts, such as “adaptive planning initiatives” that can include the following as described by one paper: “advice on the best ways of engaging individuals, communities and organisations in developing well informed responses and strategies, along with up to date, accessible information on local climate change impacts, scenarios and tipping points, and mechanisms for sharing learning about the most effective local and regional level actions” (Fritze et al., 2008). This step is especially important for initiatives related to climate justice because there exists a “double inequality” caused by climate change, as "regions and populations that currently have the greatest increase in diseases attributable to temperature rise are those least responsible for the greenhouse gas emissions that are warming the planet" (Ingle & Mikulewicz, 2020). Hence, even though vulnerable communities may not contribute to climate change, they are impacted at a substantially greater level compared to more privileged groups.

Future Directions

The impact of SES can be found on mental health can be seen in numerous ways, and the effect of climate change enhances and reinforces how SES challenges one’s psychological state. However, there are multiple mechanisms that can help to improve people’s mental well-being as it relates to climate change: green infrastructure and public policy.

Green Infrastructure.

The use of green infrastructure is one critical method that can be deployed to improve climate-related well-being. Urban green infrastructure (UGI) consists of spaces (e.g., parks and urban squares) that are composed of elements from nature (Hanna & Comín, 2021). As asserted by a separate paper, when it comes to planning urban infrastructure, green infrastructure specifically “..brings attention to how diverse types of urban ecosystems and built infrastructures function in relation to one another to meet socially negotiated goals.” (Grabowski et al., 2022). In addition, it plays a crucial part in climate change adaptation, such as the ability to manage stormwaters and limit environmental pollution (Ying et al., 2021).

One review indicates some benefits that may arise from green infrastructure, stating, “People in urban neighborhoods that are characterized by lower-income and older-age populations were disproportionately healthy if their neighborhoods contained accessible, good-quality public green space” and that urban trees could lower stress and enhance mental health (Nieuwenhuijsen, 2021).

Tree-planting within an urban space or utilizing green roofs can also limit the impact of extreme weather (Lawrance et al., 2022). Likewise, it is important to take into account the attitudes of community members when brainstorming tree-planting and other similar programs since communities, as demonstrated in the city of Detroit, may be resistant to these techniques or not feel as included during the decision-making processes (Carmichael et al., 2019). On the other hand, the same paper did find that residents indicated "widespread support for green infrastructure solutions" even though they also expressed concerns regarding city management or access to the resources and knowledge to implement these policies, thus underscoring the need for effective communication and collaboration when contemplating the success of these initiatives (Carmichael et al., 2019).

Despite the ability of green infrastructure to neutralize the impact of climate issues, green gentrification must also be avoided in the process. For instance, there is the possibility that newer green infrastructure initiatives can play a part in displacing residents that "urban greening was often meant to benefit" (Anguelovski et al., 2022), thus reproducing inequities that green infrastructure intended to tackle. Furthermore, marginalized residents who have lived in the community for a long time might feel a lack of belonging within green spaces (Joshi, 2022; Jelks et al., 2021). Ultimately, even though green infrastructure can be used in a beneficial manner, gentrification can be witnessed when there is a change in the landscape of a community paired with psychological and physical displacement, "capital reinvestment," "social upgrading of an area by high-income in-movers," along with other components (Quinton et al., 2022). Hence, certain green actions could result in isolating individuals that might benefit the most from green infrastructure. Therefore, it is also important to examine other options along with creating new green spaces, such as allowing individuals to access current areas and improving awareness about green spaces (Uchiyamaa & Kohsakabc, 2022).

Public Policy.

In addition to green infrastructure, several policies can be deployed to strengthen the relationship with one's environment and also enhance communities' structures, facilities, and resources. These policies could include targeted approaches at particular populations, such as economic assistance in the form of subsidies or guaranteed income for farmers in order to reduce the prevalence of suicide among this group (Padhy et al., 2014). At a broader scale, these methods of mental health mitigation involve ensuring better insulated housing to protect against certain extreme weather conditions and reduce fuel poverty, as "safe and secure housing" can be critical in determining positive psychological health (Lawrance et al., 2022). Moreover, the alleviation of food insecurity through better agricultural techniques which prioritize ecosystem health and limit carbon emissions could enhance well-being too (Lawrance et al., 2022). Above all else, it is imperative to make certain that practitioners become more aware of eco-anxiety and other psychological problems associated with climate change (Ingle & Mikulewicz, 2020).

CONCLUSION

In light of the limited applied research and utilization of mental health-focused techniques to tackle climate inequities, this paper discusses the role of SES in understanding the role of climate change on mental health and one's relation to their physical environment. Given its critical influence on psychosocial well-being, Fundamental Cause Theory is used to explain the risk factors that perpetuate climate inequality by underscoring the aspects of SES, such as the ecological impact of climate change, changes in labor productivity, and influence of nature spaces; these factors are also broadly tied to the presence of environmental injustice within lower-income communities. While actions centered around

the implementation of green infrastructure can be used to tackle these disparities, the growth of green gentrification is also a real concern when studying effective formulation and implementation. Regarding the implications for policy and practice at individual and community level, more grassroots initiatives paired alongside institutional changes can enhance extant infrastructure and protect historically excluded residents. Furthermore, clinicians ought to become more mindful of mental health conditions associated with ecological distress. In addition, future research ought to further examine how the greenspaces can be repurposed and can be combined with other green initiatives to empower communities that need climate change supports. Ideally, researchers will continue to use existing scholarship to create institutional change by focusing on the intertwined reality of socioeconomic inequality and the climate crisis.

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The Role of Emotions in Generating and Sustaining Climate Action for Youth Climate Champions: An Exploratory Study in Northern Ontario

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ABSTRACT

Young people are frequently positioned at the forefront of the climate movement while also often being considered vulnerable to the mental and emotional impacts of climate change. While climate emotions research is rapidly increasing, little is known about young peoples' lived emotional experiences of climate change and climate action. This research, grounded in social constructivism, aimed to explore the emotions, supports, and experiences that are generative and supportive of climate action for youth climate champions in Northern Ontario, Canada. In the spring of 2022, 12 youth climate champions (ages 15-24) participated in semi-structured interviews and asynchronous letter writing. This paper describes two thematic networks that were derived using thematic network analysis. The first network, climate emotions, is characterized by five organizing themes: 1) ecoanxiety, 2) emerging loss and grief, 3) triggers, 4) coping strategies, and 5) impacts on living and life. The second network, motivations and support for youth climate action, is described through three organizing themes: 1) action is unique to person and place, 2) intersections of emotion and action, and 3) key relationships and supports. Reflecting on this research, we offer two insights relevant to those engaging in health and education spaces with youth. First, there is a need to establish accessible, safe spaces for young people to collectively recognize, explore, and process complex climate emotions. Second, education systems across rural and remote regions are strategically positioned to support the health and wellbeing of young people through the implementation of holistic climate education that includes opportunities for engaging in collective climate action.

Keywords**:** *Climate emotions; Climate anxiety; Climate action; Youth; Interviews*

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INTRODUCTION

Anthropogenic climate change is a wicked problem (Levin et al., 2012) resulting in complex and compounding health impacts across multiple scales and timelines (Cianconi et al., 2020; Romanello et al., 2021). Building on the mounting evidence of the physical health impacts of climate change, scholarship has paid increasing attention to the mental and emotional health dimensions of the climate crisis over the past decade. One domain of ongoing research and discussion is working to create and advance conceptual understandings of climate emotions. Climate emotions refers to affective phenomena, including feelings, emotions, and moods related to climate change and climate injustice (Galway & Field, 2023; Pihkala, 2022). Within climate emotions research, ecoanxiety is one concept that has garnered increasing attention. While multiple terms and definitions for ecoanxiety appear in the literature, ecoanxiety is understood here as a complex emotional experience characterized by challenging, future-oriented, and interconnected emotions including worry, fear, sadness, and powerlessness related to climate change and intersecting environmental crises (Baudon & Jachens, 2021; Clayton, 2020; Pihkala, 2020).

Despite contributing little to rising greenhouse gas emissions, young people are disproportionately impacted by the climate crisis and are at heightened risk of experiencing mental and emotional impacts (Burke et al., 2018; Coffey et al., 2021; Watts et al., 2019). Globally, young people are reporting high levels of distressing climate-related emotions, including worry, sadness, and fear, as well as functional impairments in response to climate change (Hickman et al., 2021; Léger-Goodes et al., 2022; Reyes et al., 2021; Sciberras & Fernando, 2022). Feelings of care, empathy, and compassion may be closely entwined with ecoanxiety (Ágoston et al., 2022; Hickman, 2020; Ogunbode et al., 2021) and may be at the root of other climate emotions, including climate anger, grief, guilt, and worry (Léger-Goodes et al., 2022; Pihkala, 2022). A recent survey of Canadian youth (aged 16-25) found that 80% of participants reported that climate change impacted their overall mental health, 48% reported feeling ‘very’ or ‘extremely’ worried, and nearly 40% reported at least moderate impacts on their daily life (Galway & Field, 2023). These findings echo the global survey conducted by Hickman et al. (2021) which found that 60% of respondents (aged 16-25) across 10 countries were ‘very’ or ‘extremely’ worried about climate change and 45% of respondents experienced disruption to their daily lives and functioning because of climate emotions. These studies also highlight that challenging climate emotions and distress are associated with perceptions of government inaction in relation to the climate crisis (Galway & Field, 2023; Hickman et al., 2021).

While many factors coalesce to shape climate action, there is growing evidence that some climate emotions, including anger (Curnow et al., 2020; Stanley et al., 2021), worry (Galway et al., 2021), ecoanxiety (Clayton, 2020; Cunsolo et al., 2020; Stanley et al., 2021), and hope (Budziszewska & Głød, 2021; Cattell, 2021; Nairn, 2019) may help to generate climate action. Across the globe, young people are frequently positioned at the forefront of climate action and have been leading a strong climate movement unique in its global and local reach and engagement (Kleres & Wettergren, 2017; Wahlström et al., 2019). In the province of Ontario, the Fridays for Future movement has recorded more than 700 youth-led climate strikes (Fridays for Future, 2022) and seven young activists launched a lawsuit against the provincial government in 2019 (Feasby et al., 2020). Between 2021-2022, four Ontario universities committed to partial or full fossil-fuel divestment because of student-led campaigns (Divest Canada Coalition, n.d.). In addition to ‘traditional activism’, including political activism, young people across the province are also engaging in individual climate actions including moving toward plant-based diets and focusing on ethical consumer choices (Firinci Orman, 2022). Understanding the intersections of climate

emotions and climate action is critical if we are to address the climate action gap and limit global temperature rise to 1.5°C above pre-industrial levels (Galway et al., 2021).

This study explored the emotions, supports, and experiences that are generative and supportive of climate action for youth climate champions across Northern Ontario using semi-structured interviews and letter writing. Specifically, this research aimed to: (1) describe how youth climate champions in Northern Ontario are experiencing the mental, emotional, and spiritual dimensions of climate change, (2) explore the emotions, supports, and experiences that motivate participants to engage in climate action, and (3) identify opportunities to support ongoing youth engagement in climate action. Drawing on our findings and existing research, we suggest two opportunities to support the mental and emotional wellbeing of young people within health and education spaces.

While research focused on the mental and emotional dimensions of climate change experienced by young people is rapidly expanding (Galway & Field, 2023; Hickman et al., 2021; Léger-Goodes et al., 2022), qualitative research exploring the lived experiences of climate emotions among youth across diverse places is urgently needed (Galway & Field, 2023; Ojala et al., 2021). This study helps to address this need by providing in-depth understanding into the lived experiences of young people in a rural and remote context while also providing preliminary insight into the types of supports young people desire in the face of climate emotions and action. This research also contributes to the gap of knowledge and understanding at the intersections of climate action and climate emotions.

METHODS

Considering that youth climate action is a socially situated experience and that social norms influence emotions, this research is grounded in a social constructivist epistemology (Budziszewska & Głød, 2021; Weber, 2012). The authors recognize that researcher positionality shapes the ways in which research is carried out and data are understood and interpreted and thus posit to make their positions explicit. AK is a recent graduate of the Master of Health Sciences program at Lakehead University. As a mother and climate justice activist, AK navigates her work as an able-bodied, cis-gendered woman of mixed German Mennonite and Métis ancestry. LPG is a mother of three young children who engages in this research from the position of an able-bodied, heterosexual, racially white, settler female living in Thunder Bay (Ontario) and working as a professor in the Department of Health Sciences at Lakehead University. As an interdisciplinary scholar, educator, and activist, LPG focuses her research on the interconnections among land, water, health, and climate change with a strong orientation to place-based and place-responsive work and diverse ways of knowing and learning.

Research Setting

This research took place in Northern Ontario, Canada, a region characterized by low population density, an economy rooted in resource extraction, rural and remote communities and regional centers, and expansive wilderness. Northern Ontario faces unique economic and political challenges that result in heightened vulnerability to climate impacts and unique challenges to implementing and sustaining climate action. Between 1948-2016, the annual mean temperature in the province of Ontario has increased by 1.3°C and additional warming between 1.5°C to 2.3°C by 2050 is projected; warming is more advanced in the Northern region of the province (Bush & Lemmen, 2019). In 2018, the newly elected centre-right conservative political party canceled the provincial cap-and-trade program and, in 2023, the province remains off-track to reach its weak 2030 emissions reduction target (Environmental Defence, 2022).

Pre-pandemic, mental health trends among youth in Canada showed an increase in the prevalence of self-reported poor and fair mental health status and diagnosed mood and anxiety disorders (Wiens et al., 2020). Through the pandemic, young people across Canada reported deterioration in their mental health status (Cost et al., 2021). As stressors from concurrent crises continue to compound, symptoms of poor mental health are likely to be exacerbated for young people (Lawrence et al., 2022) and the demand on previously stretched mental health care services will continue to increase (Wiens et al., 2020). The provision of mental health care services is limited in Northwestern Ontario and children and youth in this region access significantly less mental health care services than in other areas of the province (MHASEF Research Team, 2017).

Data Collection and Analysis

Youth climate champions were recruited using a purposive sampling strategy through the distribution of flyers at local climate events, contacting local and regional climate action groups through their social media pages and emails, and via previously established contacts throughout the region. One participant was recruited via snowball sampling. To participate in the study, respondents were required to meet three inclusion criteria: (1) living in Northern Ontario, (2) 15-24 years of age, and (3) self-identify as being 'involved in climate action', which was defined as 'dedicated to idea and knowledge sharing, relationship building, and innovative action in response to climate change' (Gislason et al., 2021; Philip, 2014). A total of 12 participants from six communities across Northern Ontario took part in the study. Through ongoing conversations, the co-authors agreed that the rich data elicited by these 12 participants yielded sufficient data to answer the research questions (and saturation). Participant profiles, including self-reported demographic information and a narrative description outlining involvement in climate action (constructed by the lead author drawing on interview data), are presented in **Table 1**. Pseudonyms were selected by participants except when the participant requested that the lead author assign a pseudonym.

Table 1. Participant Profiles

Pseudonym	Race	Age	Gender	Size of Community	Narrative Description
Evelyn	White	20	Woman	> 75,000	Evelyn has completed her first year of undergraduate studies and has been in a leadership role in the school's sustainability committee for the past year.
Catherine	White / South Asian	19	Woman	< 75,000	Catherine has completed her first year of undergraduate studies and was previously engaged in her high school eco-club. She hopes to be more involved in collective climate action again in the future. She is not aware of any environmental club or group at her university.
James	White	22	Man	>75,000	James pursued climate-related research during his undergraduate degree, which he has recently completed. He has engaged in diverse forms of collective climate action for several years.
Elizabeth	White	21	Woman	< 75,000	Elizabeth has completed her second year of undergraduate studies. She is passionate about living a 'green' lifestyle, works to engage others in everyday environmentalism, and struggles to create and/or find more organized climate action in her community.

Pseudonym	Race	Age	Gender	Size of Community	Narrative Description
Reese	White / Métis	20	Woman	>75,000	Reese has completed her first year of undergraduate studies and is dedicated to recycling and litter clean-up. She is unaware of any collective climate action in her community.
Omar	Latinx	24	Man	>75,000	Omar is pursuing graduate research related to climate solutions. He has volunteered for an environmental organization for the past five years and supported tree planting in the land surrounding his home community.
Leanne	First Nations	18	Woman	>75,000	In her last year of high school, Leanne has recently begun to learn about and speak publicly about climate change. She is interested in addressing the climate crisis through art and is contemplating changing career paths to focus more on environmental issues and Indigenous culture.
Sophia	First Nations / White	19	Woman	>75,000	Sophia has been actively involved in collective climate action, including traditional activism, for several years. She is pursuing an undergraduate degree in environmental science and is dedicated to a career and life path in response to climate change. She credits her Anishinaabe culture for influencing her understanding of the environment and climate change.
Rachel	White	15	Woman	<10,000	When she was in grade 8, Rachel worked with a friend to organize a school climate strike in her community. Now in grade 10, she wishes there was an organized climate or environmental group in her school or community that she could join to support her in continuing to take collective climate action.
Chelsea	White	16	Woman	< 20,000	Chelsea, influenced by her mother who works in climate advocacy, has participated in collective climate action from a young age. Despite her busy high school schedule, she would continue to engage in collective action if there were an organized climate action group in her community.
Kristen	White	16	Woman	< 20,000	Through her high school, Kristen has been part of an eco-club and other environmental and climate-focused activities. She appreciates climate education and meeting others involved in climate action.
Arwen	First Nations	23	Woman	<10,000	A recent college graduate, Arwen lives and works in a First Nations community that is actively pursuing climate solutions. Through her work, Arwen is engaged in a variety of environmental and climate-related projects.

All 12 participants participated in a one-on-one semi-structured interview and submitted a written letter between April and June 2022. Interviews were used because they are methodologically congruent with social constructivism and appropriate for addressing the research objectives. To ensure

consistency, all interviews were conducted by the lead author. Interviews were conducted and recorded (with permission) using Zoom video conferencing and lasted 40-90 minutes. An interview guide was developed collaboratively by the authors and piloted by the lead author on two occasions to improve clarity. The interview guide consisted of five sections: (1) introductory and contextual questions to build rapport and understand the community and context in which the participant lives, (2) the participants' perspectives and direct experiences of climate change, (3) how the participant experiences and responds to the mental, emotional, and spiritual dimensions of climate change, (4) the role of climate action in shaping their mental, emotional, and spiritual dimensions of climate change, and (5) basic socio-demographic questions. The semi-structured approach allowed for a guided conversation while creating space for flexibility and the emergence of unexpected ideas.

Asynchronous letter writing was used to complement the interview process because of the sensitive nature of climate emotions and because the researchers have an interest in creative and innovative methods for collecting qualitative data. Increasingly valued by social scientists, letter writing has been shown to be an effective tool for conducting research related to emotions (Burtt, 2021) and is recognized for eliciting honest responses about sensitive topics (McAuliffe, 2003; Pithouse-Morgan et al., 2012). Recent studies suggest that research connected to emotions is well suited to letter writing, with participants noting it is often easier to write about emotions than to speak about them (Burtt, 2021). One week following their interview, participants were emailed letter writing instructions asking them to write an email or postal letter responding to the prompt "*Write a letter describing how you are feeling about climate change and your involvement in climate action work."* The one-week time delay allowed participants the opportunity to reflect more deeply on the interview, process their emotions, and offer a thoughtful response at a time and in a place of their choosing (James, 2016; McAuliffe, 2003). All participants submitted a letter within one month of their interview.

This research project received approval from the Lakehead University Research Ethics Board prior to recruitment or data collection. All participants were informed of the potential risks and benefits of participating and their rights as a research participant. Consent to be recorded was obtained prior to data collection. Given the sensitive nature of climate emotions, participants were provided with information about general psychological supports in the event they experienced distress resulting from the interview or letter writing process. Data storage and management followed processes approved by the Research Ethics Board and in accordance with university policy.

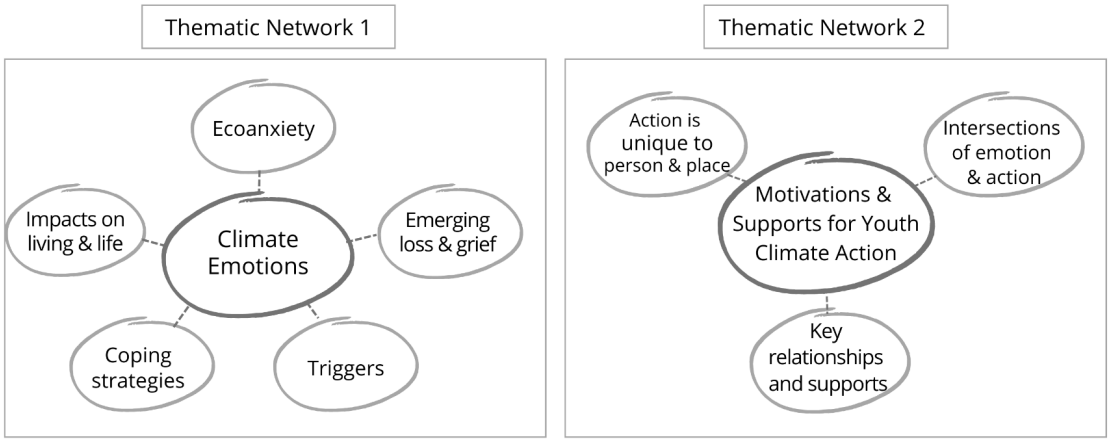
Data analysis was conducted primarily by the lead author with ongoing consultation with the second author. The lead author transcribed the interviews verbatim while removing any identifying information and read the complete transcripts to check for accuracy and increase familiarization with the data. All letters were read, and handwritten letters were transferred to electronic format by the lead author. Participants were provided with the opportunity to review their interview transcripts for accuracy and comfort with the transcriptions. Interview transcripts and letters were then uploaded to NVivo software (QSR International, 2022) to aid in organization and analysis, and all data were analyzed as a single data set. Data analysis was guided by Attride-Stirling's (2001) thematic network analysis process whereby an iterative analysis process is used to identify basic, organizing, and global themes, and a visual representation is created "to facilitate the structure and depiction of these themes." (Attride-Stirling, 2001, p.388). First, inductive coding was used to reduce the data to meaningful segments from which salient themes were identified and refined. Next, *basic themes* were grouped into larger *organizing themes* based on "shared issues" (Attride-Stirling, 2001) and high-level *global themes* were deduced to provide a main organizing structure. Network visuals were created to illustrate the global and organizing themes and are presented in Figure 1. Following the construction of the thematic networks, the primary author undertook an iterative process of exploring and describing the networks

while interpreting patterns that were identified. Ongoing consultation with the second author helped to guide and refine this process while enhancing reliability of the findings.

RESULTS

This paper explores the mental and emotional dimensions of climate change and the intersections with climate action experienced by youth climate champions in Northern Ontario. The findings are derived from the data collected from 12 youth who participated in both a semi-structured interview and submitted a written letter. Two global themes, *climate emotions* and *motivations and supports for youth climate action*, are presented along with their organizing themes in **Figure 1**. Direct quotes, tables, and visuals are used to illustrate and support findings. Unless indicated as "Letter" all direct quotes are from the interviews.

Figure 1: Thematic Networks



Climate Emotions

All participants reported experiencing and responding to a diversity of interconnected, complex emotions in relation to the climate crisis. Five organizing themes emerged around the global theme of climate emotions including: (1) ecoanxiety, (2) the beginnings of loss and grief, (3) triggers, (4) coping strategies, and (5) impacts on living and life.

Ecoanxiety

Myriad complex, interconnecting emotions consistent with the existing scholarly understanding of ecoanxiety emerged from the interviews and letters. **Table 2** provides direct quotes illustrating the emotions conveyed by participants most frequently. Participant descriptions revealed that their climate emotions were vast, deeply entangled, often fluid and "constantly shifting" (James), and that they compounded with other stressors including both global (e.g., the COVID-19 pandemic) and personal (e.g., school or friends) issues.

Emotions of powerlessness, fear, anger, and sadness, increasingly understood as core characteristics of ecoanxiety, were commonly expressed. When given the prompt "*When I think about the future, I feel…"* five participants responded with the word *"scared"*. When probed about their fears, responses included *"the rapid changes"* (Arwen) and *"thinking about what's to come"* (Kristen). Anger

expressed by participants was always on the macro scale (e.g., not personalized) and was predominantly related to climate injustices. Expressions of care and empathy were also common and were directed toward future generations, the more-than-human world, and those experiencing unequal and inequitable impacts of the climate crisis.

Table 2. Emotions Conveyed by Participants (presented in order of the most commonly discussed emotions)

Emotion	Illustrative Quote
Powerlessness	*"I feel so small. What can I possibly do? I have no political influence. I don't have an absurd amount of money. Does using reusable bags at the grocery store really help?" (Omar, Letter)* *"I'm just one person, there's not much I can do. So…most of the time I just have to sit there and watch it happen. No matter what I do, it feels like the big corporations are doing most of the damage…if I change my habits, how much is that going to do?" (Catherine)*
Fear	*"To me, climate change is scary, and I get somewhat nervous thinking of all its environmental effects, mainly the severe weather pattern changes and behaviours in our animals over the last couple of years. I often think about how drastic things will change in the future. How will people grow up in these conditions? How can we adapt to a forever changing environment?" (Arwen)* *"I think it's fear of, like, not having a future. Not even just for me, though. For people I care about…fear that those that come next won't have good lives. It really scares me." (Sophia)*
Anger	*"Anger, because people don't realize the connection they have to mother Earth. And when they look at it, they only think about themselves and not really the future, the bigger picture. Because this is going to affect our children and our grandchildren and other generations in the future." (Leanne)* *"It's all of those feelings. Anger, disappointment, frustration. Pretty much anything around the feeling of having the party that is supposed to be, or the government that is supposed to be representing you and refusing to do so despite them knowing that is what their people want, that is what their constituents want." (James)*
Sadness	*"I think it kind of comes back to that feeling of sadness, like when we go to places that I've been as a child,...we went on a hike to a trail where we usually went and they had bulldozed a big chunk of it down for a parking lot…there's that bit of sadness of losing something that you're not going to get back now due to progress." (Evelyn)* *"I'm really sad. Especially when things are, like, irreversibly damaged." (Rachel)*

Hopelessness	*"Seeing other power structures and systematic influences, like the impact they're having on proliferating this fight…I think those, seeing those groups and how they are responding to the situation, or not responding to the situation, have also contributed to some of the pessimism or hopelessness that I have felt around it." (James)* *"...there is a sense of hopelessness as a human that lives on Earth and is worried about the safety of other species and people here and about the land itself. And then there is a hopelessness that comes with knowing that what we currently have in Canada isn't working and that it needs to be changed in a very significant way but not a way that I understand." (Sophia)*
Anxiety	*"Anxiety is definitely a big one, when you get all the articles about, you know, the fires and the plastic that they're pulling out of the ocean, and oh, this species went extinct and this went extinct and then, oh God, and then I find that there are a lot of countdowns…like this is the deadline, this is the year." (Evelyn)* *"I get overwhelmed at times when I see news stories about unusual heatwaves and increased natural disasters. It is a source of anxiety, always waiting in the back of my mind." (Catherine, Letter)*
Worry	*"Climate change has made it difficult to think about my future…I struggle to imagine a home safe from the impacts of climate change. I worry what that will look like for the safety of my parents and grandparents, for my sister and my partner, and for the future children of our families. I also worry about environmental job availability in the north, wanting to stay in my home community and not have my life uprooted…" (Sophia)* *"With the fires and stuff that happened last year, there was a lot in Northern Ontario. I had quite a few friends who were [firefighting] in MNR, and I was always like, 'I hope you're safe'." (Arwen)*

Experiences of ecoanxiety were reported to be persistent and looming, and four participants described experiences of rumination whereby they perceived signals about climate change throughout their day. For example, *"Climate anxiety is something that comes back to gnaw at the forefront of my brain during most of my daily excursions"* (Elizabeth, Letter) and *"it looms in the back of my mind"* (Catherine). Other participants suggested they regularly caught themselves contemplating how everyday activities contributed to climate change. Notably, ecoanxiety was predominantly experienced alone and in isolation. As Rachel confessed, *"I'm kind of embarrassed to bring it up with my friends because they don't really care as much and I don't want to be annoying."* However, when asked, *'what kinds of supports, programs, or resources do (or would) help you cope with your feelings around climate change?*' eight participants highlighted the importance of talking with friends and family, peers, and therapists.

Emerging grief and loss

Although more subtle than expressions of ecoanxiety, participants consistently expressed an emerging sense of grief. Experiences of participants illustrated both tangible and intangible loss and grief. Participants described a tangible type of ecological grief, "the grief felt in relation to experienced or anticipated ecological losses" (Cunsolo & Ellis, 2018, p.275). This grief was expressed through direct and specific statements of witnessed or anticipated loss and suffering of humans and the beyond-human world. For instance, Catherine wrote,

> *Dear Earth,*
> *I'm going to miss you the way you were. I'm going to miss the animals thriving in the natural habitats you provide them with and all the natural beauty you bring to this world. I feel as though this beauty will soon be gone.*

Leanne expressed her grief in the following way:

> *"A lot of species that we have on Earth are probably going to go extinct. Like, there won't be much biodiversity to maintain our system."*

Participants also expressed a type of intangible loss and grief typically related to the decrease of existential security (an intergenerational perspective of the survival of humanity) (Sears, 2020), feelings of betrayal by government and big business, or the sense that the world was failing them. These sentiments often appeared as profound questions of an uncertain future, including *"are there still trees...is most of the wildlife extinct?"* (Reese, Letter), *"How will people grow up in these conditions?"* (Arwen, Letter), *"I don't want a life, that, like, just seems not amazing"* (Kristen), and *"don't you care about future generations?"* (Catherine, Letter). Sensing that something is amiss in the world, participants expressed a sense of loss and emerging grief for something largely unnameable, unknown, intangible, and unrecognized by society.

Triggers

Climate emotions and ecoanxiety experienced by participants were triggered through four main pathways: *collective inaction, systems of oppression, tangible reminders,* and *climate information and messaging.* Witnessing the collective inaction of governments, big business, and peers led to feelings of disappointment, frustration, anger, and worry in many participants. Rachel explained,

> *Sometimes [I feel] kind of angry because they [government] have the power to be doing more. And obviously I know there are limits…but I definitely think they could be doing more. Especially pipelines, too. Pipelines make me really mad.*

James felt frustrated at the inaction of his peers, articulating, *"If I can do it [take action], I feel like they can do it…They know the problems, but I feel like they're not really doing anything about it."*

Many participants referenced oppressive systems as an emotional trigger. Elizabeth expressed, *"We know how things can get better but the people in charge don't want things to get better because it's not profitable"*. In her letter, Leanne wrote,

> *I have no hope for the future of life on Earth…The structure of our society involves white supremacy, racism, cis-heteropatriarchy, post-colonialism, and capitalism, all of which contribute to hierarchy, a power system, and climate change. At this point, it seems inevitable that war is the only answer. Getting people to step down from their roles within power and*

> *giving that power to marginalized groups of people is like trying to convince a fish to fly to the moon.*

Half of participants spoke of seeing litter as an activator of climate emotions. Referring to the sight of litter, for instance, Leanne asked, *"why aren't people caring?"* Other triggering reminders included observing or experiencing extreme events in the region (e.g., wildfires, floods), driving gas powered vehicles, or witnessing over-consumption. Finally, climate information and messaging encountered through active media and/or formal education was also a common emotional trigger discussed by participants. Evelyn spoke of struggling with the disparity between the size of the problem and the size of the solutions she was learning about in school. She explained,

> *Anxiety is definitely a big one, when you get all the articles about the fires and the plastic that they're pulling out of the ocean, and oh, this species went extinct, and this went extinct and then, oh god, and then I find that there are a lot of countdowns…Like this is the deadline, this is the year. So, a lot of anxiety and apprehension when you see things like that.*

Coping Strategies

Four predominant pathways for coping were identified in the data. First, participants activated empowering thoughts and emotions through reframing their perspectives. For example, Arwen was able to positively reframe the climate emergency, writing the following in her letter: *"Although human and non-human suffering could be seen as the end product of climate change, it can also be the starting point for resistance and change."* The data also illustrate that orienting towards solutions, both by seeking examples of others working to make positive change and by engaging directly in collective climate action themselves, enabled coping with challenging emotions. Witnessing and working toward climate solutions inspired feelings of hope in participants. Relatedly, connecting with community provided emotional support and inspired hope in those participants who engaged in collective climate action. Sophia explained in her letter,

> *The feelings of hopelessness, powerlessness, fear, anxiety, and numbness brought on by climate change have been overwhelming at times. But even existing within the realm of those feelings, hope can be found through community and action. Being involved in climate action means being involved in community…It provides support systems for grief and anxiety spawned by climate change. It allows us to envision a future that is so much more than what we have now.*

Finally, eight participants engaged in activities like singing, walking, creating art, or listening to music to distance and/or distract themselves from their experiences of distressing climate emotions. The data also illustrated that participants shifted between coping strategies as their emotions, triggers, and circumstances changed.

Impacts on Living and Life

While participants shared examples of a variety of coping strategies, they also spoke about the ways in which climate emotions impacted their life decisions and daily functioning. All participants reported ways in which their life and/or lifestyle choices had been influenced by climate change and the mental and emotional dimensions of the crisis. Four participants pursued post-secondary education and career paths because of their concern for the climate crisis and six participants reported lifestyle choices including vegetarianism, avoiding air travel, and conscious consumerism, in response to the climate crisis.

Functional impairments related to sleep and concentration were also commonly reported. Five participants reported that their ability to concentrate was occasionally diminished because of their climate emotions. For example, Sophia shared that she struggled to pay attention in school because she was distracted by climate advocacy work, which she felt was more interesting and applicable to real life. Six participants reported that difficult or racing thoughts related to the climate crisis caused occasional difficulties falling asleep. Two participants also reported disturbing dreams and one participant reported experiencing interrupted sleep patterns on a regular basis. Finally, one participant had sought treatment for serious depression related to environmental concerns and another sometimes struggled to get out of bed because of climate worry.

Motivations and Supports for Youth Climate Action

As a result of self-identification, types of participant engagement in climate action varied from leadership and participation in collective action to engaging solely in individual actions. The following subsections will explore the ways in which the identities of people and places shaped participants' responses to climate change, the junctures at which action and emotion intersected, and key relationships that were identified to support generating and sustaining youth climate action in Northern Ontario.

Action is Unique to Person and Place

The ways in which participants conceived of and participated in climate action were rooted in their social location, individual identities, and the places in which they live, learn, and play. Five participants also identified that their socioeconomic status, including their ability to attend post-secondary education, influenced their sense of responsibility to actively respond to the climate crisis. Two participants felt they had to speak louder and more passionately about climate change because they were young and female. For example, Arwen felt that her age was perceived to make her *"just sort of hyper"* and her gender identity was perceived by others to mean she *"might be overreacting."* Two participants felt that their Indigenous culture played a significant role in shaping their understanding of climate change and their responsibility to act. Sophia suggested,

> *It goes back to the roots of spirituality for me…I have obligations to the land and I have obligations to the people here and I have a responsibility to protect that and take care of that…It's inseparable for me from trying to protect Indigenous creed and culture. To me, if the land is lost everything is lost.*

Participants' responses to climate change were also shaped by the places they live. Most participants living in communities with a population size less than 75,000 reported feeling "*disconnected from the action*" (Rachel). Chelsea expressed this as follows:

> *I live in such a small town. It would be nice to have something that actually made me feel like I was doing something. Like some kind of group that actually made me feel like I was making a difference…But it is a small town and there is not a lot of stuff like that here.*

Intersections of Climate Action and Emotions

Participants' emotional experiences intersected with climate action in two main ways. First, feelings of care, empathy, and reverence for nature were identified as motivations for engaging in and/or intentions to engage in climate action. Human-centered expressions of care and empathy were often on a macro scale, including empathy for *"the people who live in other places"* (Chelsea) and *"future*

generations" (Catherine). Many participants spoke of a close relationship with the natural world, often describing their cherished places, favorite nature-related activities (e.g., hiking, gardening), and a sense of wonder for ecological cycles. References to water and trees/forest were common. For example, Rachel shared that she had initiated a climate strike in her community because, *"I really care about the environment and animals and especially when things are unfair…It makes me passionate about it."* When probed about her motivations to act, Evelyn replied, "*Being in nature. Appreciating the nature we do have. I think the trees are so pretty…seeing them, it's like a motivation to be, like, 'let's keep our earth this way*."

Second, those participants who were actively engaged in collective climate action reported that their experiences of powerlessness and hopelessness decreased as they engaged in climate action, particularly as their sense of community increased. James explained,

> *…before I joined these groups, I was more upset about these things…feeling that I was the only one worried about it, and that I, as an individual, didn't have much power over what happened. But since joining those groups, I feel like having that sense of community around the problem has really made me feel better about it.*

Those participants who rarely or never engaged in collective climate action did not elucidate a shift or transformation of powerlessness and hopelessness.

Key Relationships and Supports for Youth Climate Action

Participants identified four types of support that were or would be helpful for generating and sustaining youth climate action in Northern Ontario. First, adult allies, primarily educators and mothers, were key to inviting young people into action, providing support, and acting as role models. Kristen spoke of her mother, *"I can see her trying to make that change, and I see change happen. So then I know that it's possible."* Second, existing environmental clubs or groups, often in schools, provided an entryway for participants to join and build confidence and skills related to climate action. Five participants wished for a club or organized group in their school or community, reporting that they would be involved if they knew how to connect. Third, friends, family, and peer communities both within and beyond climate movement spaces were found to be important supports for youth engaging in climate action. James explained,

> *…if I'm feeling busy or disenfranchised, just actively being a member of those groups and getting communications from them and seeing their planning and stuff can help me get back into it if I'm not necessarily feeling it all the time.*

Sophia also shared,

> *I think community sustains. Also, family, friends, people close to me. Not necessarily ones that are really devout environmentalists or anything, just being around people that you love and that love you is very nurturing and can bring some much-needed rest.*

Finally, two participants suggested that connecting with land and nature was foundational to inspiring others to engage in climate action.

Limitations

This research is not without its limitations. Although we connected with a diverse population of youth climate champions across the region, this study is limited by its small sample size and the findings cannot be generalized. The majority of participants identified as women and the voices of other genders were lacking. In future research, a gender-based analysis would be useful to understand both the experiences of climate emotions and the specific needs and strategies to support young people of diverse genders. While this study contributes unique methods of combining interviews and letter writing in climate emotions research, additional research is needed to better understand this approach. Analyzing the interview data separate from the letter writing data would provide greater insight into the value of letter writing and the utility of this combined approach. Finally, it is important to note that the lived experiences of youth captured in this study have been collected, analyzed, interpreted, and re-storied by two adult researchers.

DISCUSSION

The overall purpose of this research was to explore the emotions, supports, and experiences that are generative and supportive of climate action for youth climate champions in Northern Ontario. Our findings elucidate that youth across the region are grappling with challenging, inter-connected climate emotions that are often experienced alone and in isolation. Participants articulated the importance of relationships and community, including peers, friends, family, therapists, allied adults, and environmental groups for support to cope with climate emotions and/or for generating and sustaining engagement with climate action. Engagement in collective climate action was identified as a pathway for building a sense of community and increasing feelings of agency and hope in youth people. This study adds to the rapidly growing field of climate emotions research by providing a qualitative exploration into the lived experiences of youth climate champions in rural, remote, and mid-sized communities. The results of this study are not intended to be generalizable across broader populations (Carminati, 2018), though the findings and insights may prove relevant to similar populations in rural and remote regions.

Youth climate champions across Northern Ontario are experiencing a “constellation” (Galway & Beery, 2022) of complex climate emotions, including *ecoanxiety* and *loss and grief*. Conceptualizing climate emotions as a ‘constellation’ highlights the entanglement of diverse emotions, shifts away from characterizing emotions through a positive/negative dichotomy, and recognizes the appropriateness and generative potential of challenging emotions in the face of the climate crisis (Galway & Beery, 2022). Prominent emotions expressed by participants include powerlessness, fear, anger, sadness, hopelessness, anxiety, and worry. Over half of participants reported at least occasional impairments to their daily functioning, including occasional difficulties concentrating and/or falling asleep. In addition, Sophia reported struggling to get out of bed because of climate emotions and Omar told of suffering from climate related existential depression. These findings align with larger quantitative studies illustrating that climate emotions and ecoanxiety increase the burden of mental and emotional health on young people and can be problematic for some. A recent survey found that 78% of young people across Canada reported climate-related mental health impacts and that 37% of young Canadians reported at least moderate negative impacts on their daily functioning (Galway & Field, 2023). Globally, more than 45% of young people reported that climate emotions caused disruption to their daily lives (Hickman et al., 2021) and a significant positive correlation between challenging climate emotions and insomnia has been found in 18 out of 25 countries (Ogunbode et al., 2021). While the American

Psychological Association outlines that strong climate emotions and ecoanxiety do not imply mental illness (Clayton et al., 2017), our findings suggest that climate emotions can be problematic for some young people and we posit that these emotions are both an appropriate response to the crisis *and* that they warrant serious consideration to protect the overall health of young people (Clayton et al., 2017; Cunsolo et al., 2020; Galway & Field, 2023).

The findings of this study indicate that young climate champions across Northern Ontario are feeling isolated and alone in their emotional experiences related to climate change and that they rarely share their climate emotions with others. These participants are not alone. In 2023, more than one third of young people across Canada reported that they do not talk about climate change with other people (Galway & Field, 2023). This silence may be attributable to the fact that young people often feel dismissed, patronized, or ignored when they try to talk with others about climate change and their experiences with climate change (Galway & Field, 2023; Hickman, 2020; Hickman et al., 2021). Participants in this study identified talking with others, including friends, family, and therapists as an important coping strategy that they desired but were often unable to access. These findings emphasize a need for accessible, safe, and supportive spaces where youth can share, feel heard, and explore their experiences of and responses to the climate crisis (Galway & Field, 2023; Hickman, 2020). Given that many adults are seeking guidance and resources about how to communicate with young people about climate change and climate emotions, we suggest policy and funding support to increase education and training opportunities for mental health professionals, educators, and allied adults about climate change generally and climate emotions specifically (Gislason et al., 2021). Additionally, safe spaces for collective dialogue on climate emotions should acknowledge and respect the unique intersectional identities of young people and should be developed and implemented through meaningful collaboration with the populations they intend to serve (Galway & Field, 2023; Gislason et al., 2021; Hickman et al., 2021). To better understand the role and influence of accessible safe spaces for climate dialogue, further research is needed to identify and evaluate existing practices and programs and work to build knowledge and evidence regarding best practices moving forward.

Participants reported that engaging in collective climate action helped them to build a sense of community and orient towards solutions, which in turn helped them to activate empowering thoughts and emotions. As a result of engaging in collective action, participants reported decreased feelings of powerlessness and hopelessness while a sense of agency and hope increased. While these findings must be considered in light of the cross-sectional nature of this study which relied heavily on participant recall, other scholars have also reported similar potential for movement spaces to create opportunities for emotion management and coping, including the transformation of anger and the generation of increased agency and power (Curnow et al., 2020; Haugestad et al., 2021), Laughter and fun have also been noted within youth climate activism spaces (Bowman, 2019; Curnow et al., 2020). Taken together, these findings suggest that opportunities to engage in collective climate action may be an important pathway to supporting the mental and emotional wellbeing of young people in the face of the climate crisis. However, any emphasis on climate action must be conscientious of the potential for psychological strain and burnout among young people who are balancing the demands of school, life, and other commitments alongside climate action (Budziszewska & Głød, 2021; Nairn, 2019; Sanson & Bellemo, 2021).

Furthermore, research participants living in small and mid-sized communities (i.e., communities of less than 75,000 residents) reported fewer opportunities to engage in collective climate action and did not report an increase in agency and hope associated with engaging in climate action. While this finding is based on a small sample, it suggests that additional research is needed to better understand the opportunities for, and outcomes of, climate action in a diversity of urban and rural spaces.

Regardless of community size, participants indicated the importance of creating and supporting pathways to collective climate action in rural and remote regions. Drawing on these findings and emerging literature, we argue that education systems across rural and remote regions are strategically positioned to create pathways to climate action through holistic climate change education that engages the head, heart, hands, and spirits of students (Galway & Field, 2023). In addition to teaching the cognitive dimensions of climate change (e.g., climate science), scholars of climate change education are increasingly recommending practices that engage the affective and behavioral dimensions of learning through critical reflection, dialogue, and opportunities for collaborative community action (Trott, 2022). Young people across Canada are also asking for increased inclusion of, and emphasis on, social and emotional dimensions within climate education, including the provision of emotional supports and opportunities for engaging in collective climate action (Galway & Field, 2023). Wholistic climate change education in which young people find safe spaces to recognize, share, and process their emotions *and* engage in meaningful, collaborative community-based action is critical to supporting the overall health of young people (Trott, 2022) *especially* in small and rural communities.

Drawing on our experiences conducting this research, our findings, and existing research, we recommend three key pathways for future research. Overall, longitudinal research with young people on the lived experiences of climate emotions, coping strategies, and the influence of collective climate action is needed to better understand the complex and dynamic nature of climate emotions experienced over time and the potential of collective and community-based action as a strategy to support the mental and emotional wellbeing of young people in the face of climate change and climate injustice. To better understand the role and influence of accessible safe spaces for climate dialogue, further research is needed to identify and evaluate existing practices and work to build knowledge and evidence regarding best practices. Finally, innovative methodologies and methods are needed in climate emotions research. Research conducted *with* youth, in ways that acknowledge young people as experts on their own experiences, is important to uncovering unseen and unheard perspectives of climate emotions and climate action. Participatory action research and asynchronous methods could be explored as strategies to build trust and create opportunities in which young people feel safe to explore vulnerable emotions, feel listened to, and feel heard.

CONCLUSION

The participants of this study have shared intimate stories of the ways in which they are seeing and experiencing our rapidly changing world and how many are striving to see and act from a more expansive perspective. Young climate champions across Northern Ontario are poised to create new ways of living and being in this world, and the findings of this research suggest that intergenerational allyship and action is an important path forward if we are, in fact, to move more toward creativity and connection. Moving in this direction, however, requires the courage to engage with the “heart, gut and spirit stuff” (Hancock, 2019). While we must continue to push for immediate climate mitigation and adaptation actions and longer-term systemic change, we must simultaneously begin to collectively and courageously engage with our anxieties, our grief, our fear, our care, our empathy, and our hope.

DECLARATIONS

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AVAILABILITY OF DATA AND MATERIALS

Please contact the authors for information about access to data and materials.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This research received approval from the Lakehead University Research Ethics Board prior to recruitment or data collection. All participants were informed of the potential risks and benefits of participating and their rights as a research participant. Consent was obtained prior to recruitment or data collection.

CONSENT FOR PUBLICATION

Not applicable.

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The Authors declare they have no competing interests.

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JMHCC

Building Community: Vocabularies and Rituals Used to Define and Process Climate Grief by Politically Active Youth in Mi'kma'ki

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ABSTRACT

There are many terms that exist to describe and define climate grief but the vocabularies that youth use to describe climate grief are not well defined. The purpose of this research was to identify the vocabularies that politically active youth use to describe and define climate grief and the rituals that they use to process it through a poetry workshop, interviews, and arts-based engagement. Twenty youth ages 12-29 living in Mi'kma'ki (Atlantic Canada) engaged in political activism connected to climate change participated in individual interviews to understand their journey to becoming politically active, their personal experiences of climate grief, and how they define and manage their climate grief on a day-to-day basis. Five of those twenty youth participated in a facilitated poetry workshop that guided them through writing poetry expressing their definitions of and experiences with climate grief, followed by a focus group debriefing their experience in the workshop. An additional three of the twenty participants submitted individual visual and written pieces of art on climate grief and participated in short interviews following their submission. The main vocabularies used to define and describe climate grief were found to be in contrast: full of despair and focused on apocalypse; and full of hope and centered on community and building just futures. Additionally, participants identified that community-centered rituals that involved tangible change or meaningful interactions were crucial for helping them manage their grief through rituals.

Keywords: *Climate grief; Youth; Arts-based*

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INTRODUCTION

Background

Youth have higher rates of depression and anxiety related to climate change than other age groups (Majeed & Lee, 2017) and are often spurred to become politically active by feelings of fear for their future and climate anxiety (Fisher, 2016). A recent global survey of youth found that the vast majority of young people are extremely worried about climate change (60%), are afraid, sad, anxious, angry, powerless, or helpless (>50%), find the prospect of the future to be frightening (77%), and feel that governments and leaders have failed to care for the planet and humanity (Marks et al., 2021). This recent global survey identified that the most prevalent cause of climate anxiety in young people is inadequate government action on the climate crisis, which causes youth to feel betrayed and abandoned by the people in power (Marks et al., 2021). Young people's experiences of the climate crisis yield anxiety, depression, and other serious mental health challenges, but they also manifest emotions like anger/bitterness, fear/anxiety, guilt/self-criticism, hopelessness/despair, resolve/determination, aggression/violence, and sorrow/hurt (Gelderman, 2021; Sanson et al., 2019).

Despite the fact that many people experience climate grief due to ecological loss and changes to their lives, there are very few formal spaces and processes for people to work through these emotions (Mühlbacher, 2020). Climate grief is difficult to find space to process because climate destruction and government inaction are prominent throughout daily life and the grief is chronic, long term, and inescapable (Marks et al., 2021). Access to shared spaces of mourning, however, is crucial and the lack of such spaces often leads those plagued by climate grief to cope through numbing their pain, avoidance, blaming others, and disconnecting from themselves and their communities (Gelderman, 2021). Access to appropriate and welcoming spaces is even more rare for members of marginalized communities experiencing the brunt of the climate crisis including youth, women, gender queer people, 2SLGTBQIA+ people, racialized communities, newcomers, and disabled people (Mühlbacher, 2020). Spaces and programs that provide youth with an opportunity to contribute to the stewardship of land in their communities are examples of appropriate spaces that aid in alleviating feelings of helplessness associated with climate grief (Sanson et al., 2019).

While the potential impacts of climate change on youth are well reported in the literature, little research has considered how politically engaged youth describe and engage with climate grief. The climate crisis will be a threat for generations to come, thus it is critical to understand youth responses to climate change and equip them with the tools and support to process their grief and remain resilient in the face of climate destruction. This paper will identify definitions and descriptions of climate grief by politically active youth participants and rituals/approaches they use to work through their climate grief and build resilience.

This study is a component of a New Frontiers in Research project led by Dr. Melanie Zurba (co-author of this paper) and Professor Erica Mendritzki titled "Creating Vocabularies and Rituals for Climate Grief Through Multiple Knowledge Systems and the Artistic Process" that defines "climate grief" as a general term used to encapsulate negative emotions such as cognitive dissonance, sadness, and other forms of pain that people feel when experiencing loss associated with a changing climate. The vocabularies and rituals around experiencing climate grief are insufficiently developed, however, and there is a pressing need for community spaces to discuss, visualize, and process feelings associated with loss.

For many activists, grief due to climate related loss, like the extinction of species, is one of their primary motivations for becoming involved with activism (Pike, 2016). Environmental activists feel the loss of non-human beings and are often in perpetual mourning because of the magnitude of the crisis

leading to their activism (Pike, 2016). Marginalized communities, especially Indigenous communities, experience this perpetual mourning to an even greater extent as they are more vulnerable to the crisis (Cunsolo et al., 2020). They are also more likely to have a closer connection to the land and the non-human beings living in it (Pike, 2016). Furthermore, studies in queer ecology illuminate the fact that queer folks and other marginalized communities are often drawn to environmental/climate activism because their experiences encourage them to be empathetic (Mühlbacher, 2020). Although many at the margins are drawn to climate work, there seems to be a lack of access to intersectional spaces to process their complex grief (Mühlbacher, 2020). The current literature fails to examine how climate grief impacts politically active youth specifically and does not determine whether there are mediums for youth to process their climate grief. It also neglects to analyse climate grief from an intersectional perspective, leaving out the potential impacts of systemic oppression and discrimination on feelings of grief.

Rituals are both individual and communal processes. In mourning, each individual has their own unique experience of the loss or tragedy but there is also a shared experience of grief within the group or community who has lost someone or something (Willox, 2012). Rituals can be gatherings of mourning like funerals, memorials, protests, vigils, eulogies, obituaries, and are often long-term processes that are repeated over time (Willox, 2012). Grief and mourning rituals can be transformative experiences that help people and communities to regain environmental consciousness and reconcile their love for the world (Craps & Olsen, 2020). These rituals can help people find hope in the face of massive tragedy and crisis (Craps & Olsen, 2020). Cafés, peer support groups, online support groups, and community discussions around grief, specifically climate grief, can help people in their mourning by validating and normalizing their experiences (Wardell, 2020). Communal rituals for processing climate grief are particularly important because the systems of capitalism and neoliberalism have led to a shared sentiment of being alone at the end of the world and collective trauma (Wardell, 2020). To process one's own trauma, one must also address and come to terms with the trauma of others, this is explained well by Stolorow : "In order to tackle the overwhelming perils of climate change, we must include in our dwelling on earth an emotional dwelling with one another that renders shared apocalyptic anxiety more tolerable" (Stolorow, 2020).

Purpose and Objectives

The purpose of this study was to understand how climate grief is expressed and experienced by politically active youth in Mi'kma'ki[1] through arts-based participatory methods and intersectional analysis. The main objectives of this paper are to to identify what vocabularies and rituals politically active youth use to describe their emotional responses to climate change and to examine the impact of being politically active on feelings of climate grief.

For this research, we followed the critical reflexive methodological framework: a constant, dynamic, and complex process that begins with a critical examination of one's positionality as a researcher in the context of race, class, gender, sexual orientation, and (dis)ability (Mao et al., 2016). Critical reflexivity is a framework in which the researcher must integrate and interrogate their positional and social location with respect to their participants, the world, and their research (Mao et al., 2016). It is an ongoing and relational process in which researchers must actively and continuously engage so

[1] This research is situated in Mi'kma'ki, the land of the Mi'kmaq. Mi'kma'ki encompasses the colonial provinces in so-called Canada of Nova Scotia, Prince Edward Island, the Gaspé peninsula, Newfoundland, and most of New Brunswick (*Mi'kma'ki*, n.d.).

as to identify and work to mitigate biases and assumptions, inequitable power dynamics, and the socio-cultural and political contexts in which the research is taking place (Mao et al., 2016; Subramani, 2019). Incorporating a critical theoretical and methodological perspective into research makes it possible to identify and highlight the social institutions and power difference/dynamics that form the meanings and experiences that people live with and understand one's role as a researcher and experiences of the participants through the reality of everyday experiences and societal influences (Subramani, 2019).

In developing the objectives and proposal for this research, we examined our own positionality and experiences as youth climate activists. The main researcher critically reflected on their motivations for conducting this research and for the focus on politically active youth with climate grief. One of the first steps was to reflect on their upbringing and identities clearly and critically, they examined the potential for unequal power dynamics within the researcher-participant relationship because of their position as a researcher, their whiteness, their financial and ability privilege, and their education status. Additionally, they consciously worked to ensure that the framing of their research was relevant to all politically active youth, and not only those who may have similar experiences to the researchers. Throughout their review of the literature, they explored many different disciplines and searched terms to reach literature that expanded their worldview and conception of the issues of climate grief and activism. They employed critical reflexivity throughout the engagement with participants as well. During the interviews, they aimed to create a reciprocal and safe space in which participants felt comfortable sharing the depth of their experiences, they felt listened to and that they had the space to share anything they felt, and in which they were co-creating knowledge. Reciprocity and relationality between the researcher and participants are key components of employing critical reflexivity in research.

They also conducted participant observations as an *observer as participant"* in which "The *observer as participant* stance enables the researcher to participate in the group activities as desired, yet the main role of the researcher in this stance is to collect data, and the group being studied is aware of the researcher's observation activities" (Kawulich, 2005). Their participation supported the goal of fostering a safe, reciprocal space for participants, but their poetry was not included as data for analysis in the results of this study.

METHODS

This research took a qualitative methods approach using semi-structured interviews, a poetry workshop followed by a focus group, and individual art submissions and interviews. This study took place from September 2020 – June 2022, with data collection occurring between August -November 2021. The study took place in Mi'km'aki, which encompasses the colonial provinces of Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland and Labrador, and parts of Eastern Quebec in Canada. This study took a phenomenological approach to understand the lived experiences of politically active youth with climate grief.

As this study took an intersectional and anti-oppressive approach, it is important to understand how the positionalities of the authors connect to the research:

Lilian Barraclough is a settler of English, Scottish, Irish, and German descent originally from Toronto, on the territory of the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee, and the Wendat peoples covered by Treaty 13. Lilian Barraclough holds an integrative worldview, described by the Institute for Cultural Evolution as "primarily characterized by a self-reflexive attempt to bring together and synthesize elements of other worldviews, or of domains that in other worldviews tend to be viewed as mutually exclusive". She is a youth climate activist and a member

of many organizations and youth-led movements focussed on climate and social justice in so-called Canada, thus she is a member of the youth climate activism community that was engaged with for this research. She is also a member of the 2SLGBTQIA+ community and identifies as pansexual and as a non-binary person. She is also able-bodied, but with experience living with a chronic illness, and comes from a financially secure background. She acknowledges that she conducted this research from a place of privilege on stolen land. She was personally motivated to conduct this research because of her own experiences with climate grief. On some days, their climate grief makes it difficult to get out of bed and enter into the world that is destroying the planet and humanity. Through their own experience, as well as understanding and knowing about the experiences of their peers in the youth climate community and at school, she felt strongly that this research was needed to validate and communicate our experiences and work towards a climate resilient and equitable future.

Melanie Zurba is a settler of Ukrainian and English heritage originally from Treaty 1 territory/Winnipeg, Manitoba. In her younger years, she was a leader in the youth-environment movement and recently led the review of youth engagement and intergenerational partnership for the International Union for the Conservation of Nature (worlds largest conservation NGO with over 1,400 member states and organizations). She is an Associate Professor at Dalhousie University and is head of her research group, the Community-Engaged CoLab.

This study received ethics approval from Dalhousie University's Research Ethics Board. Given that this study's participants included some minors, and vulnerable young people, there were ethical considerations given to the potential harm to the mental health and wellbeing of participants. The ethics agreement identified this study as one of moderate risk to participants, given that there was the possibility of emotional distress when asked about intense emotions relating to the climate crisis and climate grief. Participants had the ability to withdraw their participation from the study at any point during the interviews or workshop and focus group. Additionally, during the group activities (poetry workshop and focus group), the lead researcher (Barraclough) and workshop facilitator employed active listening to be prepared to support participants should they experience distress. The study had a distress and debriefing protocol to minimize discomfort and risk for participants and had a list of mental health counselling services readily available, should participants need to be referred for urgent mental health care. Informed consent was obtained by written consent forms. Participants that were of age completed their own informed consent forms, where they were provided with the details of what they would be asked to do, any risks associated, resources available to them, and decisions regarding anonymity in the research. Participants who were minors had an informed consent form completed by their parents or guardians, and there was a separate form of assent for minor participants so that they could be personally informed as to the context and risks of the study. The informed consent and assent forms were approved by the Research Ethics Board, and the forms asked participants to select a choice between being given an alias, so as to be anonymous in the research products, or to retain the use of their name in the research products. This research was conducted through Microsoft Teams, which is the virtual meeting tool.

Recruitment and Selection Criteria

To be selected as participants in this study, the criteria were that the people had to: a) be between the ages of 12 and 29; b) Currently live in Mi'kma'ki (Atlantic Canada); c) Be involved in political work related to climate change including, but not limited to, activism, climate strikes, research, employment, engagement in political parties and the democratic process, grassroots community work, art, writing, social media, or community care work related to climate change. Additionally, participants were given the option to self-identify as a member of an equity-seeking group based on gender, sexuality, race,

ethnicity, language spoken, (dis)ability, and an explanation of what constitutes equity-seeking group was provided.

Participants were sought out through existing youth climate organizations by purposive sampling. The researchers contacted organizations and networks connected to youth to share information on the study and request recommendations of individuals in their organizations who might be interested in participating, these organizations included School Strike for Climate Halifax, Nova Scotia Youth Climate Action, the Centre for Local Prosperity & the Thinkers Lodge, Our Time network, Divestment and other climate groups at universities, environmental clubs at schools, as well as others. Building off the participants recruited from relevant organizations, those participants provided recommendations of other potential participants through snowball recruitment methods. In addition to direct outreach to organizations, recruitment occurred through voluntary sampling through social media posts that were shared through the researchers' personal networks, organizational pages, and posted in community groups on Facebook, Instagram, Twitter, LinkedIn, and mailing lists. Outreach to existing organizations was based on the researchers' awareness of youth activist networks and ethical protocols were followed by making it clear that there was no requirement to participate. We reached out to all groups that we knew of in the area, and to contacts who we knew were active in many areas of the movements to get as far a reach as possible. Those connections then shared the information by word of mouth. This study had an initial aim of 15-20 participants. The goal of this study was to undertake an in-depth exploration of each participant's experiences with climate grief. This would not have been possible within the timeframe with a larger pool of participants. This research was conducted as research for a master's degree and as such, was limited to two-years.

Data Collection Methods

Interviews

All participants (**Table 1**) participated in a virtual semi-structured individual interview through Microsoft Teams of up to one hour to explore their experiences with climate grief. Microsoft Teams was the virtual conference software approved by the Dalhousie Research Ethics Board – the researchers used their Dalhousie University credentials to sign into Microsoft Teams and a statement of potential risks of the platform were disclosed in the informed consent and asset forms for the participants.

The individual interviews explored their journey to becoming politically active and engaged with climate change, how they first learned about climate change, the emotions associated with their climate work and learning about climate change, how their life is impacted by climate grief, and how their personal journey is connected to feelings of climate grief. Individual interviews were the best opportunity to understand the personal lived experiences of the participants with climate grief. Interviews took place from August – October 2021.

We took an anti-oppressive and intersectional approach in the interviews to foster a safe space for participants to describe their experiences with climate grief, as well as how their personal identities intersected with their experiences of climate grief. Anti-oppressive interviewing takes a participatory, emancipatory, and action-oriented approach to research and focuses on levelling the power dynamic between the researcher and participants (Strier, 2006). As such, the interviews were amenable to the direction that participants wanted to take them in and the primary researcher focused on listening as much as possible, and only directed the interviews as needed.

Table 1. Participant life experiences and identities.

Alias or First Name	Identity	Age
Sarah	Sarah is a white cis-female member of the 2SLGBTQIA+ community	26
Sophia	Sophia is a white cis-female	18
Amanda	Amanda is a white cis-female	26
Hailie	Hailie is a white cis-female member of the 2SLGBTQIA+ community	25
Ricky	Ricky is a white cis-male member of the 2SLGBTQIA+ community	26
Tanya	Tanya is a Mi'kmaw woman	28
Cole	Cole is a white nonbinary member of the 2SLGBTQIA+ community	19
Kyle	Kyle is a cis-male newcomer to Canada and a person of colour	23
Jo	Jo is a nonbinary person of colour who is a newcomer to Canada and a member of the 2SLGBTQIA+ community	21
Dylan	Dylan is a white disabled cis-male who is a member of the 2SLGBTQIA+ community	25
Bailey	Bailey is a non-binary person of colour who is a newcomer to Canada and a member of the 2SLGBTQIA+ community	25
Shreetee	Shreetee is a person of colour who is a newcomer to Canada and a member of the 2SLGBTQIA+ community	22
Beth	Beth is a white cis-female who is a newcomer to Canada and a member of the 2SLGBTQIA+ community	22
Mackenzie	Mackenzie is a white cis-female	22
Choyce	Choyce is a white disabled cis-female member of the 2SLGBTQIA+ community	26
Sasha	Sasha is a white cis-female who is a member of the 2SLGBTQIA+ community	19
Cameron	Cameron is a white straight cis-man	23
Rena	Rena is a Métis woman who is a member of the 2SLGBTQIA+ community	23
Cadence	Cadence is a white cis-woman	17
Nadia	Nadia is a Black cis-female newcomer to Canada	Unknown

Poetry Workshop and Focus Group

Participants were also given the option to participate in a group poetry workshop to guide them through writing poetry to reflect on their experiences with climate grief. This poetry workshop took place in October 2021. The poetry workshop was then immediately followed by a focus group, which provided an opportunity for debrief and reflection on their experiences in the workshop. Drawing on research that illustrates the ability of poetry to serve as a research tool in helping youth express, communicate, and understand difficult emotions, the poetry workshop provided an avenue for participants to engage

in additional self-reflection (Call-Cummings et al., 2020). The poetry created during the workshop also aided in identifying the vocabularies used by politically active youth. The poetry workshop and focus group were also included to help participants experience an option for a type of ritual they could partake in to work through their grief.

The participants for the poetry workshop and focus group were the same as the participants who were interviewed, however, participants had the option of not participating in the poetry workshop & focus group and only being interviewed. Both the poetry workshop and the focus group took place virtually through Microsoft Teams. Six participants, including the primary researcher, took part in the poetry workshop. They participated in the prompts as well as observed the participants throughout the workshop and they only shared their responses to the prompts if there was no participation from other attendees so as not to take up too much space and disrupt the power dynamic as the researcher. They conducted participant observations as an *observer as participant* in which "The *observer as participant* stance enables the researcher to participate in the group activities as desired, yet the main role of the researcher in this stance is to collect data, and the group being studied is aware of the researcher's observation activities" (Kawulich, 2005). Their participation supported the goal of fostering a safe, reciprocal space for participants, but their poetry was not included as data for analysis in the results of this study.

The poetry workshop titled "Unearth: A Poetry Workshop on Climate Grief" was facilitated by a local poet/facilitator involved in the climate/social justice movement for research participants in which they wrote poetry collectively and independently, reflecting on their emotions relating to climate grief. The primary researcher worked with the poet, Katie Feltmate, to develop the outline and programming for the two-hour poetry workshop. The workshop was held on Microsoft Teams on October 6th, 2021, where Katie guided the participants through prompts in three major sections:

(1) Open Waters: "A warm-up to allow participants to wet their feet and become familiar with the context they will be writing about. It contains several free writing and journaling exercises designed to trigger stream of consciousness writing, offering flexibility, accessibility, and creative license."
(2) Tides of Change in which "participants will be challenged to dig deeper as they begin to 'unearth' the profound impacts of climate grief and the climate crisis."
(3) Building Resilience in which "participants will move away from the depths of climate grief and into a mindset of empowerment with a focus on healing, resilience, and action."

It was crucial that the poet had facilitation experience, as much of the literature attributes the success of poetic methods to the competence of the facilitator leading the methods (Norton & Sliep, 2019). Katie had facilitated multiple poetry workshops guiding youth through prompts to write about their experiences as refugees, and with the planet. Additionally, Katie writes her own poetry about climate grief, nature, and the COVID-19 pandemic and is incredibly passionate about work on the climate crisis.

Poetry allows for reflection that leads to transformative change that empowers both the researcher and the participants and pairs well with qualitative data collection to provide unique insights to the lived experiences of participants (Fernández-Giménez et al., 2019; Johnson et al., 2020). The poetry workshop led by Katie allowed participants to reflect on their experiences with climate grief and how they arrived at that place through many facets.

The poetry workshop was then directly followed by an hour-long focus group with workshop participants that delved into their experience in the poetry workshop, whether it contributed to their learning as a group about each other and climate grief, and whether it stimulated meaningful individual reflection on their experiences with climate grief. The primary researcher guided the participants

through some pre-prepared questions that specifically focused on learning related to their shared group experiences in the poetry workshop and shared understandings of climate grief, particularly on how they defined and described climate grief, and whether the workshop served as a ritual to help them process their grief. For example, to understand how participating in the group workshop and hearing other people's experiences influenced their understanding of climate grief we asked: "What did you learn from the other people in the group?" "Do you feel that you have a better understanding of each other's experiences?" "Do you think it is important to understand other people's experiences?" Do you feel more supported and understood after this poetry workshop?"

While the focus group was moderated, it was also designed in a flexible manner that allowed for the participants to determine the direction. The participants responded directly to the prepared questions we asked them, but they also brought up their thoughts and ideas coming out of the workshop throughout the focus group. The focus group transcript and poetry were also used to identify the vocabulary that youth use to describe climate grief and what sorts of activities/rituals they may partake in to process their climate grief.

Artistic Submissions

Additionally, all participants had the opportunity to submit individual pieces of art of any medium that illustrated their experiences with climate grief, followed by an individual semi-structured interview to communicate their artistic process and describe the meaning of their art. The artistic submissions took place from September – November 2021. Given that this study is a part of the larger project looking at how multiple knowledge systems and the artistic process interact to help communities develop vocabularies and rituals to describe and process climate grief, the artistic components of these methods provided participants with the opportunity to express their experiences through mediums that felt the most meaningful to them for conveying their experiences and emotions.

They were asked to submit a piece, or multiple pieces, of art that they created responding to their experiences of climate grief and then participated in a short semi-structured interview to explain what their art meant and what the process of using art to reflect on their experiences was like. They were invited to submit any previously created art, or to develop new art pieces and be reimbursed for their materials. These individual submissions allowed participants the opportunity to reflect on, and express, their experiences of climate grief in the fashion that felt the most meaningful to them. It also allowed them to reflect personally and individually on their experience through individual artistic means, rather than through a group workshop. This approach supported participants to reflect on their personal journey and experience of climate grief and to have the chance to express it. Three different participants submitted artwork based on their experiences with climate grief, two submitted pieces of visual art, and one submitted a poem as they were unable to participate in the group poetry workshop. We then undertook short semi-structured interviews with them about their artwork, what the artwork represents, and how it connects to their experience of climate grief (Zurba & Berkes, 2014).

There were separate guides for all four of components of data collection – the semi-structured interviews, focus group, the poetry workshop, and the artistic interviews. The interview, focus group, and artistic interview guides were developed by the lead researcher and reviewed with the project team of the larger Climate Grief project, comprised of leading researchers on youth health, ecology, fine arts, research with Indigenous peoples and newcomers, and feedback was given and implemented.

Data Analysis

The data analysis process involved initial thematic content analysis of the transcripts of interviews, the focus group, and the artistic interviews as well as the poetry written by participants. Once the

transcripts were fully coded, we used NVivo Pro 12 to visualize the results identifying the most frequently coded themes; the hierarchy of codes; and the overarching objectives of this research in identifying the vocabularies and rituals used to describe climate grief.

Interviews

The interview transcripts were collected through the Microsoft Teams transcription function and then reviewed for errors alongside the recordings of interviews prior to coding. The transcripts were analysed through thematic content analysis. We used deductive codes to broadly identify the vocabularies and rituals that participants used to describe and define climate grief, as well as identify their different approaches to political action regarding climate change. For example, deductive codes included 'system change'; 'descriptions of climate grief'; 'introduction to climate change'; 'lived experience'; 'rituals to process climate grief'; 'social media'; 'vocabularies'; 'work'. Beyond those initial deductive codes, the rest of the data were inductively coded through themes that arose out of the data. These inductive themes were topics/ideas/themes that were repeatedly mentioned throughout the interviews and were significant to the participants that were not covered by the deductive codes including 'burn out'; 'calls to action'; 'hope'; 'personal futures'; 'personal impacts of climate change'; 'politics'; and 'the future of humanity'. Once the main codes were identified, sub codes were developed as well that identified themes within the overarching code to detail the findings coming out of the interviews. For example, under the inductive code of 'personal futures' subcodes were identified that included 'uncertainty'; 'reproductive decisions'; 'security'; 'running out of time'; 'powerless'; and 'apocalypse'. The coding was done using NVivo 12 Pro.

Poetry Workshop and Focus Group

Some participants submitted the poetry that they wrote during the workshop for analysis, and to be included in publications on the study. These poems were uploaded to NVivo 12 Pro and were analyzed through thematic content analysis. One deductive code was used 'definitions of climate grief'; while the other codes were identified inductively and included 'systemic change'; 'politics'; 'loss'; 'injustice'; 'loss'; 'impacts of the climate crisis'; 'hope'; 'grief'; 'fear'; 'despair'; 'connection with the land'; 'compassion'; 'community'; 'anger'; 'action'; and 'accountability.'

The focus group was recorded and the transcription tool in Microsoft Teams was used. The transcription was then reviewed and compared to the recording to correct any inconsistencies. The transcript was then coded starting with two deductive codes 'vocabulary' and 'exposure to poetry' and identifying inductive codes relating to the experiences of participants in the workshop including themes like 'resonate'; 'resiliency'; 'relating to others'; 'reflection'; 'positive'; 'motivating'; 'positive collective experience'; 'community care'; and 'comforting.'

Artwork

The artwork itself was not coded, but the transcripts of the interviews with artists were analyzed inductively to identify what the process of using art to reflect on their experiences of climate grief was like, the types of terms and imagery they used to describe the art pieces, and what the ritual of art creation did to aid in their processing of climate grief. The coding of the artistic interviews was primarily inductive. One deductive code was used: 'ritual for processing climate grief' and the other codes were identified inductively including 'reflection'; 'nature'; 'interconnectedness'; impacts of the climate crisis'; 'frustration'; 'expression'; 'community'; 'anger'; and 'action'.

RESULTS

Youth vocabularies of climate grief, particularly of politically active youth, are not well defined. Participants shared different emotions that arose for them in the context of climate grief and those emotions were tied to how they defined climate grief. **Figure 1** illustrates the top emotions and phrases that participants used to describe their experiences of climate grief. Participants described deep, gutting emotions that seemed to touch them to their core. Many referenced the injustices within society that contribute to their experiences and those of others with climate grief. Climate grief was often described by participants as a very embodied experience affecting their physical and mental states.

Bleak and Apocalyptic Vocabulary

Participant responses in interviews and the poetry and visual art that they created portray a bleak and apocalyptic experience of the present and the future. **Figure 1**, below, illustrates some of the bleak and apocalyptic emotions and vocabulary that participants expressed during their individual interviews. One participant, Amanda, wrote in the poetry workshop:

> *My brain is on fire and the planet is dying.*
> *I can't breathe for worry but some can't breathe for smog.*
> *Living is expensive and barely sustainable but it is not going to get better.*
> *I dread the heat and what is coming.*
> *I am trying to get people to care but the right ones don't.*
> *The people who care are ignored by the people who can make change,*
> *So they continue making money by burning coal and clearing forests*

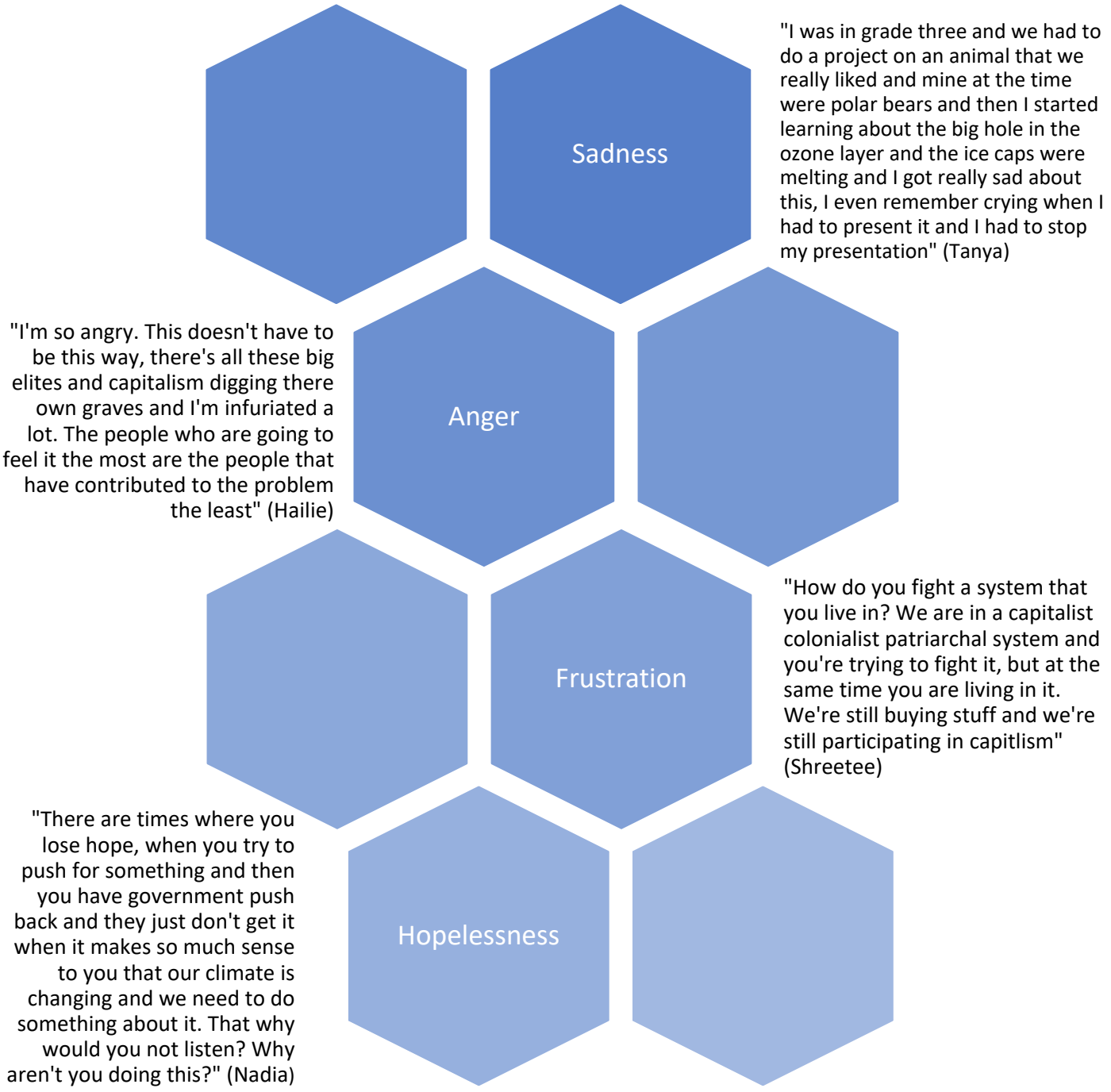
Another participant, Shreetee, described climate grief in this poem from the poetry workshop:

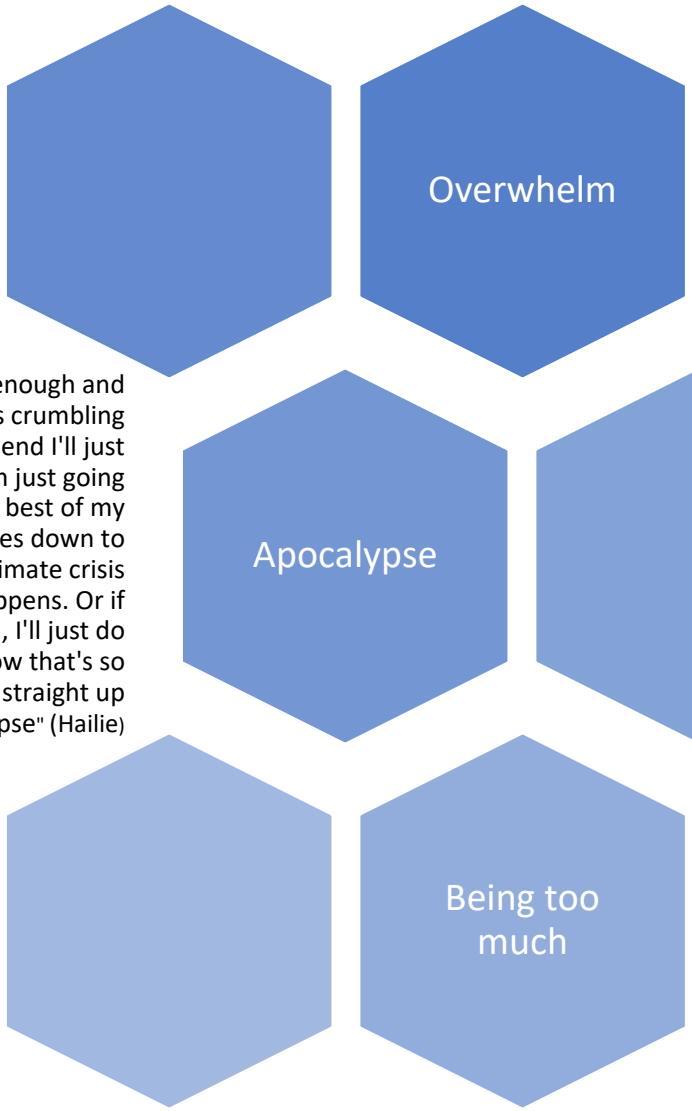
> *Climate Grief*
> *Feels like barbed wire wrapped around my heart,*
> *Always there, always hurting.*
> *Looks like half of the world on fire and half of it is under water,*
> *Smells like the rotten flesh of the fish washed ashore because of warming ocean,*
> *And*
> *Sounds like the screams of people demanding change*
> *against a system that does not want to hear them and does not want to change.*

One participant, Beth, described her experiences of climate grief through the following:

> *Climate grief sounds like roars through empty woods*
> *Climate grief feels like sobs wracking through an empty landscape, desolate of life.*
> *Climate grief looks like standing amid the rubble; once a home, now a carcass*
> *Climate grief smells like burnt plastic permeating my lungs.*
> *Climate grief tastes like sulfur caressing the hollows until I can no longer intake food, for it rots my core.*

Figure 1 Top vocabularies used by participants to describe climate grief and associated quotes from participants; the blank hexagons represent the structures of society that contribute to the experiences that politically active youth have regarding climate grief.





"I felt like this is crazy. I had no idea it was happening at all and it just made me thinking like, oh, the world is so much more complex than I knew about and there were so many things happening that I had no clue and it made me feel worried that I'm so small and that I can't change the world as I thought I could when I was younger" (Cadence)

"If it ever gets bad enough and you know it's crumbling around the very end I'll just take myself out, I'm just going to live my life to the best of my ability and if it comes down to it and I die by the climate crisis then that's what happens. Or if it gets bad enough, I'll just do myself in, I know that's so awful but this is straight up apocalypse" (Hailie)

"I generally grew up a lot faster than others, I've always been very concerned from an early age as soon as I started learning about the many, many problems facing the world and I think about the things we need to make the world better every single day of my life. It has made me feel a lot older than and am and then made me feel like it's a lot harder to fit in with other people my age" (Sophia)

In addition, Sophia wrote a poem outside of the poetry workshop as an individual art submission (without using the prompts provided to participants in the poetry workshop) that focused on bleak and apocalyptic imagery as well:

what an absurdity

we seem to live in the long-term.
trained to close our eyes and dream of the future
while the moment passes right by.
while mother earth's screams go unnoticed.
it's not like it's a someday event.

it's here, right now.
she flings hurricanes at our shores
and ignites forest fires to fill our skies with smoke,
emergency flares
desperately trying to get you all to listen.
and you just idly wonder whether the drought will ever end,
or if the temperatures will stop being so drastic
or if the ice will halt its melting
but of course those couldn't be because of a rapidly changing climate.
what an absurdity.
that's an issue you have to pass on to your children,
not something that happens within your life time.

but what about my lifetime?
after your excuses have grown as thin as the ozone layer
and your words don't stop the roaring winds and poison air,
what is left?
a wreckage of a planet you promised was just a far-off nightmare
that now fills our everyday lives.
something you said we didn't need to worry about,
even though we told you
and the scientists told you
and all the sane people in the world told you it wasn't a fucking joke.
it was the present, not the future, because of the past.
because of your past.
the one you threw at us whether we wanted it or not.
and yet you laughed it off in press conferences,
in your thousand-dollar suits made from modern slave labour
and gallons of water
and filaments of plastic that will exist for millennia to come.
because you didn't care.
you didn't dare to.
not when caring would mean acknowledging the fact
that you messed up royally and left us to deal with the shattered remains,
trying to eke out some semblance of a life
in the midst of an apocalypse that happened far before its time,
if only you'd done something.
and you can't protest and say you didn't know better,
because you did.
because we screamed at you alongside mother earth
thousands of us
from the city streets, shoes sticking to the steaming pavement
and swore we'd never forgive you for your sins
and we won't
but we'll all be dead before it matters much,
so you're safe in the end anyway.
not like us.
not as we watch islands sink
and fields turn to dust
and millions of people migrate across broken continents
desperate for the safety we were promised would always be there.
not unless you do something.
now.
to stave it off a little bit longer until it’s our time
until we wear the suits and call the shots

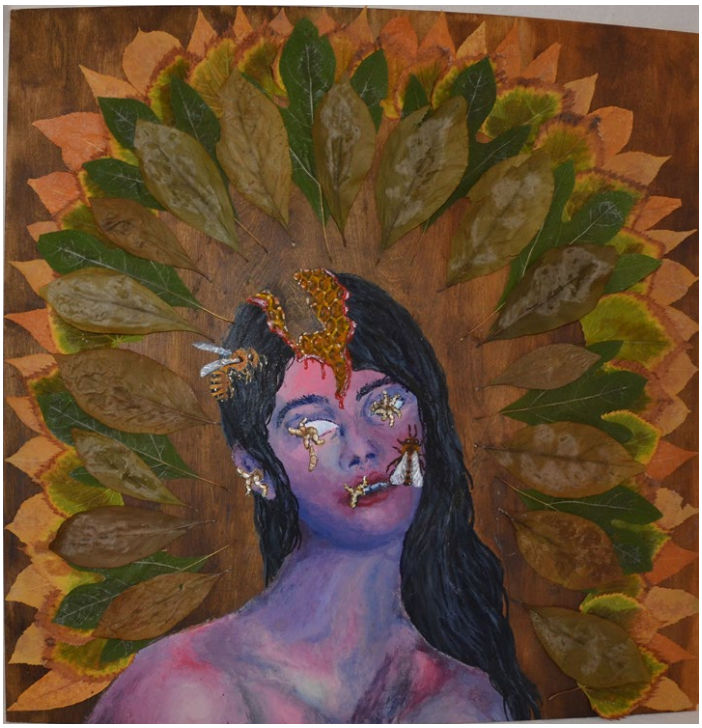
and work for something more important than money.
we're not asking for magic or a miracle or forever
or for you to even try to permanently fix this.
we've been let down too many times to expect that.
just a little bit more time
so that we at least get the chance
to try to save the world.

An individual art submission by the participant, Sasha, included as **Figure 2** below, portrays the contrast and cognitive dissonance of the current reality of society and life on planet Earth compared to the potential for destruction and loss if things continue as they are. The artwork also displays the fine line that Sasha feels society is walking between thriving and death and shows that while the government and decision makers speak about protecting nature and acting on the climate crisis, that their actions are doing the opposite and leading to the deaths of people and non-human beings across the planet. This artwork builds on the vocabulary theme of the threat of apocalypse and death and showing that we, as a society, are very close to destruction.

Another piece of art by Sasha, shown in **Figure 3**, focuses on that disconnect between appreciation of nature and disregard for how the climate crisis and human activity impacts the environment. It illustrates the potential for more pandemics and increased viral strains from human consumption of animals and the destruction of habitats across the planet. The art emphasizes the interconnection between humanity and nature and how human actions towards nature will reflect on our lives and society. Both pieces of art communicate a sense of apocalypse and destruction and how those can devastate humanity. They also, however, include an element of hope, reflecting the necessary relationship between humanity and nature and that there is potential to remain on the side of flourishing along with the planet and embracing the interconnected nature of all existence. These art pieces communicate resiliency and that desire to build strong relationships with each other and the planet, and that there is potential through love and reciprocity with Mother Earth to repair the climate crisis.

Figure 2. Individual art submission by Sasha Chilibeck©

Figure 3. Artwork submitted by Sasha Chilibeck ©



Vocabulary of community-based climate justice and visions of hope

While many participants described a devastating picture of turmoil and apocalypse, many also envisioned a possible future of justice and community. Nadia, through the poetry workshop wrote:

I feel the injustice has gone on for too long
The land we live on, the air we breathe, the water that sustains us polluted
I feel tired of anger
BUT
I feel I must continue to fight
The fight for our future
The fight to heal our Earth
I know I am not alone
Around this fight a community has grown
For that I feel hope.

Beth wrote through the poetry workshop:

Justice is equality, but more so equity.
A voice ignored finally heard, respect.

Voices raised from the depths of despair,
United in song, a chorus of hope, one of healing.
A harmony.
The lamented listened to.
No longer to fear the obstacle but feel the drive.

Another participant, Shreetee, also described what a climate just world might look like:

> *Climate justice looks like*
> *clean drinking water for all,*
> *no more violence or unjust arrests for simply existing and,*
> *exerting our rights for a better future.*
> *Climate justice looks like*
> *People over profit,*
> *Love over money,*
> *Care and reciprocity over economic growth,*
> *Climate justice looks like centering the needs of the people*
> *over the needs of a system that solely exists to cause harm*
> *Climate justice is radical love and kindness above all and,*
> *a better future for the souls who exist already and the ones who have yet to exist.*

The vocabularies used by participants had two main realms: those associated with the devastating doom and potential apocalypse of the climate crisis and injustice, and those to describe the potential for change, growth, and community resilience through hope and solidarity. It is common for activists and those involved in the environmental and climate justice fields to hold their grief and despair at the state of the world in hand with their hope and motivation (Park et al., 2020). This resilience and determination to continue working with community towards a better, sustainable, and more equitable future through the despair of climate grief is reminiscent of the persistence of communities who have experienced and continue to experience apocalyptic conditions but continue to fight for justice (Davidson & da Silva, 2021). The participants who communicated their hope and desire through their poetry for community, love, and kindness were primarily participants who are marginalized by racialization, queer oppression, and gender discrimination. It is pertinent that the youth who carry hope in their hearts for a just future are those who are at the most systemic disadvantage in society. The white and more privileged participants tended to focus solely on the devastation and apocalyptic potential of the climate crisis and feel that there is no hope or potential for change to be found. The end-of-the world dialogue is often centered around the end of the conveniences and privileges for the white, financially stable society and fails to acknowledge that marginalized communities have been experiencing different apocalypses for hundreds of years. For example, Black (slavery, pervasive racism, police brutality, murders, incarceration), Indigenous (colonialism, missing and murdered Indigenous women, Two-Spirit people, and girls, lack of clean drinking water, medical racism, police brutality), Queer (AIDs crisis, pervasive serial killers, police brutality, domestic and sexual abuse), and disabled (eugenics past and present, forced sterilization) communities (Davidson & da Silva, 2021). The vocabularies that youth participants use are also centered on justice and connect to the many other social justice issues as well as relationships with the land and other people.

Rituals for Processing Climate Grief

Community Care and Community-Based Rituals.

The rituals that participants described follow their visions brought forth in the vocabularies for climate justice and hope. Access to a like-minded community, community spaces, and community care were the most prevalent descriptions of rituals to process their climate grief, and many expressed concerns that they did not have accessible spaces where they could discuss their

experiences of climate grief and feel heard and listened to. One participant, Jo, explained that having access to a like minded community:

> *"Gives me more hope for sure, because you're not just going through that grief alone, like at least you have a community that knows what's up. There is a community of mutual understanding."*

Another participant, Dylan, explained that he doesn't feel like he has access to such a space:

> *"Most people I talk to, I talk to through a screen and that ends up being the people I already knew, the people that I was already friends with. And lovely people, but to find a space where I can just vent these frustrations as opposed to inserting myself into say, a group chat and ranting where I feel like I'm taking up somebody's time and they're like OK, what do I do with this? A dedicated space for this kind of stuff in a dedicated community where I can really talk these feelings through, I don't really feel like I have access to that right now."*

Community spaces and social connections within social and climate justice movements are not only crucial to help people process their climate grief, but also are key in fostering long-term social movement learning. The disconnect that many who are in this field of work and these organizing spaces feel from their friends, family, and communities limits their ability to learn about themselves and their positionality in society with respect to the issues that they are working on, which may enhance their experiences of climate grief (Sandlin & Walther, 2009). People may end up feeling stuck in their despair and experiences of climate grief, as well as their position in the movement and society, again increasing their feelings of grief and despair at the state of the world (Zielińska et al., 2011). Without those spaces to feel supported by others in the movement, feel accepted and loved, and feel like they are contributing meaningfully, people could become burnt out or disempowered (Zielińska et al., 2011). Social connections are often what encourage people to become and remain politically active and continue to learn about themselves and the issues facing the world. One participant, Mackenzie, only became concerned about the climate crisis and involved because of her friends:

> *"I have a friend who start talking about his anxiety more and stuff that I never would talk to him about and I never fully understood where his anxiety was coming from and then I'd listen to him talk with all my friends, and there's three of them who are really interested in big corporations and what they're doing to the world. And like I always knew it was a bad thing that was happening and then with them I started understanding because he was getting a lot of world anxiety like climate anxiety so then I started looking into it more because he was a really good friend and I was just like whoa, this is actually bad, we are literally destroying everything."*

Mackenzie's experience witnessing her friend's climate anxiety and the discussions between her group of friends led her to come to terms with the climate crisis herself and identify her own climate grief. Her experience also led her to the turning point of becoming truly aware of the issue and started her on the steps of her political engagement. She described changing her own behaviours in terms of recycling and driving and encouraging her family members and roommates to do the same, as well as her start to comprehending the enormity and the complexity of the climate crisis. Access to like-minded groups of individuals seems to be key not only in helping politically active youth process their climate grief, but also for encouraging personal change and motivation for action.

For these community spaces to effectively aid in the processing of climate grief, they must also be safe spaces where people's diverse lived experiences are acknowledged and accepted, and there is

no tolerance for discrimination. A Métis participant, Rena, originally from Saskatchewan explained that she:

> *"Definitely didn't appreciate feeling really at home somewhere before I moved away from Saskatchewan. It just wasn't something that I thought about, but now that I've left and I don't get to go back very often, it's harder than I thought it would be. I just felt a lot more connected there and I had a much better understanding of my place in the world which was about the community there and feeling more connected to everything."*

Everyone experiences climate grief differently and have different needs in the context of community groups and spaces. Social movements and spaces can help create collective identities and help individuals build those connections within the community where they feel that they can contribute meaningfully and that they have a network of people who care about them and whom they care about (Mühlbacher, 2020). Spaces that are particularly cognizant of the lived experiences of marginalized people, however, are lacking and were identified as a need for politically active youth to effectively process their climate grief (Mühlbacher, 2020).

Participants with access to community explained that having that having access to a like-minded community and a close-knit group of friends is a lifeline that helps them feel safe and secure and to feel at home. As the climate crisis continues to cause destruction and devastation, more people are going to lose their sense of place and home and having access to a tight-knit community will be key for building resiliency through those events (Albrecht, 2020) Rena explained that she used to have access to a strong and caring community in Saskatchewan in which they:

> *"Always had someone that you could ask for help if you needed it and not feel like you were pressuring them or anything because you know that you would do the same thing for them which was really nice and made it easier to know how to give back to the community as well because you knew which groups were actually doing good work and who was going to benefit from the work you were doing."*

It seems to be very challenging to build the strong community networks that Rena describes, and Nadia, another participant, expressed the challenges that she has experienced as a Black newcomer to Canada in accessing both white activist spaces, and the Black community as an outsider to both:

> *"I definitely see myself existing in the movement a bit differently from how my white colleagues might see themselves within the movement. We haven't been listened to and I find I spend lots of time with community in conversation about that. As someone who didn't grow up in these communities, I take those [interactions] as learning opportunities and I think it helps me position myself and still just not lose myself as being part of a movement that has historically been very white."*

In Nadia's experience, learning from the Black Nova Scotian community fosters her learning of the historical and present environmental injustices and racism the communities face (Waldron, 2015) and her learning and definition of her own identity and positionality within society and the climate movement (Walker & Walter, 2018). Nadia also describes the importance of maintaining her identity through her work in the environmental movement and ensuring that her approach to environmental work is grounded in the needs and experiences of the marginalized communities in the region.

Tangible Activities as Rituals to Process Climate Grief

Tangible activities were some of the other key rituals that participants described for processing their climate grief (**Figure 4**). The focus was on activities that have the potential to draw people out of their situation in the moment and bring them into the present through activities that lead to some form of obvious positive impact on the environment or community and/or obvious impact on the individual.

Kyle, a newcomer person of colour from the Bahamas, described a specific tangible project that he led:

> *"With the tree project there were 500 or 600 thousand planted in Haiti and they have a lot of deforestation which caused a lot of mud slides and other issues, so being able to plant those trees there was a good thing. But what really made the whole project worthwhile is that we got a lot of feedback from people in different community groups, and they were telling people about the importance of trees and how they were excited about the project and were getting other people to plant trees and getting their friends and their community members involved. It was just nice to see that the work was able to translate into something tangible for people as well as some value."*

Kyle explained that being able to clearly see the impact that his work had on the environment of Haiti and the community helped him feel more comfortable with himself and the state of the world and fueled him to continue in his work. This example also shows the power of a like-minded community, the project and impact on the community grew exponentially when the participants shared their experience and knowledge with others in their community and it gave all involved something to come together to contribute to and to be proud of.

Other participants explained that taking part in personal or group activities to reflect on their experiences and work through their emotions in a tangible way are effective like artistic practices or writing, drawing, painting, musicking, connecting with nature through walking, gardening, hiking, or camping or becoming more self-sustaining through baking their own bread, making food with local produce, and making sustainable choices in their everyday lives like shopping zero waste or second hand. These activities not only help people to situate themselves within the context of society and the climate crisis through critical self-reflection, but also take that to the next step and apply their reflection and learning to choices in their everyday lives (Cranton, 2016). In all of these tangible activities, there are some key factors that arose: connection to community, connection to land and sense of place, and connection to oneself and one's emotions and wellbeing.

We live in a time of disconnection, especially in the aftermath of the COVID-19 pandemic where in-person and face-to-face interactions are rare, spontaneous or informal socializing is unlikely, and close interactions are fraught with fear (Cost et al., 2021). Shreetee, a queer person of colour and a newcomer to Canada expressed their frustration at the disconnected messages they received during their undergraduate in environmental studies where:

> *"I feel sometimes there is a disconnect in some of my classes in terms of how humans are [described] as kind of an external factor to the environment when it's like, no, we are all a part of the environment."*

It seems to be clear that to process climate grief and maintain lifelong learning, these youth participants have clearly identified the need to connect with like-minded others in the community and foster community care, connect with the land they live on and nature, and connect with themselves through reflection.

Figure 4. Types of tangible activities participants described that help them to process climate grief.

DISCUSSION

This research engaged politically active youth ages 12-29 in Mi'kma'ki in reflection through semi-structured interviews, a poetry workshop followed by a focus group, and individual art submissions. This research fulfilled the objective of identifying key vocabulary that youth use to describe their climate grief as well as activities that they use to process it.

The definitions and descriptions of climate grief were similar across all participants and centered on two major themes: climate apocalypse and climate justice. These themes reflect the variety of vocabularies participants used to describe their climate grief and illustrate the contrast and internal conflicts that participants face as activists in which they must simultaneously hold their grief and fear with hope and visions of potential positive futures (Park et al., 2020). Their definitions and descriptions were apocalyptic, focused on end-of-the-world narratives, but their responses to climate grief and their visions for action spelled a story of resistance, hope, perseverance, and community. Community care, community wellbeing, and community strength were key themes throughout the entirety of this research. Participants emphasized the need for strong relationships with others to be able to withstand their climate grief and the worse impacts of the climate crisis to come, but also to build resilience and communities where people can count on one another to show up, to stand in solidarity, and to have a shared vision and identity. They identified that not only are community care and spaces necessary for processing climate grief, but also for developing directions forward for the climate movement and climate action as a whole. Their calls for transformation of the way that we relate to one another in

society, in the movement, and in our personal relationships towards one of reciprocity, respect, and sustainability spoke to the types of rituals they felt were needed to support them in their climate grief.

Strengths & Limitations

This research does not claim to provide generalizable results on the experiences of politically active youth with climate grief in Mi'kma'ki. The goal was to explore the depth of their experiences through learning, vocabularies and rituals, and their political activism and how that connects to and describes their climate grief. Although the results and discussion were successful in exploring and addressing all three objectives with a lot of depth, there were some key limitations. One of the primary limitations being that we only had one round of interviews with participants exploring their personal journey and experience with political activism and climate grief. We knew many of the participants from outside of the research to varying degrees but only having one interview might not have allowed for participants to become comfortable enough to share the entirety of their experiences with climate grief. Additionally, all the research engagement (interviews, poetry workshop, focus group, individual art interviews) were held through Microsoft Teams and as such there was little possibility for picking up on body posture and cues and it was difficult at times to read participants' comfort in the research, it also made some of the interactions unnatural. Furthermore, since this research focused on arts-based engagement, the participants may have favoured arts-based rituals when describing how they process climate grief. The arts-based nature of the research may have also attracted certain individuals with an interest in arts, although there was an opportunity to only participate in the interview component, the recruitment did emphasize the arts-based components as well.

This research was strong in that it took an intersectional and anti-oppressive approach and considered the experiences of participants in relation to all the interconnected injustices related to climate change. Additionally, there were multiple methods of data collection which improved the robustness of the data, including the opportunity for the artistic representation of the participants' climate grief. Incorporating artistic methods allowed the participants to explore their experiences in more depth and communicate them creatively. Although the artistic representations may have expressed the experiences of climate grief differently than participants shared in their semi-structured interviews, the pairing of the discussions of the everyday experiences during the interviews, with the visual and poetic descriptions, provided a more comprehensive understanding of their experiences.

Relevance and Implications

This research illustrated the powerful role that artistic approaches to climate work in communities can have in connecting people, facilitating reflection, and providing opportunities for learning. This research identifies the ways in which politically active youth are expressing and describing climate grief, including their messages for hope, perseverance, and community through visual art and poetry that can inspire and uplift readers and other youth activists. Furthermore, the existing literature on definitions of emotions related to climate change lacked definitions directed by youth experiences and as such this study adds to the growing literature on climate grief and anxiety, specifically from a youth perspective. Many key rituals and activities were also identified that other youth can try and implement into their lives to help them process their climate grief including: spending more time with community, building stronger relationships and community with those around you and in your work, helping each other out, having social and community building events, using art or journaling to reflect on experiences of climate grief and express them, having more conversations about climate grief with those they work with and care about, grounding themselves in nature and through physical activity or environmental actions like

tree planting, litter clean ups, or shoreline clean ups, and participating in both individual consumer choice actions like shopping zero waste and political action like protests.

This research is the beginning of a larger conversation that needs to happen within families, friend groups, chosen families, organizations, clubs, educational institutions, and everywhere young people are learning about and are engaged in action on the climate crisis. The systems of society like to convince people, especially youth, that we are all alone and that we have the responsibility alone of making the world change, but part of resisting the climate crisis and injustice, and processing climate grief needs to be through rejecting the notion that it is an individual's burden to bear.

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AVAILABILITY OF DATA AND MATERIALS

Anonymized data and corresponding materials are available by request to the primary researcher, Lilian Barraclough.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This research received ethics approval from the Dalhousie University Research Ethics Board. All participants signed forms of informed consent to participate. Underage participants were provided with a form of informed assent, and their parent or guardian completed the informed consent form.

CONSENT FOR PUBLICATION

This publication draws on Lilian Barraclough's master's thesis, including some reproduction. The primary author, Lilian Barraclough, holds the copyright for the thesis and provides consent for reproduction.

COMPETING INTERESTS

The Authors declare they have no competing interests.

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Exploring the Relationship between Subjective Social Disconnectedness and Climate Change Anxiety

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ABSTRACT

Climate change is contributing to mental health challenges globally and there is a need to identify pathways that can mitigate these effects. Relational factors that are linked with higher resilience and improved mental health are understudied in relation to climate distress. We examine the association between social (dis)connection and climate change anxiety among a sample of individuals, aged 16+, living in British Columbia, Canada. Cross-sectional online surveys administered between May and December 2021 were conducted with a sample of participants recruited via online social media advertisements. We conducted multivariable linear regression analyses to assess associations between social disconnection and climate change anxiety. Mediation analyses were also conducted to assess if generalized psychological distress mediated the pathways of interest. Findings revealed that (a) subjective social disconnection was associated with greater climate change anxiety, and (b) this effect was mediated by higher levels of generalized psychological distress. Dominance analyses revealed social disconnection and political orientation as key contributors to climate change anxiety. We conclude that building resilience through supportive social networks and communities may mitigate the harmful effects of climate change anxiety. Interventions may benefit from group-based and community-building modalities. Further research on such interventions is needed.

Keywords**:** *Climate Change Anxiety; Non-specific Psychological Distress; Subjective Social Disconnection*

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INTRODUCTION

Average global atmospheric, oceanic, and surface temperatures are increasing (Masson-Delmotte et al., 2021). These increases are driven primarily by atmospheric emissions from human activities and worsened by natural cyclical processes (He & Silliman, 2019; Masson-Delmotte et al., 2021). Given past performance towards emissions targets aiming to curtail the negative effects of climate change, it is unlikely in the near-term that we will achieve meaningful reductions in human atmospheric emissions in order to stave off the worsening, cascading, and accelerating impacts of climate change (Masson-Delmotte et al., 2021). As such, climate change poses considerable challenges to people across the globe (Watts et al., 2015).

Challenges associated with climate change include increased prevalence and intensity of heat waves, forest fires, excessive precipitation, floods, and other natural disasters (Watts et al., 2015). These events destroy agriculture, livestock, greenspace, and housing—in turn compounding existing emotional, psychological, and existential problems already facing individuals and society (Morganstein & Ursano, 2020). To date, researchers have documented experiences of worry, anxiety, sorrow, pain and hopelessness in relation to climate change (H. L. Berry et al., 2010; Clayton, 2020; Fergusson et al., 2014; First et al., 2017; Vergunst & Berry, 2022; Wardell, 2020). These functional emotional responses in turn have resulted in climate change-related mental health conditions such as anxiety, post-traumatic stress, and depression (Bratu et al., 2022; Clayton, 2020, 2021). Climate change also exacerbates and amplifies existing social inequities and preexisting mental health challenges and can also intensify the impacts of social and health issues that are already under resourced. There is a growing concern among researchers and practitioners that people suffering from climate change anxiety may represent “sentinel populations” and that these problems will only continue to worsen as the threat to our environments, livelihoods, and homes increases (Clayton, 2021; Jordan & Huitema, 2014; Usher et al., 2019).

Existing approaches to address climate change primarily focus on technological innovation (e.g., improving buildings, levies, carbon capture) and emergency response systems (e.g., disaster relief counselling; (Weinstein et al., 2019). However, intensifying, cascading, and accelerating consequences of climate change will make it increasingly difficult to adequately respond to climate-related threats – particularly those that impact not only built infrastructure, but also human health (Vergunst & Berry, 2022). As such, there is a need to pre-emptively build “pre-traumatic resilience” rather than solely address post-traumatic distress. This can be accomplished by investments that support individuals holistically and focus on upstream prevention of climate change and poor mental health (Döring et al., 2015; Feldmeyer et al., 2019; McEvoy et al., 2013; Morecroft et al., 2012; Patel et al., 2017).

In particular, investments to build resilience are needed to support the mental health of individuals and populations facing climate change (Babić et al., 2020; Döring et al., 2015; Feldmeyer et al., 2019; Patel et al., 2017; Roeckner et al., 2021). Among multiple factors, social connectedness is a key contributor to individual and community resilience. In fact, most scientific instruments of resilience measure some dimension of social support, including the Connor-Davison Resilience Scale, the Adult Resilience Scale, Wagnild and Youngs’s Resilience Scale, the Scale of Protective Factors, and the Predictive 6-Factor Resilience Scale (Connor & Davidson, 2003; Fernandes et al., 2018; Friborg et al., 2003; Ponce-Garcia et al., 2014; Rossouw & Rossouw, 2016). The importance of social connectedness to resilience likely operates through a variety of biological, psychological, and social mechanisms that collectively influence our abilities to cope and adaptively deal with distress (Ozbay et al., 2007). Indeed, being connected to others—especially those who are empathic, supportive, and emotionally available—provides an opportunity to process one’s experiences, pool resources to cooperatively

address problems, and reduce tensions and stress through relaxation and recreation (Chen et al., 2020) Connecting with other concerned individuals, and working together to address shared concerns about the climate can also foster a spirit of action that allows people to cope in productive ways that can support climate resilience (Baudon & Jachens, 2021). For these reasons and others, social connectedness has been identified as a key adaptation strategy for dealing with climate-related events, such as extreme heat events (Kafeety et al., 2020; Kim et al., 2020). However, few studies have empirically examined the relationship between these factors.

In sum, there is strong reason to believe that social health may be important to averting distress arising from climate anxiety. However, empirical tests of this relationship are needed to understand how social connections could be leveraged to promote positive mental health in the face of climate change. To address these gaps, the present study aims to: (a) examine associations between social connectedness and climate change anxiety, (b) explore the extent to which protective effects of social connectedness against climate change anxiety are mediated by their effect on generalized psychological distress, and (c) identify the most salient factors underlying climate change anxiety.

METHODS

Data Collection

This analysis used data from the third wave of the British Columbia Climate Distress Monitoring System (BC-CDMS), which recruited participants living in British Columbia, Canada, aged 16+, using paid social media advertisements on Facebook and Instagram. Advertisements for the third wave of the BC-CDMS were publicized between 30-Nov-2021 to 4-Dec-2021, approximately two weeks following the November 2021 Pacific Northwest floods (Bratu et al., 2022). BC-CDMS participants were screened for eligibility (i.e., BC residence, age 16+), provided informed consent, and completed a 10-minute questionnaire. Data from the first two waves of the BC-CDMS were not used as they did not include any scales measuring social connectedness. Analytic exclusion criteria further restricted the present sample to cases with complete data across the variables included in this analysis. The BC-CDMS was reviewed and approved by the research ethics board at Simon Fraser University.

Variables

Climate Change Anxiety. The primary outcome variable for this analysis was climate change anxiety, defined as a summary scale reflecting the mental and emotional response to climate change. Several candidate scales assessing climate change anxiety are beginning to emerge, allowing for the first quantitative epidemiological assessments of these phenomena (Clayton & Karazsia, 2020; Hogg et al., 2021). These scales attempt to isolate specific experiences of distress attributable to climate change. Empirical investigations examining the relationship between ecological distress and generalized psychological distress demonstrate that ecological distress is a distinct phenomenon, though the concepts are correlated and likely mutually reinforcing (Hogg et al., 2021). Among existing scales, Clayton and Karazsia's Climate Change Anxiety Scale (CCAS) was the first developed scale to account for these cognitive and functional impairments (Clayton & Karazsia, 2020). We used the CCAS to measure climate change anxiety. The CCAS consists of 13-items assessing frequency and persistence of anxious symptoms (e.g., "*Thinking about climate change makes it difficult for me to concentrate*", "*My concerns about climate change undermine my ability to work to my potential*"). Each item is scored on a five-point Likert scale ranging from "Never" to "Almost Always." For each item, a higher score reflects a greater endorsement of the content covered by the item. Final scores are calculated as an average of scale items and range from 1 (Low Climate Change Anxiety) to 5 (High Climate Change Anxiety).

Generalized Psychological Distress. In addition to the CCAS, we included the 6-item Kessler Psychological Distress Scale (K6; Stolk et al., 2014) to measure generalized, or non-specific, psychological distress. The K6 consists of six items measuring the frequency and persistence of symptoms of non-specific psychological distress (e.g., "Felt restless," "Felt Hopeless"). Each item is scored on a five-point Likert scale ranging from "None of the time" to "All of the time." Final scores are calculated by summing the individual items and range from 0 (Low non-specific psychological distress) to 24 (High non-specific psychological distress).

Subjective Social (Dis)connection. To measure subjective social disconnection, we used a four-item scale. Items on this scale were created by our team and modeled after the questions used in the K6 to allow for seamless integration of the scale within the BC-CDMS's ongoing serial cross-sectional survey without the addition of multiple lengthy scales. The items were written to cover four domains of social disconnectedness: (1) loneliness (e.g., the feeling of being disconnected from others), (2) existential aloneness (e.g., the feeling of not being like others and unable to connect with them), (3) community belonging (i.e., the feeling of not having a community), and (4) perceived social support (i.e., the feeling of not having people to count on for support) (Mansfield et al., 2021; McNamara et al., 2021; Rosedale, 2007; Thompson, 2021; Wang et al., 2018; Yanguas et al., 2018). The four questions asked participants how often in the past 4 weeks they "felt lonely," "felt like no one understands you," "felt like you were not a part of your community," and "felt like you had no one to turn to when you needed help." Participants responded to these prompts on a five-point Likert Scale: (1) "None of the time," (2) "A little of the time," (3) "Some of the time," (4) "Most of the time," (5) "All of the time." The internal consistency of these items was tested using Cronbach's Alpha and indicated good reliability (α = 0.89, 95% CI = 0.88-0.89). As shown in **Table 1**, all items had strong item-to-total correlations and removing any of the items from the scale would result in reduced reliability.

Table 1. Social Connectedness Scale

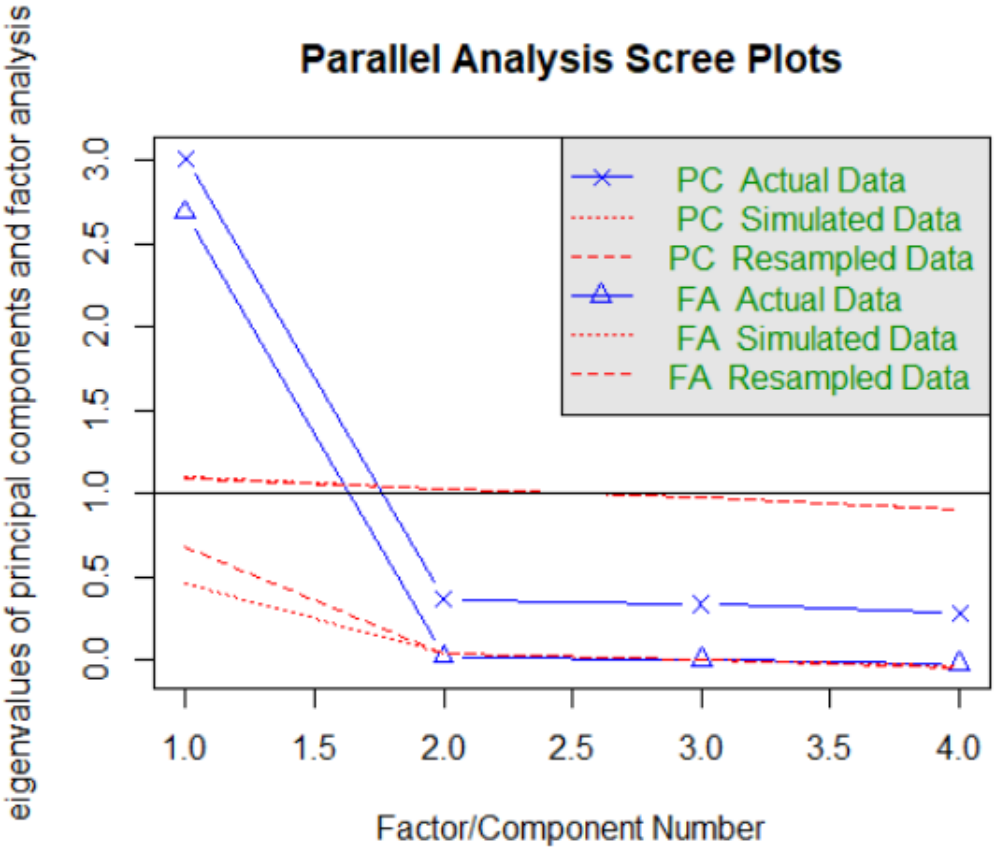
	Descriptives		**Exploratory Factor Analysis**		**Cronbach's Alpha** (α = 0.89, 95% CI = 0.88-0.89)	
Item	**Mean (SD)**	**Median (Q1-Q3)**	**Uniqueness**	**Factor Loadings**	**Reliability if item dropped**	**Item-to-total correlation**
Felt lonely	2.07 (1.20)	2.00 (1.00-3.00)	0.372	0.793	0.87	0.85
Felt like no one understands you	1.95 (1.20)	1.00 (1.00-3.00)	0.342	0.811	0.86	0.86
Felt like you were not a part of your community	2.12 (1.32)	2.00 (1.00-3.00)	0.331	0.818	0.86	0.87
Felt like you had no one to turn to when you needed help	1.87 (1.19)	1.00 (1.00-3.00)	0.268	0.793	0.85	0.88

Notes: Factor Analysis: Sum of squared loadings 2.687; Proportion of Variance Explained = 0.672; χ^2 = 2.05, df = 2, p-value = 0.36. Higher scores represent greater disconnectedness.

Parallel Analysis (See **Figure 1**) was used to determine the number of factors included in the scale, indicating a single factor structure. Exploratory factor analysis was used to explore factor structures for a 1-factor structure. The χ^2 test indicated data-model fit for the single factor structure (p = 0.36) – with 67.2% of the model variance explained by a single factor. A single factor structural equation model (SEM) was also used to confirm factor structure. The χ^2 test for the SEM model indicated strong data-model fit (p = 0.62), as did the RMSEA (0.000, 90% CI = 0.000-0.068), Comparative

Fit Index (1.00), Tucker-Lewis Index (1.055), and the Standardized Root Mean Square Residual (0.011). A sum score was calculated by adding together the values of each scale. Final scale scores ranged from 0 to 20, with higher scores indicating greater feelings of disconnectedness. Scale scores were right skewed (Mean = 8.01, SD = 4.26, Median = 7.00, Q1-Q3 = 4.00-11.00), with most participants reporting low social disconnectedness. Subjective Social Disconnectedness scores were strongly correlated with scores from K6 (Spearman's ρ = 0.741, p-value < 0.0001) and CCAS scores (Spearman's ρ = 0.552, p-value < 0.0001); which were also correlated with each other (Spearman's ρ = 0.739, p-value < 0.0001).

Figure 1. Parallel Analysis Scree Plot to Determine Factor Structure of the 4-item Connectedness Scale



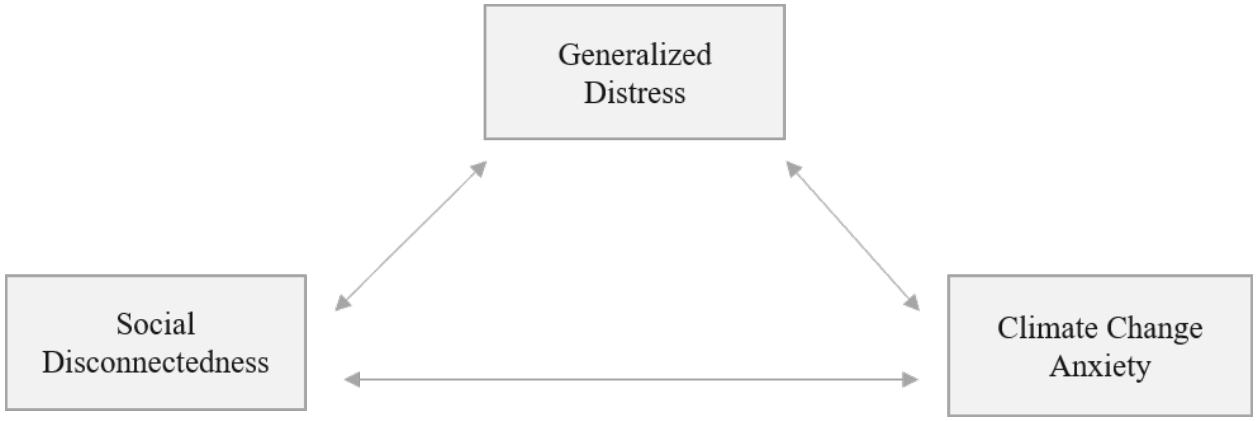
Confounding Variables. Age (16-24, 25-44, 45-64, 65+), gender identity (man, woman, non-binary; transgender participants were classified as the gender they identified as, not their biological sex), income (<$30,000, $30,000-$59,999, $60,000-$89,999, $90,000+), education (high school or less, some post-secondary training, bachelor's degree or higher), population density (low [>300/sq.km.], medium [300 – 1,499/sq.km.], high [>1500/sq.km.]; Dijkstra, 2020), and political orientation (A standard 7-point scale with answers from "extremely conservative" to "extremely liberal"; Haltom, 1990) were included as confounders. Population density was assessed by linking participant's self-reported Forward Sortation Area (FSA) code to 2016 census estimates of FSA-level population density. Population density was reported as per 100 people per square kilometer. Age, gender, ethnicity, income, and education were assessed using single demographic items.

Data Analysis

All data analyses were conducted in R (R Core Team, 2021). Frequencies (N) and proportions (%) are reported for categorical variables, and means and standard deviations are reported for continuous variables. Chi-square (χ^2) tests were used to test bivariable differences on categorical variables, one-way ANOVA tests were used for continuous normal variables, and Kruskal–Wallis tests were used for continuous non-normal variables. Spearman correlation coefficients tested relationships between CCAS scores, K6 Scores and Subjective Social Disconnection Scores. Multivariable linear regression was used to assess the associations between the exposure variable of subjective social disconnectedness and the outcome variable of climate change anxiety. Standard diagnostic plots were used to assess assumptions of linear regression using the plot() function.

Additionally, a mediation analysis tested the mediating effect of K6 scores on the relationship between social disconnectedness and climate change anxiety (See **Figure 2**). These mediation models included the same confounders used for the overall analyses. Quasi-Bayesian confidence intervals were constructed for mediating effects using the mediation() package in R. Finally, dominance analysis (i.e., a comparison of the relative importance of predictors in multiple regression based on R^2 contribution) (Budescu, 1993), with CCAS scores stratified at their median value, was conducted to assess the contribution of each variable to the model's explanatory power.

Figure 2. Hypothesized Mediation Model Tested



RESULTS

Of a total of 580 respondents who were recruited to complete the survey used in wave 3 of the BC-CDMS, 427 were included in our analyses, and 153 were excluded due to missing data. **Table 2** provides an overview of the analytic sample, with descriptive outcomes stratified by the median value for the Subjective Social Disconnection Scale scores. The median CCAS score was 1.46 (Q_1, Q_3: 1.00, 2.15) and the median K6 score was 7 (Q_1, Q_3: 2.00, 12.00).

In adjusted linear regression analyses, the association between subjective social disconnectedness and increased Climate Change Anxiety Scale scores was statistically significant (β = 0.069, SE = 0.007, p-value < 0.0001) when the K6 scale for generalized distress was not considered. In a bivariable Spearman Rank correlation, social disconnectedness was strongly associated with CCAS scores (rho = 0.535, $p < 0.0001$). However, upon inclusion of the K6, the effect of Subjective Social Disconnectedness on Climate Change Anxiety Scale scores became non-significant (β = 0.001, SE = 0.009, p-value = 0.906).

Table 2. Sample Description (n = 427)

	Overall N = 427	**SSD* ≥ 7** N = 236	**SSD ≤6** N = 191	**p-value**
Age				<0.001
16-24	49 (11.5)	37 (15.7)	12 (6.3)	
25-44	162 (37.9)	96 (40.7)	66 (34.6)	
45-64	153 (35.8)	82 (34.7)	71 (37.2)	
65 years and over	63 (14.8)	21 (8.9)	42 (22.0)	
Gender				0.014
Man	210 (49.2)	105 (44.5)	105 (55.0)	
Non-binary	14 (3.3)	12 (5.1)	2 (1.0)	
Woman	203 (47.5)	119 (50.4)	84 (44.0)	
Ethnicity				0.524
BIPOC	63 (14.8)	32 (13.6)	31 (16.2)	
White	364 (85.2)	204 (86.4)	160 (83.8)	
Income				<0.001
Less than $30,000	157 (36.8)	108 (45.8)	49 (25.7)	
$30,000 to $59,999	98 (23.0)	57 (24.2)	41 (21.5)	
$60,000 to $89,999	86 (20.1)	38 (16.1)	48 (25.1)	
$90,000 or more	86 (20.1)	33 (14.0)	53 (27.7)	
Education				0.005
High School or Less	72 (16.9)	52 (22.0)	20 (10.5)	
Some Post-Secondary Training	143 (33.5)	77 (32.6)	66 (34.6)	
Bachelor's Degree or higher	212 (49.6)	107 (45.3)	105 (55.0)	
Population Density/100/sq.km.	12.57 (20.49)	13.54 (22.71)	11.37 (17.33)	0.277
Low (>300/sq.km.))	226 (52.9)	118 (50.0)	108 (56.5)	0.219
Medium (300 – 1,499/sq.km.)	77 (18.0)	49 (20.8)	28 (14.7)	
High (>1500/sq.km.))	124 (29.0)	69 (29.2)	55 (28.8)	
Political Orientation Score	4.77 (1.94)	5.16 (1.78)	4.28 (2.03)	<0.001
Extremely conservative	23 (5.4)	4 (1.7)	19 (9.9)	<0.001
Moderately conservative	55 (12.9)	22 (9.3)	33 (17.3)	
Slightly conservative	38 (8.9)	20 (8.5)	18 (9.4)	
Neither liberal nor conservative	83 (19.4)	47 (19.9)	36 (18.8)	
Slightly liberal	22 (5.2)	13 (5.5)	9 (4.7)	
Moderately liberal	96 (22.5)	53 (22.5)	43 (22.5)	
Extremely liberal	110 (25.8)	77 (32.6)	33 (17.3)	
CCAS Score	1.71 (0.79)	1.98 (0.84)	1.38 (0.55)	<0.001
1.46 or higher	217 (50.8)	157 (66.5)	60 (31.4)	<0.001
Less than 1.46	210 (49.2)	79 (33.5)	131 (68.6)	
Subjective Social Disconnection (SSD)	8.40 (4.36)	11.51 (3.51)	4.55 (0.75)	<0.001

As shown in **Table 3**, a multivariable causal mediation analysis was undertaken to examine whether generalized psychological distress mediated the pathway from subjective social disconnectedness to climate change anxiety. Mediation analyses with 1,000 bootstraps generating Quasi-Bayesian Confidence intervals showed that 98.6% ($p < 0.0001$) of the indirect effect of social

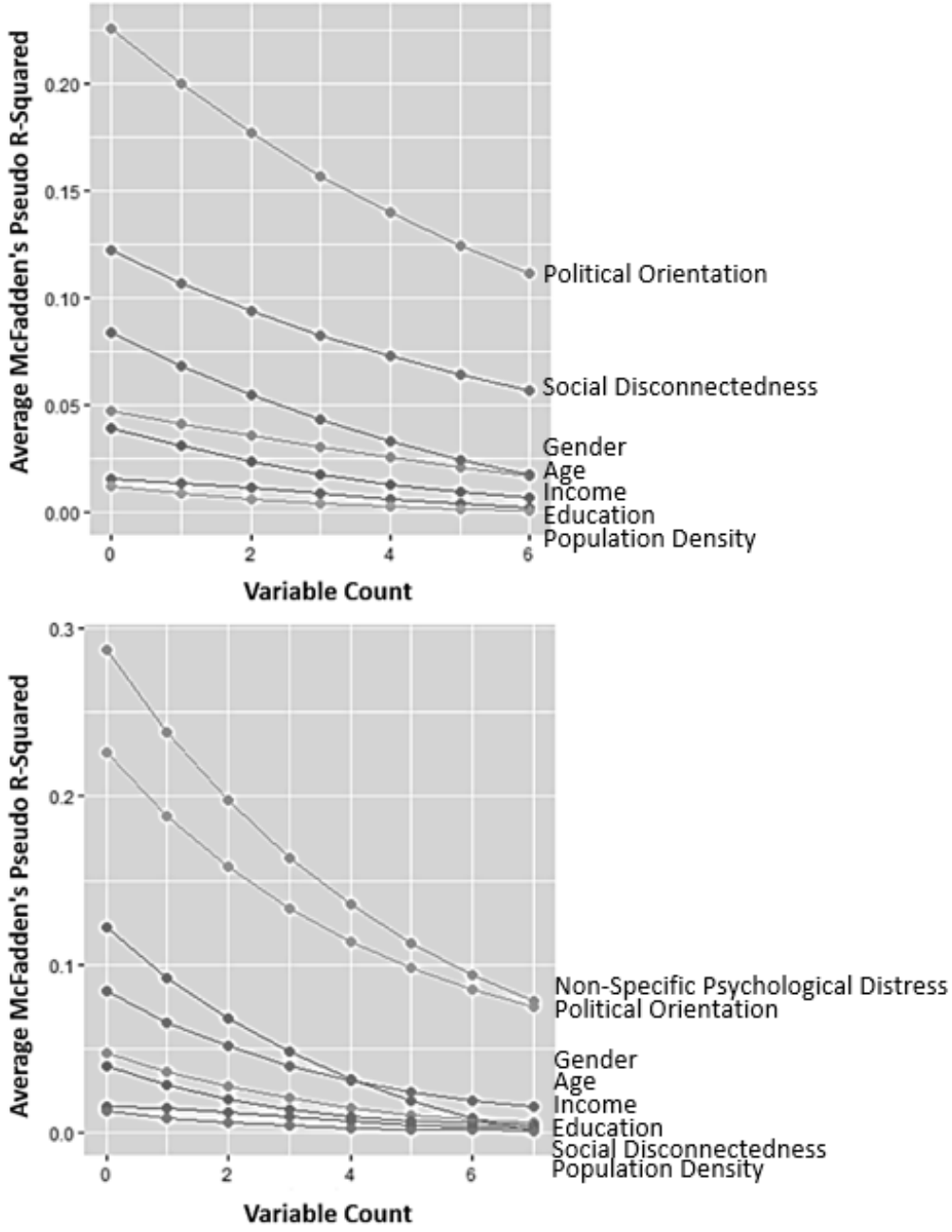
disconnectedness on climate change anxiety was operationalized through increased psychological distress (ACME = 0.068 [0.054- 0.080], ADE = 0.001 [-0.018, 0.020], Total Effect = 0.690 [0.054, 0.080]).

Table 3. Multivariable Linear Regression Model Predicting Higher CCAS

	Model 1: Without K6 Scores			**Model 2: With K6 Scores**		
	β	**SE**	**p-value**	**β**	**SE**	**p-value**
Primary Explanatory Variable						
Subjective Social Disconnectedness, per 1 point increase	**0.07**	**0.01**	**0.00**	0.00	0.01	0.91
Confounding Variables						
Age (Ref = 16-24)						
25-44	**-0.20**	**0.11**	**0.06**	**-0.19**	**0.10**	**0.05**
45-64	**-0.31**	**0.11**	**0.00**	-0.16	0.10	0.11
65 years and over	**-0.43**	**0.12**	**0.00**	-0.18	0.11	0.11
Gender (Ref = Man)						
Non-binary	**0.48**	**0.17**	**0.01**	**0.43**	**0.15**	**0.01**
Woman	**0.27**	**0.07**	**0.00**	**0.21**	**0.06**	**0.00**
Ethnicity (Ref = BIPOC)						
White	0.01	0.09	0.47	-0.03	0.08	0.71
Income (Ref = Less than $30,000)						
$30,000 to $59,999	0.06	0.08	0.47	0.07	0.07	0.36
$60,000 to $89,999	0.09	0.09	0.28	0.10	0.08	0.21
$90,000 or more	-0.08	0.09	0.41	-0.02	0.08	0.79
Education (Ref = Bachelors or Higher)						
High School or Less	-0.08	0.09	0.38	-0.10	0.08	0.22
Some Post-Secondary Training	-0.11	0.07	0.12	-0.10	0.06	0.12
Population Density, per 100/sq.km.	0.001	0.002	0.47	0.001	0.001	0.45
Political Orientation, per 1 point increase towards greater liberalness	**0.10**	**0.02**	**0.00**	**0.06**	**0.02**	**0.00**
K6 Non-specific Psychological Distress Scores, per 1 point increase	-	-	-	**0.07**	**0.01**	**0.00**

Dominance analysis, with CCAS scores stratified at their median value (1.46), was conducted as part of the mediation analysis to assess the contribution of each variable to the model's explanatory power (Budescu, 1993). Conditional dominance analyses tested for models with and without the K6 scale included (See **Figure 3**) – findings reinforced the mediating effect of psychological distress on the relationship between subjective social disconnectedness and climate change anxiety. The dominance analyses also revealed a persistent association between political orientation and climate change anxiety.

Figure 3. Conditional Dominance Analysis for Models with (top) and without (bottom) Kessler 6-item Psychological Distress Scale Scores Included



DISCUSSION

Primary Findings

The present study (1) identified a significant association between subjective social disconnectedness and climate change anxiety, (2) explored the mediating effect of generalized psychological distress on this relationship, and (3) highlighted political orientation and generalized psychological distress as key correlates to climate change anxiety.

Comparison to Existing Literature

Despite relatively little evidence directly examining the association between climate change anxiety and social connectedness, our findings are conceptually consistent with a broad and growing literature base underscoring the importance of social connection to mental well-being and stress reduction (Harandi et al., 2017; Mushtaq et al., 2014; Robb et al., 2020; Saeri et al., 2018; Santini et al., 2020). Indeed, the link between social connection and distress is already well established (H. Berry & Shipley, 2009; Fu et al., 2017; McGinty et al., 2020). The present study furthers this existing literature by providing initial evidence that social disconnection might worsen specific anxieties, such as climate change anxiety, by contributing to increased generalized (non-specific) psychological distress. This research exists in the context of previous studies showing that efforts to build resilience to psychological distress by building social connection is beneficial. This is especially needed given research showing that environmental degradation removes an important source of solace for individuals by destroying their homes and landscapes (Eisenman et al., 2015).

In addition to recovering these landscapes, social support can be one way to fill the gaps created by shifting environments. Worry about climate change is a normal response to the unknown challenges that may be posed by changing weather patterns and intensifying climate events. However, strategies are needed to cope and our data supports previous studies that point to building more resilient communities is a key coping strategy (Ojala et al., 2021). For example, Green et al. (2015) highlight social cohesion as a key factor for protecting communities from the harmful mental health effects associated with flooding. They argue that building social cohesion through increasing civic participation is a potentially inexpensive, albeit effective, defense against avoidable mental health harms that will arise from climate change (Greene et al., 2015). In the wake of Hurricane Sandy, community-based organizations stepped up to play an important role in building a social and structural response to the environmental devastations – demonstrating the importance of investments in human capital, not just structural capital to mitigate the effects of climate change (Schmeltz et al., 2013). Ebi and Semenza propose a multi-step wise course of action for promoting community-adaptation for climate change that leverages grassroots interventions mixed with top-down interventions implemented in organizations and agencies. These approaches, they note, will require robust mobilization of stakeholders and resources to achieve the protective effects of having a healthy community (Ebi & Semenza, 2008). Ultimately, we concur with Berry (2009), whom suggested that in the context of climate change it is important to find opportunities to build community capacity – which may not only address the immediate mental health effects of climate change, but also the cascading mental health benefits of creating more socially connected communities (Berry, 2009). Capacity for greater social connection requires not only the removal of social barriers (e.g., long or irregular working hours; social anxiety; discriminatory social attitudes) but also intentional efforts to build communities in ways that are more hospitable and conducive to socialization. This includes both investments in communities as well as architectural considerations for creating built and natural environments where people can connect (Corcoran & Marshall, 2017).

Our results also highlight the reality that these effects may be particularly salient for politically left-leaning individuals for whom levels of climate change anxiety and loneliness are elevated (Ojala et al., 2021). Indeed, political orientation and social connection were observed to be two key contributors to climate change anxiety – with much greater explanatory power than other person-level characteristics considered. Given the power of political orientation in contemporary social life, social and political organizing within and between political groups might be one strategy to provide effective outlets for social support and climate action. Previous studies have shown that political engagement and participation can be an important component of one's social identity and sense of belonging

(Gibson & McAllister, 2013). For example, Reilly (2017) demonstrated that more politically engaged individuals tended to be less isolated – and that this effect was similar for both ends of the left-right political spectrum. Leveraging existing political networks, and establishing new climate-engaged models of social participation might serve to support mobilization and provide healthy coping outlets for addressing climate change through political action (Kleres & Wettergren, 2017). However, given the economy of climate politics research is needed to understand how social organizers can avoid burnout among activists – which could worsen, rather than better, people's generalized and climate-specific anxiety (Gorski & Chen, 2015). For example, Conner et al. (2021) showed that large majorities of activists pay mental health costs for their labour. However, providing an optimistic counterpoint, previous research among Black and Latinx college students in the United States show that the effects of activism can provide secondary benefits as well – providing some protection and resilience against discrimination and stress (Hope et al., 2018). Ultimately, people who engage politically must be trained to protect their mental health and build the sort of resilient social networks that will benefit them most (Eiroa-Orosa & Lomascolo, 2018). Leveraging these sites of activism for coping and resilience building has the added benefits of providing immediate opportunities to transform anxieties into action – one common strategy endorsed by eco-psychologists (Baudon & Jachens, 2021).

Implications for Practice

These basic findings suggest that responses to climate change anxiety should consider the role of social connection as well as other factors that contribute to psychological distress. A number of interventions are already emerging to address climate change anxiety and other forms of inevitable ecological distress (Baudon & Jachens, 2021). A recent review by Baudon & Jachens (2021) highlights social connection as one of the four primary psychological approaches for group and individual treatments of climate change anxiety. Within this review, the authors identified an array of social health actions that can improve climate change anxiety, including encouraging patients to join established groups and organizations, group traditions and gatherings, and collective action on climate change and other environmental efforts (Baudon & Jachens, 2021). Our study adds indirect support for the potential individual and population utility of these emerging approaches and highlights the importance of investing in social health and wellbeing as a key component of interventions related to mental health in the era of climate change (Adger, 2010; Bains & Turnbull, 2019).

Limitations

This study has limitations. First, our study is based on an online convenience sample, which introduces the possibility that our findings are partially attributable to sampling and non-response bias. While we have used multivariable methods to adjust for potential confounding effects, there are likely omitted variables that we did not account for. We also note that due to ethical reasons are sample includes only individuals aged 16+, causing us to miss vital data about youth 15 years of age or younger. Second, our study relied on a short questionnaire that was designed to take less than 10 minutes to complete. As such, we were not able to include expansive measures of climate distress, social connection, or generalized distress. Where feasible, we have opted for the shortest, easiest to use scales. For instance, in the case of our scale of social (dis)connectedness we opted for a scale that would be seamlessly integrated with the existing K6 Psychological Distress scale and have thereby provided a novel short scale, with strong face validity evidence and appropriate statistical characteristics (e.g., internal reliability and factor structure). However, we recognize that this scale will require further validation and comparison with other scales measuring the manifold dimensions of social health. All results should be interpreted as preliminary and without final conclusions regarding direction of causal effects due to

the cross-sectional survey design. This is particularly true given likely bi-directional relationships and feedback loops between the variables under investigation here (e.g., climate anxiety may cause more distress, but distressed individuals may also be more prone to climate anxiety; or social disconnection may cause distress, but distressed individuals may also withdraw from social situations).

Future Research Directions

As this study is among the first in examining the relationships between social connection, psychological distress, and climate concerns, our findings require replication in larger samples more representative of the general population. Robust and nuanced scales will need to be used to better specify the effects tested here. Indeed, it is evident that social connectedness is likely only one of many variables at play in the relationships explored in this paper (Koger et al., 2011). For instance, recent research by Jia et al. (2021) suggests that one of several ways social connection can help address climate change is by promoting environmental engagement (Jia et al., 2021). More specifically, their work showed that social connection was associated with finding a greater meaning in life, which in turn was associated with pro-environmental behaviours (Jia et al., 2021). This would suggest that meaning-making activities and approaches are likely another candidate for supporting psychological wellbeing and resilience to distress (Li et al., 2019; Macià et al., 2021). At present, we are not confident that we fully understand what potential interventions might be effective at reducing climate anxiety. Health Canada's recent report titled "Health of Canadians in a Changing Climate" highlights climate adaptation strategies as only being in their infancy ("*Health of Canadians in a Changing Climate — Advancing Our Knowledge for Action*").

Given links between social connection, personal meaning, and positive psychology (Stavrova & Luhmann, 2016), it is clear that there is considerable nuance yet to be explored. Nevertheless, our study highlights a key opening and a myriad of opportunities for research focused on resilience-building in the climate change era and underscores key intersections between political ecology, social and civil society, the global environment, and our individual psychological wellbeing (Harrison et al., 2019; Mi et al., 2016; Roger et al., 2016). Clearly, further research in this area will improve our understanding of interactions between humans and their communities and their larger environments, and provide a clearer articulation—and stress the importance— of an eco-social understanding of health (Krieger, 2001; Levins & Lopez, 1999; Merz et al., 2021; Parkes et al., 2020).

CONCLUSION

In conclusion, our results indicate that subjective social disconnection contributes to psychological distress, which in turn contributes to climate change anxiety – suggesting that resilience building efforts and other approaches to address climate change anxiety should account for social and community components of interventions to ensure individuals are included and supported as they wrestle with concerns and anxieties about climate change. Further research is needed to better understand the social processes that might mitigate climate change anxiety to better understand how social networks and systems can be leveraged to promote resilience and wellbeing among those who are worried about climate change.

DECLARATIONS

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AVAILABILITY OF DATA AND MATERIALS

Data and materials are available upon request to the corresponding author.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical review for this study was completed by the Research Ethics Board at Simon Fraser University.

CONSENT FOR PUBLICATION

Not applicable.

COMPETING INTERESTS

The Authors declare they have no competing interests.

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Inner Development Goals and the Meaning, Awareness and Purpose (MAP) Model for Climate Coaching

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ABSTRACT

In the initial study, two focus groups (n=11) scrutinized the five domains within the Inner Development Goals (IDG) framework, examining the essential skills for tackling challenging goals. They collaboratively crafted a streamlined 29-item measure (IDG-A), incorporating a novel sixth domain: organizational belonging. The second study assessed the IDG-A among employees from four organizations (n=39), exploring correlations between the 29 items, six domains, and overall scores. Significantly, many items, nearly all domains, and all domains in relation to the composite score exhibited meaningful correlations, suggesting strong single conceptual alignment. The third study employed findings from the first, leveraging the conceptual congruence of these domains, and motivational theories to shape the Meaning, Awareness, Purpose (MAP) model, designed to activate individuals for climate change goals by taking up climate action, and improving well-being. To assess MAP's effectiveness, two global organizations recruited employees interested in climate change, who underwent IDG-A assessments and were divided into a Carbon Literacy Training (CLT) group (n=10) who dissected strategies for climate action and created a project, or the MAP condition (n=6) emphasizing intrinsic motivation and merging individual and team climate actions to enhance well-being and communication. CLT involved a 15-hour course over 10 weeks, while MAP spanned 9 hours over 10 weeks. Post-intervention, both groups underwent IDG-A re-evaluation and interviews to gauge climate action engagement. Baseline IDG-A scores showed no group differences, with CLT showing no significant improvement. Conversely, MAP significantly improved (p=.004) and outperformed CLT (p=0.03). Interviews indicated personal changes for all, but uniquely, MAP reported enhanced team cohesion and improved well-being. In conclusion, this study proposes future research directions and practical applications.

Keywords: *Climate Coaching; Sustainability; Imagery Training; IDG*

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INTRODUCTION

Background

In an era increasingly focused on the United Nations Sustainable Development Goals (SDGs), it is evident that governments worldwide are actively pursuing these 17 macro-level objectives, including poverty alleviation, clean energy accessibility, and climate action (United Nations Climate Change, 2022; Leiserowitz et al., 2020). However, at the micro-level, organizations have lagged in translating these goals into tangible actions (Mio et al., 2020; Gifford, 2011), despite their potential and sector-specific expertise (Berrone et al., 2019).

A central challenge lies in bridging the gap between these global SDGs and their application within individual businesses, especially concerning employees who may question the impact of their efforts on such lofty goals. This disconnect can amplify mental health concerns when individuals perceive insufficient action addressing impending threats like droughts (Sartore et al., 2005). Effective goal pursuit requires personal and team resilience, coupled with various skills and qualities. Enter the Inner Development Goals (IDGs) framework, devised to identify essential attributes for tackling complex societal issues, particularly those underpinning the UN's Agenda 2030 and the 17 SDGs (Inner Development Goals, 2021). The IDG research involved 861 participants who were asked to enumerate 3-7 essential personal qualities for SDG attainment. The results distilled five overarching qualities: self-relationship, cognitive skills, care for others and the world, social skills, and the ability to drive change. The IDGs, rooted in both leadership development and sustainability, serve as a comprehensive framework for examining individual and collective attributes while considering organizational and institutional support (Inner Development Goals, 2021). The pertinence of the IDGs extends to both organizational and broader contexts, serving as a guiding framework for leadership and SDG development. To operationalize the IDGs within companies, several critical challenges must be addressed. These include assessing change, determining optimal empirical methods to activate individuals, and working groups, and fostering a motivational climate that sustains momentum beyond initial goal agreement. This is where climate educators and coaching psychologists come into play, leveraging their expertise to measure change, motivate employees toward micro-level business goals that impact SDGs, and guide stagnant teams toward progress.

A notable trend within organizational sustainability and climate change is that the impact of initiatives does not meet the intentions. Bain and Company (Davis-Peccoud, 2017) surveyed and interviewed 300 organizations, finding 98% of climate initiatives failed and 81% judged it to be of moderate value. Equally, Accenture (2022) found that 93% of companies are currently expected to miss their Net Zero targets. Research from Microsoft (2021) explored this broad trend and concluded that this failure to meet targets is “partly due to a failure to turn strategy into action and a scarcity of in-house skills”. It is reasonable to conclude from these findings that the organizational change and workforce training and development programmes are not currently effective in many organizations. This underlines the need to look explicitly into the effectiveness of current initiatives; the theoretical framework underpinning them; and the potential for alternative approaches to adult development such as coaching and psychology to contribute to the approach employed by organizations.

While individual executive or one-to-one coaching boasts a high success rate (Jones et al., 2016), it is noteworthy that many team coaching programs encounter difficulties. A meta-analysis exploring the effectiveness of coaching programs in workplace settings (Wang et al., 2022) discovered that various models, including the well-known GROW (Goal, Reality, Options, and Will), POSITIVE (Purpose, Observations, Strategy, Insight, Team, Initiate, Value, and Encourage), and models like Cognitive Behavioral Coaching (CBC), exhibited equal effectiveness when addressing complex goals. Wang et al.

also argue that integrated models (e.g., CBC + GROW), which emphasize solution-oriented and strengths-based coaching, offer the most promise in the workplace context. However, there is still a need for a comprehensible and easily implementable integrated team model grounded in personal development that can be applied and refined to fit complex individual and team needs.

A solution-focused approach to coaching is generally the most effective for setting and achieving shared goals. Most carbon literacy training programs in organizations typically commence with learning styles in the workplace, adapt knowledge (i.e., understanding the effects of climate change), and culminate with a project that demonstrates knowledge (Srkoc et al., 2021). This solution-focused approach, centered on specific goals, bears similarities to person-centric coaching models like GROW and POSITIVE, which provide straightforward frameworks for coaches to follow. However, carbon literacy training often neglects the challenges associated with integrating learning or goals related to complex, systemic issues such as climate change into standard business operations. It also fails to address the merging of personal and interpersonal motivation effectively. Consequently, there is a need for an innovative model that places individuals and teams at the center, effectively combining intrinsic motivation, purpose-driven values, adaptive goal setting, and team cohesion.

One well-established and enduring behavioral approach often used in coaching is Motivational Interviewing (MI; Miller & Rollnick, 2012), which prioritizes intrinsic motivation in all interactions. MI begins with the development of personal and often team self-awareness, subsequently addressing ambivalence and goal setting, and ultimately leading to motivation and planning. MI has yielded positive results in encouraging personal climate-centered behaviors, such as energy conservation (Endrejat et al., 2017), and can be delivered to individuals, groups, and communities (Güntner et al., 2019). Although MI alone is a powerful method for pursuing challenging goals, its combination with imagery training has been shown to enhance motivation even further (Solbrig et al., 2018; Rhodes et al., 2021).

When MI is combined with imagery, it becomes Functional Imagery Training (FIT), originally developed to support individuals in pursuing challenging goals. From FIT, an applied model, known as Applied Imagery for Motivation (AIM; Rhodes & May, 2021), emerged. AIM breaks down significant challenges into manageable process tasks, primarily employing imagery to evoke motivation and devise strategies to overcome hurdles. While the AIM model has not yet been applied to climate goals, it has demonstrated effectiveness in enhancing team performance (Rhodes et al., 2020), and imagery training has been associated with increased pro-environmental behaviors (Boomsma et al., 2016). Consequently, an intrinsically motivated, goal-centered approach grounded in imagery appears to be a logical starting point when developing a model that can be easily deployed with teams.

In this study, we have honed several models, approaches, and techniques, including GROW, POSITIVE, CBT, CBC, MI, and the AIM model, into a new framework that can be delivered by psychologists, coaches, or climate moderators. This framework is named MAP, signifying Meaning, Awareness, and Purpose. MAP serves as the foundation for our climate coaching framework, employing person-centered conversations to explore motivation and personal meaning. This exploration primarily focuses on developing a sense of responsibility by connecting personal motivation to adaptive behaviors. This process involves two key components: awareness, which explores what actions can be taken to act responsibly or engage in nature initiatives, and imagery training, which envisions what change will look like. There is existing evidence (e.g., Mayer & Frantz, 2004; Whitburn et al., 2020) underscoring the significance of a connection with nature in promoting ethical and sustainable behaviors. Whitburn et al. (2020) suggest that additional evidence is needed to fully grasp causation, as it is believed that measures that encompass affect, cognition, and behavior in building a connection with nature will be the most effective at driving pro-environmental behavior. This aligns with the

pathways to nature connection (Rickard & White, 2021), which include multisensory connection, meaning, compassion, and beauty. This profound connection with nature is more likely to stimulate motivation and, consequently, action. Lastly, the concept of purpose considers how actions will impact others. When combined with imagery, it can evoke goal-directed action. By delving into personal motivation and connecting it to adaptive behaviors, we anticipate tangible actions will result (van Valkengoed & Steg, 2019). Furthermore, when teams collaboratively develop actions based on discussions about meaning, awareness, and purpose, they are likely to create more effective processes as they work toward challenging goals. This, in turn, will enhance self-understanding, thinking skills, social skills, and the development of explicit communication systems, ultimately improving well-being and enabling change. These factors can be partially traced through the IDG framework (Inner Development Goals, 2022).

While the MAP model serves as the overarching approach to facilitate communication, it requires careful navigation within corporate organizations. Systems thinking, a well-documented concept (Senge, 2014), offers a more holistic approach to understanding the interplay between the system, encompassing organizational structure, employee needs, and relationships, the behaviors that occur within it, and the resulting outcomes. Climate change is fundamentally a systemic issue, necessitating a deeper exploration and comprehension of the system for climate-related goals to be achieved. Therefore, the MAP model has been developed within the context of systems thinking, firmly rooted in the complexity of climate change and the organizational environment.

This series of pilot studies serves three progressive purposes. Firstly, our primary objective is to develop an adapted version of the Inner Development Goals (IDGs) framework using focus groups. This adaptation aims to facilitate the measurement of personal qualities and skills associated with inner development. Secondly, employing a small sample, we conducted a trial of the adapted IDG, referred to as IDG-A, to ascertain its appropriateness and suitability for assessing personal qualities. Our intention is to make this scale available for organizations to use freely in their assessments. We hypothesize that the domains within IDG-A will not exhibit significant correlations, given their constructive variation. However, we anticipate that the combined item average score for each domain will demonstrate a significant correlation with the total combined average score.

Thirdly, in alignment with the conventions of exploratory research (Sherlock-Storey et al., 2013), we aimed to develop and implement a coaching model, denoted as the MAP model, designed for coaches working with teams. This model is designed to offer a structured yet adaptable framework capable of accommodating individuals with diverse goals within organizations striving to achieve SDG outcomes. To assess the effectiveness of the MAP model, we conducted a comparative analysis. Specifically, we compared a team that received traditional carbon literacy training coaching with a similar team that underwent MAP coaching. We utilized IDG-A to measure baseline and post-intervention skills and qualities. Our hypothesis posits that a significant difference will emerge between the two groups after the training, with the MAP group achieving higher scores than the carbon literacy group. Additionally, we conducted post-intervention interviews to evaluate whether behavioral intentions translated into enduring implementation and to gauge participants' perceptions regarding the effectiveness of their efforts toward larger SDGs.

The Present Study

This research unfolded in two concurrent facets: the transformation of the IDG framework into a practical measurement instrument and the development of the MAP model, followed by its comparison to a control intervention. Consequently, this research encompasses three distinct studies. The first study focused on the creation of the adapted IDG-A measurement tool; a process facilitated by

conducting focus group sessions. Subsequently, in the second study, we recruited a small sample and tested the appropriateness of the IDG-A items and considered how the measure should be used and fed back to participants. Finally, the third study involved the recruitment of participants from two organizations, who were then subjected to either a carbon literacy intervention or the MAP intervention. The effectiveness of these interventions was evaluated using the IDG-A and post-intervention interviews.

Given the multifaceted nature of this interdisciplinary research, characterized by various operational components, we adopted a pragmatic, critical realist, and constructivist approach. Throughout the research, we remained grounded in the exploration of 'real' structures, 'actual' events, and 'empirical' perceptions (Hoddy, 2019).

Ethical approval for this research was granted by the institutional ethics committee of the lead author. It is essential to note that this initial pilot project was not preregistered, and data analysis plans were not submitted prior to data collection. Nevertheless, we made a concerted effort to adhere to the transparency and openness guidelines outlined by Nosek et al. (2015), including purposeful participant selection and facilitating access to data and corresponding code wherever possible.

STUDY ONE

The genesis of our research lay in crafting a measurement tool rooted in the pre-existing IDG framework. Our objective was to moderate open discussions using focus groups to curate a set of items that could be readily employed by any organization to evaluate inner goals through personal skills and qualities, thereby serving as a catalyst for meaningful climate dialogues and proactive measures. This measurement instrument is denoted as the IDG-Adapted (IDG-A), signifying its evolution from the original framework.

Participants

To develop the IDG-A, the lead author moderated two focus groups with a purposeful sample of climate coaches external to this project (n=5, M_{age}=41.2, SD=6.9, Female=3, Male=2) who had extensive experience (+7 years) working with corporate organizations, and a group of six Chief Executive Officers (CEO's) (M_{age}=54.77, SD=7.39, Female=1, Male=5) based in America (n=5) and Europe (n=1). All participants in these focus groups were recruited opportunistically due to their established connections with members of the research team. Participants were provided with research details, including the study's objectives, and granted written ethical consent before the initial session.

Procedure

The procedure consisted of two distinct online focus group sessions, each lasting 1.5 hours. These sessions were voice recorded and were centered around a discussion of the IDG framework (Inner Development Goals, 2022a). The primary objective was to enhance and adapt this framework into a set of questions that could be effectively utilized by climate coaches and organizations. These questions were intended to pinpoint personal qualities suitable for refinement during climate coaching sessions. In accordance with Tong et al.'s (2007) recommendations for optimizing qualitative research, all relevant criteria were meticulously addressed across three domains: the research team and reflexivity, study design, and analysis. Additionally, the groups were encouraged to provide insights into the IDG framework, critique its individual components, and offer clarification where necessary. It is worth noting that the IDG framework had its origins in focus groups that involved over 3000 participants (IDG, 2021).

The IDG framework encompasses 23 transformational skills categorized into five domains: relationship to self, cognitive skills, caring for others and the world, social skills, and driving change. In light of these domains being established during the original framework research, the lead author sought interpretations through confirmatory quotes extracted from the current focus group discussions. This process aimed to strike a balance between providing objective descriptions of emerging themes/domains and maintaining a phenomenological perspective. The theoretical approach of Interpretative Phenomenological Analysis (IPA, cf. Smith, 2011) guided the study's design and had a profound impact on the development of the IDG-A. The voice recordings of the focus group sessions were transcribed verbatim, with quotes that supported each question in the IDG-A meticulously highlighted. Subsequently, the entire set of adapted items was shared with the focus group members to ensure precise meaning and to solicit their feedback. At this point, the transcripts and audio, but not the finished IDG-A were shared with researcher five who did the same task of sifting through the quotes to create their own IDG-A measure. When this was complete the two researchers discussed the end measure and shared the IDG-A with quotes to the participants for feedback and clarity.

Results and Discussion

The outcomes of the focus groups demonstrated a unanimous consensus on the significance of the five IDG domains, a consensus substantiated by discussions and quotes identified through IPA. These deliberations led to the refinement of specific items deemed suitable for inclusion into the IDG-A. The IDG-A encompassed five key domains, with the following number of items allocated to each: relationship to self (five items), cognitive skills (five items), caring for others and the world (four items), social skills (five items), and driving change (four items). Moreover, the focus group discussions gave rise to an entirely new domain, which added a sixth domain to the IDG-A: organizational belonging (six items). This additional domain emerged in response to feedback from the focus groups, who perceived the need for a broader perspective that could holistically connect an individual's inner goals with those of the team and organization.

We recognize the potential for bias as we sifted through quotes to match them with the already identified IDG framework and sought to establish a link between remaining quotes and general themes of discussion. To remain as objective as possible, as domain quotes and items were being discussed in the focus groups with the single research moderator, a second researcher did a similar task post-focus group discussion with only the audio and transcripts to analyze. That way they remained unbiased from the sessions and could make their own judgements without influence. The researcher independent of the focus group confirmed the location of a new domain which she named: culture connection. This was discussed with participants and changed to organizational belonging as participants felt it was a better fit.

The six additional questions introduced within this new organizational belonging domain were as follows: (1) "My values and goals align with my organization's and teams’," (2) "I have a clear understanding of my role, autonomy, and a sense of accountability," (3) "Stressful situations are addressed collectively within a culture of support, compassion, and learning," (4) "Contributing and feeling heard and valued in meetings is straightforward," (5) "Team strategy is discussed and communicated, fostering a sense of team belonging," and (6) "I actively contribute to the collective vision, have well-defined objectives, and can monitor progress for both myself and the team."

The focus groups unanimously endorsed the suitability of the questionnaire for assessing the skills and qualities of individuals engaged in change initiatives, affirming that the quotes accurately captured the intended meanings. While our initial intent was to make the transcripts available for critique, participants expressed a preference for non-disclosure. Therefore, direct quotes often

reported when using IPA are not available. The total number of items incorporated into the IDG-A amounted to 29.

STUDY TWO

Participants and Procedure

A total of 39 participants (M_{age}= 30.95, SD=10.46, Females=14, Males=25) were purposefully recruited from four global finance organizations known to authors one, two and five in this research paper. All participants provided informed ethical consent before independently completing the IDG-A through an online survey platform. Subsequently, the results were individually debriefed to each participant via the same online platform. An attempt was made to have participants complete a retest within a one-week window; however, only seven respondents did so. Therefore, the retest data is not reported due to the limited number of responses.

Measures

The IDG-A was converted to an online platform, necessitating participants to provide their email address (for feedback and follow up purposes), age, gender, and organizational affiliation. Respondents used a Likert scale for scoring of the 29 items, ranging from 1 (strongly disagree) to 5 (strongly agree). The complete IDG-A questionnaire can be found in **Appendix 1**.

Results and Discussion

The IDG-A had significant correlations between many of the 29 individual items. The complete correlation matrix breakdown by item and total average scores (including confidence intervals) is available here: https://osf.io/8ewz9/?view_only=8a5114adf5bb4f60888651a2beb9e655. Each of the domain specific individual items significantly correlated with the domain combined average score. The domain combined average scores and correlations between each domain are available in **Table 1**, with the only domain not correlating occurring between domain two and three. **Table 1** also shows the significant correlations between each domain and the combined item average score.

Table 1. IDG Means, Standard Deviations, Confidence Intervals, and Correlations for the Six Dimensions and Average Total Score.

Variable	*M*	*SD*	1	2	3	4	5	6
1. Relation to Self	3.98	0.55						
2. Thinking	3.81	0.52	.69** [.48,.83]					
3. Thinking of Others	4.01	0.43	.35* [.04,.60]	.29 [-.0,.56]				
4. Social Skills	4.04	0.49	.52** [.25,.72]	.57** [.32,.75]	.47** [.18,.68]			
5. Social Change	3.72	0.62	.36* [.05,.61]	.51** [.23,.71]	.29 [-.03,.55]	.50** [.22,.70]		
6. Org'nal Belonging	3.60	0.63	.59** [.33,.76]	.46** [.18,.68]	.40* [.10,.64]	.42** [.12,.65]	.33* [.02,.59]	
7. Combined Average Score	3.86	0.40	.81** [.67,.90]	.81** [.67,.90]	.58** [.33,.76]	.77** [.61,.88]	.67** [.46,.82]	.75** [.57,.86]

*Note. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates p < .05. ** indicates p < .01.*

Given the notable correlations observed among IDG-A items, domains, and the combined average score, it appears improbable to delineate the IDG-A into six distinct constructs. While a targeted intervention concentrating on each domain individually might yield specific improvements, it seems more plausible that any effect on one domain would likely influence another. To investigate the potential for interventions to alter IDG-A scores, the climate change coaching project was devised, with a particular emphasis on merging the six domains during the MAP intervention.

We hypothesized that the domains of the IDG-A would not significantly correlate but were incorrect. It is evident that when using the IDG-A the combined total score serves as a suitable indicator of inner development. However, it remains worthwhile to investigate whether climate interventions exert any discernible impact on specific domains, and if so, which domains are most affected.

Future research should focus on roughly 200 respondents per item (Kline, 2023) which would allow for a sufficient confirmatory factor analysis, especially when items are split over six conceptually different domains. Pilot study measures form the gateway for additional research (Carmines & Zeller, 1979), but with the data presented it is likely that personal qualities and skills fall into one inner development factor. Therefore, in its current state, the IDG-A should be primarily used to promote self-understanding and engage individuals in sustainability conversations focused on change.

STUDY THREE

In study three, we introduced the MAP intervention, which was administered to the experimental group, while the active control group underwent Carbon Literacy Training (CLT). To gauge the effectiveness of each intervention, we employed the IDG-A and conducted follow-up interviews.

Participants

Organizations were recruited through an invitation which was circulated through social media (LinkedIn) and the personal business networks of the coaches. Most of the interest in participating came through personal business networks and leading to discussions with 18 businesses. The selection of organizations was based on suitability (business of more than 100 employees with a clear commitment to Net Zero or sustainability); appetite (they wished to participate); and ability to proceed within the timescale of the project. As a result of this exercise, two businesses, one based in North America (with approximately two and a half-thousand employees) and one in the United Kingdom (approximately six hundred employees) who both made a clear public commitment to Net Zero were recruited. Each organization had an Environmental and Social Governance (ESG) or a Net Zero team, with most participants coming from that department. The North American organization consisted of 10 participants (M_{age}= 35.0, SD=11.29) with seven females and three males. The British organization contained six participants (M_{age}=28.83, SD=8.04) of which four were female and two were male. The organization and each participant gave consent before the study commenced.

Procedure and Measures

The c-suite teams (executive level managers such as the Chief Executive Officer and Chief Operations Manager) of the American (n=9) and British (n=8) organizations had an initial one-hour online meeting with the coaching team. The c-suite teams discussed their personal and organizational values, and a shared organizational sustainability goal linked to the SDGs (in both cases): carbon neutrality. Both c-suite teams independently decided to include sustainability as an organizational core value and would support any employee-based initiative that would benefit the company's climate goals. The

organizations offered our programme to employees engaged within Environmental, Social, and Governance (ESG) in the organization who volunteered to participate.

All participants had an initial online briefing session lasting for one hour where they were informed of the research project, discussed personal goals and hobbies, and completed the IDG-A. The American group was randomly allocated as the control group, receiving the CLT programme, whilst the experimental (British) group received the MAP model (explained below). A total of five discussion workshops led by an experienced coach were conducted for both intervention groups, delivered at least one week apart. The rationale for this break was based on the work of Poincare (1913) who suggested that ideas should involve a preparation period, incubation of problems and solutions, illumination due to new ideas, and verification of a solution. For this process to be followed, there must be enough time for teams to explore ideas, act, and reflect.

At the end of the CLT and MAP delivery, both groups met separately online. In this session the participants were retested on the IDG-A and the follow-up interview was conducted to discuss progress with projects/initiatives. Furthermore, in this interview to assess pro-environmental behaviors, the questions asked to the participants were taken from Soliman and Wilson's (2017) suggestions: explain your environmental responsibility, how do you gather sustainability related information, explain how you engage in social media, and what are your shared action/major climate related decisions? However, where possible, open questioning was used to draw out behavioural intentions and implementations. This interview was used to determine overall program effectiveness.

Six months later, a final follow-up interview occurred with the two organizational Heads of ESG for both companies to discuss return on investment and behavioural implementations focused on the initially agreed target of becoming carbon neutral.

Carbon Literacy Training

The CLT programme (for full learning objectives see Carbon Literacy Project, 2023) has 5 key elements, each delivered at least a week apart through live online training. Element One (7 hours): Learning Methods, consisted of social learning within workplace environments, group enquiry, and positivity. Element Two (2 hours): Knowledge, including greenhouse gases, communicating carbon literacy, and the effect of climate change. Element Three (2 hours): Values, fairness and equity, working with others, and mindset. Element Four (2 hours): Action, discussing significant action in the workplace, community, and researching our carbon footprint. Element Five (2 hours): Processes, systems thinking and a research project. The delivered content was engaging to evoke discussion with some parts delivered in a lecture format where a core topic was explored (e.g., what's a greenhouse gas?), and some parts required reflection, fact finding (e.g., what local projects can I get involved in?), and application (e.g., create a way I can reduce my carbon footprint). A trained female executive coach (Age=44) with seven years working with organizations and trained via a carbon literacy provider delivered the intervention over 10 weeks.

Meaning, Awareness and Purpose (MAP) Model

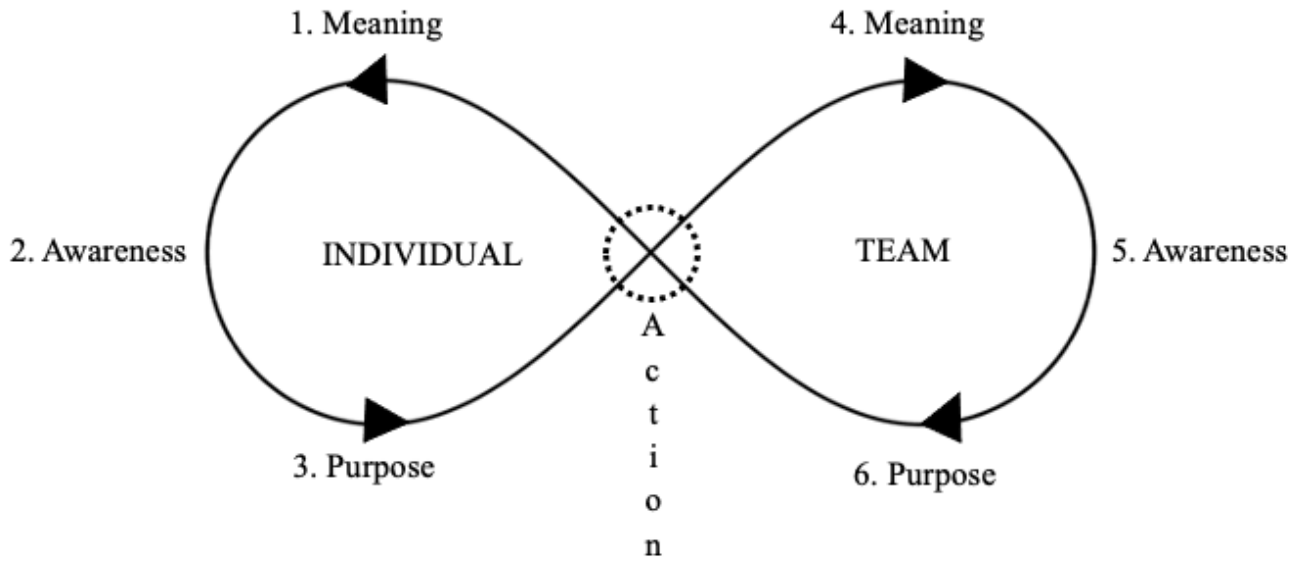
The conversations with the focus group participants, the six IDG-A domains, and the general overarching person-centered approach to work from values through to behaviors constructed the MAP model (Prust, 2005). Although six coaches (F=2, M=4) initially developed the content of the intervention sessions and general research design, the four male coaches (M_{age}=47, SD=7.31) delivered the MAP interventions. All coaches were members of the Coaching Climate Alliance with a minimum of 5 years' experience working with organizations. The coaches were based in Britain (n=2), Canada (n=1), and Australia (n=1).

Using motivational theories (e.g., Deci & Ryan, 2008), the research team decided to focus on personal meaning and intrinsic motivation before introducing climate change awareness. This meant

that we gave the participants time to share what was of importance to them, from their values first, which would (and did) engage the groups in meaningful discussion. We also used imagery training because of its impact on pro-environmental behaviors (Boomsma et al., 2016) and mental health including life satisfaction (Turner et al., 2020).

Like the CLT condition, all sessions were live and online. The first 3 hours engaged in the discussion of individual values, mindset, attitudes to change, cognitions, and behaviors (Rokeach, 1973). We created the MAP model (see **Figure 1**) as an overview of the key process when discussing: (1) individual meaning (why is climate change important to me?), (2) individual awareness (of existing and future personal sustainability behaviors and motivation, a discussion about personal values and common values, and finally a focus on personal action) and (3) individual purpose (how do my goals impact others?). Within the MAP model, we taught imagery to the team using the AIM model (see Rhodes & May, 2022) to further explore mindsets, attitudes and cognitions. Throughout each of the sessions, we used the spirit of motivational interviewing (Miller & Rollnick, 2012; Endrejat et al., 2017) to evoke change talk and utilize imagery to plan ways to overcome individual obstacles, focus on strengths and develop a personal action-based goal (the dotted circle within the MAP model). The first session ended with participants being asked to imagine and find a picture of their place of awe; where they feel connected with nature. Participants were invited to engage in a practice of nature connection (Rickard & White, 2021) in between the first and second sessions.

Figure 1. The MAP Model. The coaching process which progresses from discussing individual meaning through to personal action, then on to team meaning and team action. After one cycle, the individual and the team operate together, thus making the numbers and direction of the process moot.



Session two, again three hours long, focused on: (4) team meaning (why is climate change important to us?), (5) team awareness (what existing initiatives are we engaged in such as cycle to work schemes, what is our shared goal, and what is our systems thinking approach), and (6) team purpose (how does our shared goal impact others?). Imagery was again used throughout sessions to explore mindset (Duchi et al., 2020), what action would be like, imagining succeeding (and failing) the teams' purposeful goal, and setting performance milestones to track progress. This session, although imagery centered used components of the GROW and POSITIVE models to evoke motivation. The coaching team

ended the session by discussing systems thinking (Arnold & Wade, 2015) and implementing action learning (Reynolds, 2011) approaches which aim to solve problems through action and reflection.

The final three coaching sessions were conducted a week apart for one hour per workshop and acted as boosters to support actions. These boosters are essential when using motivational interviewing with imagery for behaviour change (Rhodes et al., 2021). The booster sessions discussed a shared goal, role clarity and acceptance, general plan development using imagery, timelining to include exploratory action phases, reflections, and ways to maintain momentum when starting to work towards goals (Grover & Rhodes, 2023). It is worth mentioning that at no point did any of the coaches provide a solution to the group's shared goal, the individuals developed actions independently.

Data Analysis

A histogram of total scores on the IDG-A found a minimal skew score of 0.17. Therefore, data analysis was conducted under parametric conditions. All statistics were conducted in R and the code and outputs available here: https://osf.io/sdaq2/?view_only=9e42112ebdff4e078e1e1325f7dc8650

Results - Intervention Differences

Comparing the two conditions at baseline, there were no significant differences between the CLT and MAP groups between any of the six domains and average score $F(1,14)=0.03$, ges=0.001, $p=0.87$. Paired contrasts for the control and experimental groups can be found in **Table 2** with significant differences detected in bold. The effect size for the significant score in the CLT group is: $d=0.329$, and for the MAP condition: thinking of others, $d=4.99$, organizational belonging, $d=2.01$, and for combined average score, $d=2.4$.

Differences between the Carbon Literacy Training and MAP conditions at the end of the study were significant between the six dimensions and average score $F(1,14)=4.94$, ges=0.17, $p=0.04$. Post-hoc tests showed significant differences only in Domain six: Organizational Belonging, $t(14)=4.09$, $d=1.97$, $p=0.001$, and combined average score, $t(11)=2.47$, $d=1.13$, $p=0.03$.

Results - Interviews

Group interviews with all participants yielded positive and complimentary feedback regarding the program and its delivery methods. In the CLT group (n=8), participants collaboratively worked on an internal project aimed at raising employee awareness using posters and workshops. One participant expressed their perspective, stating, "This gave us a great sense of togetherness, and because some information was displayed in the office, it felt like we were being taken seriously." When probed about their behavioral intentions, participants noted that they had developed "a greater sense of personal awareness and responsibility toward climate goals." We asked if the intervention enhanced well-being and the participants unanimously said that they perceive better informed when having climate related communication, and an improved “nature connection.”

During an interview with the CLT group’s Head of ESG six months later, she characterized the experience as resembling a project with a defined beginning and endpoint. She acknowledged that the workshops had provided a shared goal but also recognized that once that goal was achieved, participants reverted to their regular duties. She considered it a “partial success” and expressed confidence that, with more coaching, they could have “continued working toward their zero-carbon targets”. She also said that: “investment into training is necessary but we aren’t yet seeing any return on past expenses. These things take time.”

Table 2. IDG scores for group by time, including paired contrasts between time points.

Group	*Dimension*	*Time*	*M*	*SD*	T(df)	P value
Carbon Literacy	Relationship to self	Baseline	3.72	0.77	0.5(9)	0.62
		Final	3.66	0.69		
	Thinking	Baseline	3.74	0.61	0.45(9)	0.66
		Final	3.78	0.5		
	Thinking of Others	Baseline	3.83	0.51	1.26(9)	0.24
		Final	3.67	0.43		
	Social Skills	Baseline	4.04	0.62	1.59(9)	0.15
		Final	3.86	0.53		
	Social Change	Baseline	3.7	0.71	0.8(9)	0.44
		Final	3.65	0.7		
	Organizational Belonging	Baseline	3.1	0.52	2.7(9)	**0.024**
		Final	3.28	0.57		
	Average Score	Baseline	3.66	0.51	0.44(9)	0.67
		Final	3.64	0.46		
MAP	Relationship to self	Baseline	3.83	0.2	2.17(5)	0.082
		Final	4.1	0.17		
	Thinking	Baseline	3.67	0.41	1.62(5)	0.17
		Final	4.07	0.3		
	Thinking of Others	Baseline	3.71	0.4	2.71(5)	**0.04**
		Final	3.92	0.44		
	Social Skills	Baseline	3.97	0.08	1(5)	0.36
		Final	4.03	0.2		
	Social Change	Baseline	3.5	0.57	1.58(5)	0.17
		Final	3.67	0.38		
	Organizational Belonging	Baseline	3.44	0.42	4.26(5)	**0.008**
		Final	4.19	0.32		
	Average Score	Baseline	3.68	0.16	5.06(5)	**0.004**
		Final	4.02	0.12		

Notes: Values in bold indicate significance.

Participants in the MAP group (n=6) offered insights into the coaching program's effectiveness. A participant commented: "connecting everyone on an emotional level first and then teaching a new skill, which we already had: imagery, was a great way to engage us." Participants appreciated the incorporation of systems thinking and the use of “booster sessions, as these elements introduced accountability to our self-established targets.” When queried about climate-conscious behaviors, group members provided a list of personal changes, such as "upcycling furniture" and including messages in their email signatures encouraging recipients not to print unnecessary emails. We asked about participant well-being, and the group commented on better “personal understanding” related to values, how they “think of others”, more “optimistic of social change”, and that team communication and togetherness created “purpose driven actions.”

Finally, we sought feedback from the MAP group’s Head of ESG regarding the program. She explained that they encountered a challenge early in their action phase when creating a project aimed at connecting employees for climate discussions, as it became apparent that not all members of their organization shared the same level of sustainability interest or could commit time to attend the session.

However, she credited the coaching for enabling them to pivot and reconsider their planning and communication strategies, which subsequently influenced their overall approach to tackling challenging goals and having sustainability conversations.

Results and Discussion

Despite the small sample size, significant improvements, as hypothesized, were observed in the MAP condition when comparing baseline IDG-A combined average scores to scores after the intervention. Moreover, the MAP condition's combined average score showed a significant increase in comparison to the CLT condition. These improvements are also evident in the effect size, particularly in the comparison of post-intervention CLT and MAP variations between the combined average scores (d=1.13). Notably, for the MAP condition, the most substantial changes detected occurred between pre- and post-intervention for thinking of others (d=4.99), organizational belonging (d=2.01) and the combined average score (d=2.4). However, the combined average total score arguably serves as the most reliable indicator of personal change detected on the IDG-A. This does not imply that CLT is ineffective at initiating climate change initiatives; rather, it suggests that it may not significantly impact inner development goals. This could be attributed to the way the MAP program prioritized personal development and emotional connection initially (Jose Braun, 2022). It involved the development of intrinsically informed goals, training individuals' ability to imagine, and creating processes driven through systems thinking and action learning. Additionally, it may be influenced by how organizations react to initiatives developed by participants, such as supporting the display of posters or the introduction of workshops into the workday, and how other employees engage in conversations about the program. Another contributing factor is likely the explicit integration of nature connection through affect, cognition, and behavior within the MAP model. While CLT appears to be knowledge-focused, MAP is designed specifically to improve inner development goals, personal development, and well-being within a team.

The purpose of this study was to introduce and apply the MAP model. The integrated model, administered through MI (based on Endrejat et al., 2017), followed an infinity sequence that began with self-understanding and progressed to team action. The MAP infinity sequence represents the eventual connection between an individual's motivation and the team's rationale for climate action, situated within both a broader connection to nature and the system in which they operate. For practitioners using MAP, we recommend a deliberate approach to information presentation, with an initial focus on building personal meaning. Subsequently, awareness and imagery training can catalyze intention and create purpose and action. Once individuals connect with their inner goals, it is likely that they will find harmony with nature and a sense of control (Davidson & Kecinski, 2022). This sense of control fosters well-being as it aligns with action and meaningful conversations.

The application of the MAP model may seem straightforward but is complex to deliver for novice coaches. Practitioners who use MAP must be proficient in MI, with a particular focus on core skills like reflective listening (Passmore, 2020). They also need a deep understanding of how to train imagery (Rhodes & May, 2021) and systems thinking methods (Rebs et al., 2019). As an initial step, in collaboration with more organizations, we plan to develop a fidelity check (e.g., Wayne & Coggshall, 2022) for practitioners interested in using MAP. As a research team, we are committed to maintaining open access to content like the IDG-A for researchers, coaches, and organizations, similar to the developers of the original IDG program (Inner Development Goals, 2022b). Furthermore, we are collaborating with global movements like the Climate Coaching Association to disseminate the work completed (and ongoing) with companies as they reimagine climate change. We also extend a warm

welcome to coaches interested in learning more about using MAP as part of their ongoing professional development.

DISCUSSION

This project represents an interdisciplinary effort between coaches, organizations and psychologists to turn the IDG framework into a measurable tool, known as the IDG-A. Although it is crucial to exercise caution when utilizing this measure, primarily due to the item correlations, when employed as a single construct divided into general themes, it proves to be a valuable tool for enhancing personal understanding and for researchers seeking to discern changes resulting from interventions, as indicated by the combined average score.

Despite its contributions, this study does present several notable limitations. Firstly, there is a recognized need for further research using the IDG-A to establish its reliability and validity, thus elevating its academic rigor (Carmines & Zeller, 1979). This limitation underscores the foundation for our forthcoming research endeavors. Secondly, upon reflection, the coaching interventions—CLT in comparison to MAP—appear distinct when evaluating behavior change. This divergence arises from the CLT approach, which centers on knowledge dissemination through climate education workshops, personal awareness cultivation, and focused action within the framework of team research projects. In contrast, the MAP approach adopts a person-centered methodology, evoking intrinsic motivation through emotional engagement and fostering a shared sense of climate urgency using imagery training. Davidson and Kecinski (2022) emphasize that establishing an emotional connection with climate change represents a primary step toward behavior change, and that is what MAP does at its heart.

What this research effectively magnifies is the paramount importance of self-understanding as the initial step, characterized by personal meaning, awareness, and purpose, followed by concrete action. The MAP model is inherently rooted in the exploration of personal values, beliefs, attitudes, and cognitions (including imagery training; Rhodes & May, 2022). This approach is interwoven with various goal orientated models (e.g., GROW) and motivational theories (e.g., intrinsic motivation), all essential components for delving into the realms of meaning and purpose, which subsequently contribute to the formation of one's identity. MAP fosters a profound sense of personal connection and belonging to nature, individuals rejoin their teams with a heightened sense of urgency for change, likely resulting in better value-based decision-making and improved overall well-being. Teams that are emotionally charged for change possess the potential to clearly define a shared goal, identify meaning, become cognizant of their need for adaptation, ignite a collective sense of purpose, and finally, embark on decisive action.

CONCLUSION

In the context of mental health and well-being, this research highlights the significance of nurturing personal development and emotional connection as integral elements in motivating individuals and teams to engage in climate action. By placing emphasis on self-understanding and intrinsic motivation, interventions such as the MAP model hold promise for not only advancing climate initiatives but also contributing to the mental health and well-being of individuals and organizations alike. This interconnected approach aligns with the broader goals of promoting holistic mental health and fostering a sense of purpose in a world grappling with climate challenges. Further exploration of these connections between inner development, well-being, and climate action is warranted to advance both the field of mental health and our collective efforts toward sustainability.

DECLARATIONS

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AVAILABILITY OF DATA AND MATERIALS

All data and materials are available through Open Science Framework.

- Correlations and original data is available here: https://osf.io/8ewz9/?view_only=8a5114adf5bb4f60888651a2beb9e655
- Intervention data is available here: https://osf.io/sdaq2/?view_only=9e42112ebdff4e078e1e1325f7dc8650

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was granted from the University of Plymouth, and each organization and all employees consented to participate in all parts of the study.

CONSENT FOR PUBLICATION

Not applicable.

COMPETING INTERESTS

The Authors declare they have no competing interests.

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APPENDIX 1

Inner Development Goals – Adapted (IDG-A)

Please circle one item per row		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I am aware of my values and purpose and am committed to my goals.	1	2	3	4	5
2	I act with sincerity, honesty, and integrity.	1	2	3	4	5
3	I have a willingness to be vulnerable and embrace change and consistently develop.	1	2	3	4	5
4	I am reflective with my own thoughts, feelings, and desires.	1	2	3	4	5
5	I can live in the here and now, without judgement and in a state of open-ended presence.	1	2	3	4	5
6	I critically review others' views, evidence and plans without bias.	1	2	3	4	5
7	I have an understanding of, and skills in, working with complex and systemic conditions and causalities.	1	2	3	4	5
8	I understand and actively make use of insights from differing perspectives.	1	2	3	4	5
9	I can make sense out of complex stories and patterns.	1	2	3	4	5
10	I have a long-term vision and can formulate goals and sustain commitment.	1	2	3	4	5
11	I relate to others and to the world with a basic sense of appreciation, gratitude, and joy.	1	2	3	4	5
12	I have a keen sense of being connected with and/or being a part of a larger whole, such as a community, humanity, or global ecosystem.	1	2	3	4	5
13	I act in accordance with the needs of the situation without concern for my own importance.	1	2	3	4	5
14	I relate to others, myself and nature with kindness, empathy and compassion and address related suffering.	1	2	3	4	5
15	I really listen to others to: foster genuine dialogue manage conflicts constructively, and to adapt communication to suit diverse groups.	1	2	3	4	5
16	I motivate others and help facilitate collaborative relationships with diverse individuals, characterized by psychological safety and genuine co-creation.	1	2	3	4	5
17	I am willing and competent to embrace diversity and include people and collectives with different views and backgrounds.	1	2	3	4	5

18	I show trust, create, and maintain trusting relationships.	1	2	3	4	5
19	I inspire and mobilize others to engage in shared purposes.	1	2	3	4	5
20	I stand up for values, make decisions, take decisive action and, if need be, challenge and disrupt existing structures and views.	1	2	3	4	5
21	I generate and develop original ideas, innovate and am willing to disrupt conventional patterns.	1	2	3	4	5
22	I sustain and communicate a sense of hope, positive attitude, and confidence in the possibility of meaningful change.	1	2	3	4	5
23	I stay engaged and remain determined and patient even when efforts take a long time to bear fruit.	1	2	3	4	5
24	My values and goals align to my organizations' and teams'.	1	2	3	4	5
25	I have detailed role clarity, autonomy and feel accountable.	1	2	3	4	5
26	Stressful situations are dealt with as a collective team and there is a culture of support, compassion, and learning.	1	2	3	4	5
27	It is easy to contribute and feel heard and valued in meetings.	1	2	3	4	5
28	Strategy is discussed and disseminated, and I have a sense of team belonging.	1	2	3	4	5
29	I contribute to the collective vision, have clear targets, and can track progress of myself and team.	1	2	3	4	5

Scoring

Domains	Items	Average Score
Domain 1. Being: Relationship to self	1-5	
Domain 2. Thinking: Cognitive Skills	6-10	
Domain 3. Relating: Caring for others and the world	11-14	
Domain 4. Collaborating: Social Skills	15-19	
Domain 5. Acting: Driving Social Change	20-24	
Domain 6. Organizational: Cultural Belonging	25-29	
Combined Average	1-29	

Call for Submissions

Special Issue: Social Roles and Identities in The Context of Climate Change and Mental Health

We are excited to invite submissions for the next issue of the Journal of Mental Health and Climate Change (JMCC). In doing so, the editorial board welcomes submissions that focus on social roles and identities in the context of climate change and mental health.

Scope of Special Issue

This special issue will focus on contributions that interrogate the influence of social roles and identities in shaping relationships between mental health and climate change. This issue aims to elucidate how varying social contexts—encompassing factors such as gender, ethnicity, parenthood, profession, and socioeconomic status—influence and are influenced by climate-related mental health outcomes. Submissions that deploy various methodological approaches across disciplines such as public health, social ecology, epidemiology, and sociology to illuminate the complex dynamics between identity markers and mental well-being in the face of climate change are welcomed. We encourage the submission of studies that advance and add nuance to our understanding of the field. In line with the journal's overarching aim, submissions should aim to offer actionable insights for mitigating the mental health impacts of climate change across diverse social groups and for individuals in diverse social roles. Priority will be given to those that significantly advance issues related to equity, diversity, and inclusion for equity-seeking communities and those disproportionately impacted by climate change.

Submission Formats

We welcome reports in the form of empirical studies, evidence reviews, registered reports, brief reports, commentaries, perspectives, practice briefs, and research-creation.

Submission and Publication Timeline

All submissions received by February 1st, 2023 will be considered for publication in this special issue of JMHCC. Online versions of articles will be available as they are accepted.

Submission Process

To learn more about JMHCC, please visit https://mhcca.ca/jmhcc. To submit an article for consideration, please visit https://mhcca.ca/jmhcc-manuscript-submission.

About JMHCC

As the official publication of the Mental Health and Climate Change Alliance, The Journal of Mental Health and Climate Change (JMHCC) is an open-access scholarly publication that features

interdisciplinary scientific research and evidence-based editorials focused on the intersection of mental health and climate change.

Journal Aims and Scope

Climate change has a broad range of impacts on mental health. These impacts arise from the direct effects of environmental change (e.g., natural disasters, loss of environmental resources), as well as the indirect effects caused by worry and concern for one's future and wellbeing.

JMHCC aims to publish high-quality research examining the impacts of climate change on mental health and wellbeing and identifying opportunities to ameliorate these effects. In defining the journal's scope, our editorial uses broad definitions for both mental health and climate change. Articles that deal with any psychosocial aspects of climate change will be considered. This includes articles that adopt a strengths-based approach to understanding how communities can adapt to climate change as well as studies that highlight the need for targeted investments and community adaptation.

As an interdisciplinary journal, JMHCC welcomes articles from the disciplines of epidemiology, anthropology, sociology, psychology, communication, policy, and economics. We encourage submissions leveraging a wide array of methodologies, including evidence synthesis and content analyses, qualitative ethnographies and interviews, quantitative surveys and modeling, and other non-Western approaches to knowledge generation. We also accept policy briefs, opinions, and editorials from both academic and community perspectives.

If you have questions about whether your research fits within the scope of JMHCC, please direct inquiries to our Editorial Board by emailing a 150 to 300-word structured abstract to kcard@sfu.ca.

Editorial Board

Article Processing Fee

The article processing fee is $750 CAD due upon acceptance of the manuscript. As a non-profit organization, the MHCCA uses these fees to directly compensate peer reviewers and to cover the direct costs associated with permanent upkeep of journal articles. Corresponding authors will receive an invoice upon acceptance of the article. Discounts and fee waivers are available on a needs basis. Please contact Dr. Kiffer Card (kcard@sfu.ca) to apply.

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