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Research article

## Climate emotions and anxiety among young people in Canada: A national survey and call to action

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## ABSTRACT

**Introduction:** Young people have a unique positionality in relation to the mental and emotional dimensions of climate change: they have contributed the least to the crisis, they are and will be disproportionately impacted, and they have limited opportunities and invaluable perspectives for influencing action. Evidence increasingly illustrates that young people are particularly vulnerable to climate distress and anxiety.

**Methods:** The purpose of this study was to generate knowledge about climate emotions and climate anxiety among young people using a representative survey. We surveyed 1000 young people (aged 16–25) across Canada. The online survey asked respondents about: (i) climate emotions and their impacts, (ii) perspectives on the future due to climate change, (iii) perspectives and feelings about government (in)action, (iv) perspectives on supports, programs, and resources needed to cope with climate emotions and anxiety, and (v) perspectives on climate change education (including socio-emotional dimensions). Data were weighted to improve representativeness according to age, gender, and region. Descriptive analyses were conducted, scales were generated, and textual responses were analyzed using thematic analysis.

**Results:** Young Canadians are experiencing a diversity of challenging climate emotions. At least 56% of respondents reported feeling afraid, sad, anxious, and powerless. 78% reported that climate change impacts their overall mental health and 37% reported that their feelings about climate change negatively impact daily functioning. Data also illustrate that climate change is contributing to negative perceptions about their future. For example, 39% of respondents report hesitation about having children due to climate change, 73% report thinking that the future is frightening, and 76% report that people have failed to take care of the planet. Respondents rated governmental responses to climate change negatively and reported greater feelings of betrayal than of reassurance. The data show that young Canadians need a diversity of coping supports and believe the formal education system should be doing more to support them.

**Conclusion:** This study adds to the emerging and increasingly concerning evidence base on climate emotions and anxiety among young people. We conclude by summarizing key directions for future research.

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### 1. Introduction

Climate change is a formidable threat to human and planetary health and an immense injustice [1]. The mental and emotional health dimensions of climate change are increasingly concerning as extreme events become more severe and common, extractivism and ecosystem destruction advance unheeded, and people become more knowledgeable about climate impacts and injustices [2–4]. Although the connections between the climate crisis and mental and emotional health have historically been overlooked, scholarly work in this realm has grown exponentially in the last decade [5]. One specific line of inquiry within this emerging body of research has focused on the

experiences and implications of climate emotions and climate anxiety. Climate emotions are understood here as feelings, emotions, and affects related to climate change and climate injustices [5,6]. Although there is no consistently agreed-upon definition of climate anxiety, it can be understood as heightened distress related to the climate crisis that is characterised by a constellation of strong and interconnected emotions such as worry, fear, sadness, anger, and powerlessness [7]. Climate anxiety is future-oriented and related to eco-anxiety more broadly; some scholars understand climate anxiety as a specific form of eco-anxiety [8,9]. The lived experiences of climate emotions and climate anxiety are influenced by numerous factors including geographic and social location, experiences of climate impacts, sense of agency and efficacy, and knowledge of climate change and climate injustice [7,10–12] (see [4,5,7–10,13] for recent reviews and discussions around climate/eco-anxiety).

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As the American Psychological Association outlines, strong climate emotions and climate anxiety “do not constitute mental illness” [3]; climate anxiety is likely non-pathological for most [3,9]. However, climate anxiety can be paralyzing and problematic [7]. Some evidence indicates that strong emotions and climate anxiety can be problematic for certain people and populations with impacts on functioning and overall well-being [4,14]. Despite the potential for climate emotions and climate anxiety to result in negative consequences for well-being, many scholars and practitioners argue that strong emotional responses are appropriate considering the scale and urgency of the crisis [11,13,15,16]. Particularly concerning, the mental and emotional burden of climate change is disproportionately borne by young people who have contributed the least to rising greenhouse gas emissions (GHG) and the systems and structures that cause and fuel climate change [10,17–19].

There is increasing evidence that climate anxiety is particularly prevalent among, and relevant to, youth and young adults [11,18,20]. Moreover, young people currently have limited opportunities for influencing policy-making on climate change given that decision-making systems generally exclude them [21]. A recent multinational study by Hickman et al. [19] examined climate anxiety in 10,000 young people in 10 countries with varying climate-related vulnerabilities: a concerning proportion of young people reported high levels of distressing emotions, associated impacts on functioning, and negative perceptions of their future. Distressing emotions, climate anxiety, and impacts on functioning were correlated with perceptions of inadequate action by governments and feelings of betrayal [19]. The lack of meaningful and transformative climate action from governments, and the continued lack of reparations for damages and impacts already caused, exacerbates the mental and emotional health impacts of climate change itself. Canada was not included in this global study, conducted by Hickman et al. [19], and no existing empirical and representative survey research has focused on the experiences, perspectives, and needs of young Canadians in relation to climate emotions and/or climate anxiety (at the time of publishing). Canada is a relevant context to explore climate emotions and anxiety among young people. As a country, Canada is warming twice as fast as the rest of the planet and impacts are rapidly unfolding [22]. Moreover, per capita GHG emissions are among the highest in the world, and Canada has a dismal record when it comes to cutting carbon emissions, fossil fuel extraction, and taking responsibility for climate injustices [23]. Calls for rigorous empirical studies prioritizing young people’s voices and experiences of climate-induced distress [4], the influential Hickman et al. study [19], and existing knowledge gaps have inspired the research presented herein. Importantly, although the literature on climate emotions and anxiety is rapidly advancing, many unanswered questions remain about lived experiences across diverse contexts and about how to best support young people coping with complex and challenging climate emotions. As Wu et al. argue, existing data in this realm “preclude our ability to take action” [20].

The purpose of this study was to generate knowledge about climate emotions and climate anxiety among young people (aged 16–25) in Canada. We replicated the methods used by Hickman et al. [19] while also expanding on this existing research by collecting perspectives on the supports, programs, and/or resources that young people identify as helpful to cope with climate emotions and climate anxiety, as well as youth perspectives on advances needed in the formal education system. Replicating and expanding on the Hickman et al. [19] study enables global comparisons while addressing knowledge gaps to inform action and making novel contributions to the literature. Furthermore, the data collected here will serve as a robust baseline for longitudinal monitoring of climate emotions and climate anxiety among young people in Canada.

## 2. Methods

### 2.1. Study context: climate impacts, (in)justice, and (in)action in Canada

Across the country, climate-related impacts include more extreme heat, less extreme cold, changing growing seasons, shorter snow and ice cover seasons, thinning glaciers, thawing permafrost, rising sea levels, and increased frequency and severity of extreme events [22]. Losses from extreme events are increasing: from 1983 to 2008, the cost of extreme weather events in insured damage averaged \$420 million annually while between 2010 and 2020, it averaged \$2.1 billion annually. For context, in 2021, the province of British Columbia experienced a fatal heat dome with 595 people dying from extreme heat [24]. The heat was followed by 1600 wildfires across the province affecting 9000 km<sup>2</sup> of forest and increased climate change anxiety among British Columbians [25]. While many parts of Canada have been experiencing severe climate impacts, Canada’s action on climate policy is not aligned with calls for GHG reductions. Canada’s 2030 reduction plan is consistent with 2°C of warming rather than the Paris Agreement’s 1.5°C of warming limit [23]. Canada submitted a Nationally Determined Contribution commitment in 2021 to reduce greenhouse gas emissions by 40–45% below 2005 levels, which would bring Canada’s rating from “highly insufficient” (policies on track for 3°C of warming) to “almost sufficient” (policies on track for 2°C of warming) [23]; however, the Canadian government has a track record of missing every climate target that has been set. Moreover, Canada continues to advance fossil fuel extraction, production, and export (crude oil in particular) while providing billions of dollars in subsidies, tax breaks and financial support to the fossil fuel industry annually [26].

Beyond this, the existing inequities in Canada, such as poverty, social inequality, the ongoing effects of colonialism, and systemic racism exacerbate how marginalised peoples experience and adapt to climate impacts [27]. The youth climate justice movement has grown to the largest environmental social movement in history. As many youth activists have continually asserted, climate injustices are not merely environmental issues but are racial and gender injustices [28]. The claims and experiences of youth climate activists are not homogenous and may be better understood as a ‘polyphonic movement’ [29]; however, youth climate activist messaging has a common characteristic that focuses on intergenerational injustices of climate impacts—that is, climate change will affect their futures and adults have not acted with moral responsibility and obligation [28].

### 2.2. Data collection

Study participants included young people in Canada aged 16–25 ( $n = 1000$ ). Abacus Data, an online Canadian polling and research firm, was contracted to administer the survey. The survey was translated into French (second official language), programmed, and fielded by Abacus Data.

Potential participants were invited to complete the online survey from the Lucid exchange platform marketplace. A set of 21 partner panels, representing a total potential participant pool of approximately 1,000,000 Canadians, was used. The panels are double opt-in survey panels and are blended to address any potential bias that could arise from a panel single source. De-duplication methods were used to ensure that there was no duplication of respondents. The electronic invitation included details about the study and informed consent. Potential participants were not able to access the survey, and no data were collected, before consent was obtained. A unique link was used to track each potential participant and enable the completion of the survey over more than one session. The Lucid exchange platform panel providers compensate survey takers in either cash, gift cards, or reward points. Incentives offered are minimal and unlikely to impact the voluntariness of participation or consent. The data

collection process was compliant with the Canadian Research Insights Council's Public Opinion Research Standards, the ESOMAR Code of Conduct as well as Marketing Research and Intelligence Association standards. The study received ethical approval from the Lakehead University Research Ethics Board.

The survey instrument included 15 questions (a mix of yes/no/prefer not to answer, Likert scale, and open-ended questions) and took 10–15 min to complete. The questions asked about: i) climate emotions and their impacts, ii) perspectives on the future due to climate change, iii) perspectives and feelings about government (in) action, and iv) perspectives on supports, programs, and resources that young people identify as needed to cope with climate emotions and anxiety, and iv) perspectives on climate change education (including socio-emotional dimensions) in the formal education system. Information on age, gender, language, ethnicity, and region were also collected (See Supplemental file, indicating questions replicated from Hickman et al. [19] and additional questions for this study).

Data collection began on February 23, 2022 and ended March 2, 2022 once 1000 complete responses were obtained. The data were weighted (according to 2016 Census data) to improve representativeness of the Canadian population according to age, gender, and region (following the approach used by Hickman et al. [19]). Descriptive findings reported below use weighted data. Prior to weighting, the mean age of respondents was 21.2 years (SD 2.60), 54% were female, 44% were male, and 3% were non-binary or preferred not to answer. Most respondents completed the survey in English (84%). In terms of ethnicity, half of the respondents identified as White/European, 13% as Southeast Asian, 12% as South Asian, 11% as Black, 5% as Indigenous (i.e., Inuit/First Nations/Métis), 5% as Arab and West Asian, 4% as Latin American, and 1% selected 'Other'. We did not weight data by ethnicity as the question in our survey used different population groups than Statistics Canada suggests (following more recent best practices [30]). Statistics Canada is in the process of "consulting partners, stakeholders and the general public to establish a suitable terminology and classification" to describe and gather data on ethnic population and racialized groups [31].

### 2.3. Data analysis

Descriptive statistics were calculated, and tables and graphs generated where appropriate. We also generated the following 4 scales following Hickman et al. [19]: i) negative thoughts about climate change; ii) beliefs about government response; iii) feeling betrayed by government; and iv) feeling reassured by government. The negative thoughts about climate change scale is a summative score ranging from 0 to 7 including all items for the question, "Does climate change make you think any of the following..." where "Yes" was coded as 1 and "No" was coded as "0". The beliefs about the government response scale included 9 items from the question, "In relation to climate change, I believe that my government is...". In this scale, "Yes" was coded as 2 and "No" was coded as "1". Reverse coding was applied where needed, total score ranged from 9 to 18. The feeling reassured by government scale reports a mean across 4 items measuring specific emotions related to government action indicating feelings of reassurance ("When I think about my government's response to climate change, I feel... hopeful /valued/protected"). and reassurance generally ("I am reassured by my federal government's action on climate change."). All items were measured using a 5-point Likert scale. The feeling betrayed by government scale was constructed from the "negative" emotions in response to government action (i.e., anguished, abandoned, afraid, angry, ashamed, belittled) on a 5-point Likert scale (1=not at all, 5=extremely). The score is a mean across 5 items. Those respondents selecting "Prefer not to say" were excluded resulting in varying sample sizes. Cronbach's alpha was calculated for the betrayal and reassurance scales to assess internal consistency. Finally,

a coding scheme was developed for the responses to all open-ended questions using an iterative thematic analysis approach and NVivo software. Non-responses and nonsensical responses were removed.

### 2.4. Limitations

There are limitations of this study in terms of design and methods that should be recognized when interpreting findings. First, given the cross-sectional design, data collection was conducted at one point in time. Emotional responses and impacts associated with climate change are likely transient and dynamic over time but our data are unable to capture such trends [32]. Second, the data have been weighted by age, gender, and region thereby increasing confidence that our findings represent experiences and perspectives of our target population (young Canadians aged 16–25) on these factors, thereby reducing potential bias. However, we did not weight by ethnicity such that findings may under or overrepresent some population groups compared to Canadians aged 16–25 overall. Third, all measures are self-reported which may threaten validity. Fourth, as [19] report, the survey instrument uses non-standardised measures and a three-factor scale (yes/no/prefer not to answer) to measure the existence of specific climate emotions (not a Likert scale). Fifth, although these findings are very likely generalizable to Canada and similar contexts, they may not hold in all settings. Finally, although we provided an opportunity for youth to share their experiences and perspectives, the findings are still framed by, interpreted through, and shared from adult perspectives (the researchers).

## 3. Results

### 3.1. Climate emotions, climate anxiety, and coping

Overall, the survey data illustrate that young people across Canada are experiencing a diversity of climate emotions at high rates. In terms of specific emotional impacts and responses, young people most commonly report feeling afraid (66%), sad (65%), anxious (63%), helpless (58%), and powerless (56%). The least commonly reported feelings were grief (34%), optimism (21%), and indifference (20%) (Fig. 1). Participants were also asked "I am worried that climate change threatens people and the planet." Nearly half (48%) of all respondents reported feeling "very" or "extremely worried": only 5% reported feeling "not at all" worried.

Given the extent to which young Canadians are experiencing difficult emotions, it is not surprising that young people also reported impacts on daily functioning and overall mental health. Only 22% of respondents reported that climate change does not at all impact their overall mental health and 37% reported that their feelings about climate change negatively affect daily life at least moderately. The survey data also illustrate that climate change is contributing in myriad ways to negative thoughts about their future. For example, 39% report hesitation about having children due to climate change, 48% believe that humanity is doomed, 53% think that they will not have access to the same opportunities that their parents had, 73% report thinking that the future is frightening, and 76% report that people have failed to take care of the planet. The negative thoughts about climate change score was 4.13 out of 7 (SD 2.60) illustrating a generally negative outlook about the future.

Our survey also collected perspectives on the supports, programs, and/or resources that young people think do and/or would help them cope with climate emotions and climate anxiety using an open-ended question. Table 1 summarizes the 8 themes, illustrative examples from the data, and the proportion of respondents coded under each theme. Variations of "don't know" or cases where coders could not make sense of responses were excluded. Also, although talking about climate emotions is likely an important coping mechanism supporting the processing of big and challenging emotions like anxiety,

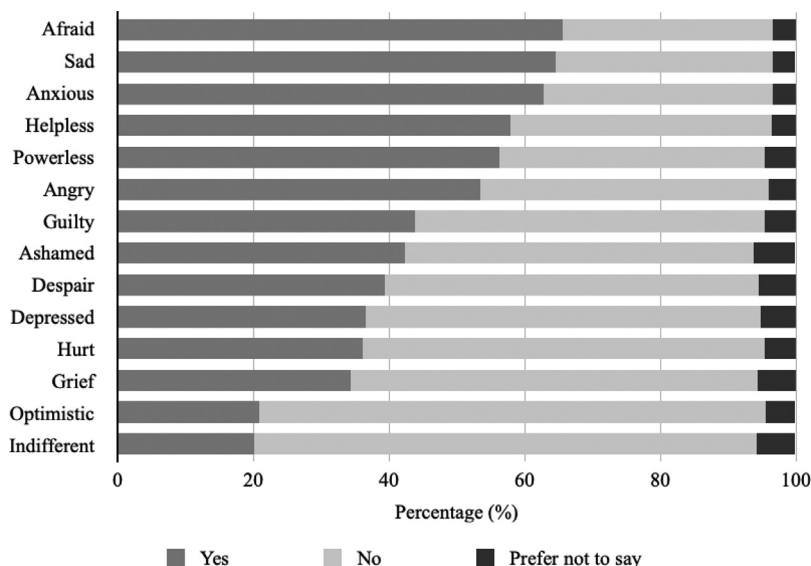


Fig. 1. Climate emotions reported by young people (aged 16–25) in Canada (n = 1000, weighted).

powerlessness, and sadness, 32% of participants reported that they do not talk about climate change with other people and 36% reported that when they do, they feel ignored or dismissed.

3.2. Beliefs and feelings about government (in)action

Our data illustrate that inaction at the systemic and structural levels shape the lived experiences of climate emotions and climate

anxiety among young Canadians. Notably, 64% of survey respondents do not think that the Canadian government is doing enough to avoid climate catastrophe. The beliefs about government response scale indicates a negative perception of the Canadian government’s response to climate change, with a summative score of 14.96 (SD 2.60) on a scale ranging from 9 to 18 (Table 2). The feeling betrayed by government scale is higher than the feeling reassured by government scale, with mean scores of 2.55 (SD 1.00) and 2.19 (SD 0.89).

Table 1

Coding scheme for open-ended question on the kinds of supports, programs, and/or resources that do or would help young people cope with feelings about climate change.

Theme	Illustrative Examples	% of coded responses
Seeking emotional and mental health support from/with others	- "Psychologist" - "Talking with family and friends" - "Support groups about climate change" - "... a community of like-minded people who feel the same as I do, that might make me feel less alone in my efforts to make a difference."	25
Taking individual and collective climate action	- "Trying to take part in initiatives that fight against climate change from the ground, as well as become a less wasteful consumer." - "Donate to charities"	25
Formal education initiatives or programs	- "Programs that educate people about climate change and all the ways we can contribute towards working on a solution." - "Awareness programs" - "Programs where they gave more information about the situation and provided possible long-term solutions."	12
Managing feelings and emotions through activities	- "Meditation" - "I try to go outside on hikes." - "Video games" - "Music and reading are some coping mechanisms I used to help ease my feelings."	11
Not coping/not doing anything to cope	- "I don't cope, I stay miserable." - "Nothing, I suck it up." - "I don't think support programs would help, because trying to make me feel better about things doesn't change the fact that climate change is still happening and no one in power is doing anything to try and change it."	8
Seeking out information and solutions through informal learning	- "Blogs discussing small things I can do to help." - "News Channels that give me hope."	7
Shifting perceptions and positive thinking	- "I just stay optimistic" - "Taking it more seriously"	6
Systemic action needed from governments	- "Maybe if our government started taking climate change seriously. Not just ours in Canada but all of them, worldwide." - "I also think the government taking more accountability and action would greatly improve people's anxieties."	4

\*Note: nonsensical responses and "Don't know" were not coded.

**Table 2**

Beliefs about the federal government's response to climate change reported by young people (aged 16–25) in Canada ( $n = 1000$ , weighted).

In relation to climate change, I believe that my government is ...	Yes (n)	No (n)	Prefer not to say (n)
Doing enough to avoid a climate catastrophe	26.7% (267)	63.8% (638)	9.2% (92)
Taking my concerns seriously enough	26.9% (269)	61.5% (615)	11.9% (116)
Protecting me, the planet and/or future generations	31.8% (319)	57.5% (575)	10.7% (107)
Failing young people across the world	56.4% (564)	33.4% (334)	10.2% (102)
Lying about the effectiveness of the actions they're taking in relation to climate change	53.5% (535)	34.7% (347)	11.8% (118)
Acting in line with climate science	36.5% (365)	53.2% (532)	10.3% (103)
Can be trusted	31.9% (319)	52.4% (524)	15.8% (158)
Dismissing people's distress	47.9% (479)	41.3% (413)	10.7% (107)
Betraying me and/or future generations	48.4% (484)	38.9% (389)	12.7% (127)

The Cronbach's alpha for the betrayal and reassurance scales were 0.88 and 0.82 respectively, illustrating high internal consistency. When asked how the government's response to climate change makes them feel, 35% of the sample report feeling "not at all" valued, 32% report feeling "not at all" protected.

### 3.3. Perspectives on social and emotional dimensions of climate change education

Survey participants were asked their opinions about the formal education system and climate change education. Approximately 65% believe that the education system in Canada should be doing more or a lot more to educate young people about climate change. Similarly, 60% believe that the formal education system should focus more on the social and emotional dimensions of climate change (described as "developing the emotional intelligence and/or interpersonal skills that enable learners to constructively cope with the emotions and feelings about climate change and its impacts and to more effectively collaborate, negotiate, and communicate with others to address climate change"). To elicit detailed perspectives on possible opportunities for integrating social and emotional dimensions into education, we also asked the participants to share their perspectives on "the most important thing the education system can do to support your mental and emotional health in the context of the climate crisis". Table 3 reports 5 key themes

which illustrate that young Canadians want more climate change content in schools and want to learn about solutions.

## 4. Discussion and conclusion

Using a national survey and replicating and expanding on the methods and findings from Hickman et al. [19], this study illustrates that climate emotions and climate anxiety are prevalent among 16 to 25 year old Canadians. Overall, our findings illustrate a constellation of challenging climate emotions, negative thoughts around climate change and the future, concerning levels of climate change-related distress, and negative perceptions and emotional consequences of Canada's response to climate change. The findings also highlight diverse supports that young Canadians are calling for to cope with challenging emotions and advancements needed in the education system to address the growing mental health burden of the climate crisis.

A majority of young Canadians surveyed reported feeling afraid, sad, anxious, helpless, powerless, and angry while a minority reported feeling optimistic in relation to climate change. These findings align closely with the global findings reported by Hickman et al. [19] where feeling afraid, sad, anxious, powerless, and angry were the most commonly reported climate emotions across 10 countries. A small minority, 5% of respondents in our study and across all 10

**Table 3**

Coding scheme for open-ended question on the most important thing the education system can do to support mental and emotional health in the context of the climate crisis.

Theme	Illustrative Examples	% of coded responses
Increase climate change content in school	- "Launch a variety of environmental programs." - "Make climate change courses mandatory." - "Education and accessible resources are key for youth understanding the climate crisis."	23
Teach solutions	- "Teach about what can be done to help climate change." - "Educate us on the ways we can contribute to solving the climate crisis."	16
Provide mental health supports and programming in the education system	- "Offer counselling services." - "Create student support groups." - "Teach students about how to cope and take care of their mental and emotional health around the climate crisis." - Make it feel safe to speak about our feelings and hold a safe space with training.	16
Engage in reassurance, positive, and hopeful messaging	- "Reassure the youth and have resources for them if they want to learn and help." - "Give supports to individuals who feel distress and help reassure them."	9
Teach about climate risk and urgency	- "Teach the real reality." - "Educate about the danger." - "Be honest and not give students false hope." - "Simply telling the truth about climate change."	7

\*Note: nonsensical responses and "Don't know" were not coded.

countries in the Hickman et al. [19] study, reported feeling not at all worried about climate change. Our findings are also consistent with an emerging consensus in the literature highlighting that fear, sadness, anger, powerlessness, and worry about the future are core characteristics of climate anxiety among young people [9]. Although this study adds to the rapidly growing literature on experiences of climate emotions among young people, more work is needed to better understand how lived experiences vary across identity, culture, and context, to better understand those factors influencing experiences and impacts of climate emotions, and to advance our collective understanding of the interplay between climate emotions and (in)action. We plan to further analyze these survey data to better understand how and why climate emotions vary across age, gender, and ethnicity and are currently undertaking qualitative research to complement this work.

Concerningly, our data illustrate that the climate crisis is impacting the overall mental health and daily functioning of young Canadians: 8 in 10 reported that climate change impacts their overall mental health and 4 in 10 reported that their feelings about climate change negatively impact daily functioning. In terms of impacts on daily functioning, our findings align closely with data from Australia (32%), France (35%), and Portugal (37%) but differ markedly from countries in the Global South including Nigeria (66%), India (74%) and the Philippines (75%) as reported by Hickman et al. [19]. Overall, our findings align most closely with the so-called Global North countries suggesting that contributions to GHG emissions, vulnerability, and levels of governmental (in)action that vary across countries and contexts likely play a role in shaping experiences and impacts of climate emotions and climate anxiety among young people. Also noteworthy, beliefs about governmental response to climate change and negative emotional impacts of government response (as measured by the betrayal scale) illustrate consistency with Australian and American data [19]. This is perhaps not surprising given similarities in terms of government failings to take meaningful action against climate change, economies that are heavily reliant on resource extraction, ongoing settler-colonialism, and high levels of per capita GHG emissions.

Like others, we consider strong climate emotions and anxiety appropriate responses to the climate crisis, while also recognizing the mental and emotional that burden young people are bearing [11,33]. Supports, policies, and programmes are necessary to enable young people to cope with climate-related distress, foster emotional resiliency, and prevent harm. However, it is essential to recognize that young Canadians are experiencing distress and mental health consequences *because of* the failure of adults, decision-makers, and governments to adequately address the climate crisis. As one survey participant expressed, "...the government taking more accountability and action would greatly improve people's anxieties". The inaction from adults and the wholly inadequate response to the climate crisis in Canada and globally illustrates a lack of care, and can also be seen as a form of youth mistreatment, harm, and neglect [16]. Echoing the voices and perspectives of young Canadians, we call for urgent and transformative climate action to protect the mental and emotional health of young people.

Our data illustrate that young people feel powerless and betrayed and do not feel cared for, valued, or protected when it comes to climate change and Canada's response. It is therefore also imperative that young people are heard by decision makers, feel heard, and have access to diverse safe spaces to voice their experiences of climate change and priorities for climate action [34]. Beyond a moral imperative, being heard and feeling heard by adults can address feelings of powerlessness and betrayal while building allyship and support through social networks. Implementing participatory models [35] for meaningful youth engagement in decision-making can address structural and actual disempowerment experienced by young people [21,36]. However, existing models of youth engagement—youth

councils for example—can be tokenistic or exploitative if equity and positionality are not considered throughout youth-adult engagement and governance [37] or if adult involvement is not focused on listening to and empowering young people [38]. Another pitfall of youth-adult engagement can occur when adult allies download the responsibility for climate action to young people or future generations. This reinforces a view that young people are isolated, and neglects the role of adults and communities to engage in systemic and societal responses to climate change in conjunction with youth-led movements [39]. Meaningful engagement with young people requires adult-allies that work to support youth empowerment while acknowledging intergenerational injustices, respecting and supporting young people's capabilities, and validating emotional experiences.

An important contribution of this study is hearing young people's perspectives on specific programs and/or resources that can support coping with challenging climate emotions. The most frequently coded theme from our data was *Seeking emotional and mental health support from/with* others, talking with family and friends or seeing a psychologist for example. Notably, approximately two-third of young Canadians reported that they either don't talk to others about climate change or feel dismissed or ignored if they do. Similar findings were reported by in the UK, the USA, and Australia [19] illustrating what we call a 'climate of silence' in these contexts [19,40]. Breaking this constructed silence by creating and offering a diversity of safe spaces for young people to talk about climate change and their experiences of climate emotions is therefore critical [34]. There are a growing number of support groups, networks, and group therapy approaches offering non-judgemental and safe spaces for young people to come together to recognize, voice, and work with their emotions related to the climate crisis. However, these tend to be through non-profit organizations rather than widely available to youth through school programs and may not be accessible to marginalised groups. Our study emphasizes the growing need for accessible initiatives and spaces pointing to the importance of enhanced financial support, research, and policy to expand this work. These findings also highlight the need for increased training and knowledge about climate emotions generally and among professionals who work with young people; educational and mental health professionals in particular [41]. The second most frequently coded theme was *Taking individual and collective climate action*. Our data support the emerging consensus in the literature on the important links between climate emotions and climate action. Specifically, there is emerging evidence indicating that emotions can motivate and promote climate action and that engaging in climate action, collective action in particular, can help people cope with challenging emotions and climate anxiety [42]. Overall, the 8 themes illustrating young people's perspectives on programs and/or resources to support their coping exemplify the three main coping strategies that Ojala has identified working with young people in Northern Europe: "(1) Problem-focused coping, i.e., thinking about, planning, and trying to do something to fight climate change; (2) Emotion-focused coping, for instance getting rid of negative emotions with distancing strategies; (3) Meaning-focused coping and hope, i.e., being able to switch perspective and see both negative and positive trends, and putting trust in more powerful societal actors." [43]

An additional contribution of this work is in identifying possibilities for change within the formal education system. Secondary and post-secondary institutions provide formative learning experiences and the knowledge and skills that young people need for their lives post-graduation; schools are where young people spend much of their time. As reported above, 6 in 10 young Canadians believe that the education system in Canada should do more, or a lot more, to educate them about climate change and should focus more, or a lot more, on the social and emotional dimensions of climate change. We interpret these findings as a call to action from young people and

point to the thematic analysis results as suggested direction from young people to improve their experiences through providing supports within education systems. Specifically, young people want the formal education system to support their mental and emotional health by integrating more climate change content in schools. Respondents suggested a variety of environmental and climate-focused extra-curricular programs and activities, such as making climate change courses mandatory and integrating project-based and design-thinking learning processes focused on addressing climate issues into classroom instruction. The data also indicate that young people want solutions-focused instruction and learning opportunities within the education system. This is supported by analysis of regional curricula across Canada [44] and findings internationally on how to improve climate change education [45]. In the words of one survey participant, "Educate us on the ways we can contribute to solving the climate crisis". Teaching about climate solutions and providing opportunities to take and support climate action may address feelings of powerlessness, betrayal, fear, and worry while also providing opportunities to talk about climate change with peers and adult-allies. Our findings also show that young people want mental health supports within the education system, such as access to counselling services, student support/discussion groups, and instruction that integrates explicit teaching on coping strategies in response to climate change. These findings add to the currently limited research on climate change education gaps in formal education systems [45] and challenge formal education systems to provide relevant knowledge and understanding, skills, and mental or emotional supports that young people indicate they need.

Drawing on our findings and existing knowledge and practice gaps we conclude with a set of directions that we see as priorities for advancing this field of research and protecting the mental and emotional well-being of young people in the context of the climate crisis. First, we argue for additional empirical research on climate emotions among young people across diverse places and cultures, generally, and a focus on understanding the ways in which social location, identity, and marginalization shape climate emotions specifically. Although more survey data and analytical work is certainly needed, qualitative data is also needed to deepen our understanding of complex climate emotions and intersections with identity and (in)action. Therefore, both quantitative and qualitative methodologies are needed and an intersectional approach, rooted in the notion that multiple socially constructed positions intersect to shape experiences [46], will be particularly helpful here. Second, more research is needed on the ways in which youth are (or are not) coping with challenging climate emotions and the ways in which adult-allies can support the development of adaptive and culturally-relevant coping skills within and beyond the formal education system [4]. Relatedly, research to better understand unique challenges and possibilities for schools (primary, secondary, and higher education) to become safe spaces to foster coping skills and emotional resiliency to climate change is currently lacking. Third, there is a growing need for research to better understand the knowledge, attitudes, and skills of mental health professionals and educators in relation to climate change generally and the emotional dimensions of climate change specifically. Robust evidence is needed to inform training and skill-building opportunities with mental health professionals and educators around climate literacy and best practices for supporting young people in relation to the emotional burden of the climate crisis [33]. Fourth, efforts are needed to explicitly examine and learn from the existing interventions aimed at offering non-judgemental and safe spaces for young people to recognize, voice, and process climate emotions with others. Finally, research that not only prioritizes young people's voices and experiences but also empowers young people through the research process itself is promising direction [21]. Participatory methodologies oriented towards conducting research with the people affected by a given issue and aimed at

change are particularly relevant. For example, participatory action research with young people aimed at learning how best to involve them in climate action and policy-making processes or curricular reform that also acknowledges and recognizes emotional dimensions of the climate crisis is a promising direction forward. Participatory action research can also explicitly foster intergenerational relationship building and youth-adult allyship which we see as imperative to both addressing climate distress and co-creating a safe, healthy, and equitable future.

## Contributions

LPG and EF contributed to conceptualization, literature synthesis, study design, data collection, data analysis, writing and editing. Both authors had full access to the data and accept responsibility for publications.

## Data sharing

Authors will consider making de-identified data available between 5 months and 5 years after publishing to parties submitting rigorous and justified proposals for analysis. Those requesting data would have to sign a data access agreement.

## Author agreement statement

We the undersigned declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Supplementary materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.joclim.2023.100204](https://doi.org/10.1016/j.joclim.2023.100204).

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