

“It’s like getting a diagnosis of terminal cancer.” An Exploratory Study of the Emotional Landscape of Climate Change Concern in Norway.

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Abstract

Increasingly more people consider climate change a global emergency and emotionally charged terms such as climate anxiety or climate depression have entered public discourse. At the same time, emotions lie at the core of many psychological processes and are thus a critical component of pro-environmental engagement, as well as human health and well-being. Systematic empirical evidence about the emotional experience of climate change and its effects for an individual's functioning is lacking, however. In the present study, we address this gap in knowledge and conduct an exploratory qualitative study of the emotional experience behind concern for climate change and its impacts on mental and psychosocial functioning. Drawing from 33 in-depth interviews conducted in Norway with a diverse sample of people who self-identified as worried about climate change, we map and contextualise the complex palette of mostly strong negative emotions experienced in relation to the concern for climate change. These emotions affected the participants psychologically in a number of ways, including in terms of lowered mood, reproductive concerns, difficulties in social functioning, but also through feeling an urge and responsibility to engage in pro-environmental behaviour. Our findings empirically validate the view that people can be psychologically affected by the mere awareness of the scale and implications of climate change, and that the emotional labour behind feeling an individual responsibility for climate change can affect people's psychological well-being.

1. Introduction

The scale of the current climate crisis but also the available knowledge about disastrous future events related to climate change are unprecedented in human history. On these grounds, concern for climate issues is on the rise. For example, the biggest ever opinion poll on climate change across 50 countries showed that 64% of people considered climate change a global emergency ([UNDP and University of Oxford 2021](#)). In addition, the median percentage of population across 23 nations considering climate change a major threat to their country has gone up from 56% in 2013 to 67% in 2018 ([Poushter and Huang 2019](#)). In 2020, climate change remained one of the top-most perceived threats across countries despite the global spread of the new dangerous coronavirus ([Poushter and Huang 2020](#)).

Traditionally, climate change concern has been associated with a set of opinions and beliefs about climate issues. Recently, emotional aspects of this phenomenon started coming into the spotlight with terms such as "climate depression" or "climate anxiety" entering the popular discourse. While there is little conceptual clarity over what they actually mean (e.g. how they relate to depression and anxiety in clinical terms), understanding emotions related to climate change concern seems important for furthering the knowledge on the social mechanisms of climate change mitigation and adaptation, as well as the impacts of climate change on people's health and wellbeing.

2. Emotions In The Context Of Climate Change

Emotions are central to human experience as they affect a number of psychological processes (Barrett, Lewis, and Haviland-Jones 2016). Although there is no scientific consensus on the definition of emotion, in the recent literature they are considered to be mental concepts constructed “in the moment” based on the past experience to give meaning to bodily sensations (Barrett 2017). One of the key functions of emotions is to mediate between continually changing situations and the individual’s mental functioning and behaviour (Barrett 2012). From this perspective, emotions are also central to the experience of climate change. They mediate between climate-related stimuli and our cognitions, behaviours, health, and well-being. In that sense, the way we emotionally experience the issue of climate change to large extent steers our mental and behavioural reactions to this complex problem.

Until recently, the topic of emotions in climate change psychology has been largely overlooked (Roeser 2012; Wang et al. 2018). Nevertheless, studies that have begun to take emotions into consideration show the importance of their role for people’s behaviour in the context of climate change. For example, negative affect was one of the strongest predictors of adaptation behavior in a recent meta-analysis of factors influencing people’s individual adjustments to reduce or avoid negative impacts of climate change (van Valkengoed and Steg 2019). Similarly, strong emotional experience of climate change predicted climate change policy support (Wang et al. 2018), and in another study it performed better than a set of variables usually associated most strongly with pro-environmental engagement such as cultural worldviews and sociodemographic variables (Smith and Leiserowitz 2014). In experimental studies, climate change narratives evoking heightened emotional arousal predicted pro-environmental behaviour significantly better than messages lacking emotion-evoking qualities (Morris et al. 2019). In the same vein, inducing guilt, fear, worry, and sadness was shown to be an effective tool to encourage pro-environmental behaviour and behavioural intentions (Skurka et al. 2018; Swim and Bloodhart 2015; Rees, Klug, and Bamberg 2015).

3. Emotional And Mental Health Impacts Of Climate Change Concern

As much as negative affect in relation to climate change can lead to behavioural engagement in the issue, a frequent experience of negative emotions is also associated with poorer mental and physical health (e.g. DeSteno, Gross, and Kubzansky 2013). While direct negative effects of climate change on physical and mental health have been widely discussed in the literature, the observation that the mere awareness and anticipation of the consequences of the climate crisis could result in negative effects for emotional well-being, and in turn affect health and psychosocial functioning, is a relatively new field of study (Clayton, Manning, and Hodge 2014; Whitmee et al. 2015). Concurrently, studies across the world showed that people experience a range of strong emotions in relation to the mere awareness and anticipation of global climate change. For example, a nationally representative survey in the US revealed that, in terms of discrete emotions, 62% of Americans associated global warming with worry and interest, while about 40% linked it with feeling disgust, helplessness, hopefulness, anger, and fear (Leiserowitz et al. 2018). Other studies indicated that people associated climate change also with the feelings of loss and frustration (Moser 2013), worry and powerlessness (Fischer et al. 2012), as well as sadness and grief (Cunsolo and Ellis 2018).

To date, few published studies have empirically examined the association between negative affect behind climate change concern and an individual's psychosocial well-being and functioning. Small but significant positive links between climate change distress, defined two-dimensionally in terms of anxiety and hopelessness, and clinically significant general depression, anxiety, and stress were found in a student and general public sample in Australia (Searle and Gow 2010). More recently, a study on a sample of adult online research platform users from the US showed that perceived environmental stress, including stress about climate change, significantly positively predicted depressive symptoms (Helm et al. 2018). Another online study in the US found that “climate change anxiety”, measured on the scales of cognitive-emotional impairment and functional impairment, was strongly positively correlated with general anxiety and depression (Clayton and Karazsia 2020). Nonetheless, two studies found no relationship between worry about climate change and pathological worry (Verplanken and Roy 2013) or non-specific symptoms of anxiety and depression (Berry and Peel 2015).

What is notable in the above studies is the lack of uniformity in the approach to the emotions behind concern for climate change. On one hand, it is no surprise that studies, which borrowed items from the existing questionnaires on anxiety, hopelessness, or stress, and presented them in the context of climate change, found associations between elevated “climate change distress” or “climate change anxiety”, and symptoms of clinically defined anxiety and depression. On the other hand, the two studies that did not find empirical links between climate change worry and mental health struggles, assessed worry using only one general item (*How often do you have thoughts about the environment, which you find worrying, uncomfortable, or upsetting?*(Verplanken and Roy 2013), and *I am worried about global warming*(Berry and Peel 2015).

4. The Current Study

To address this lack of conceptual clarity, rather than relying on top-down quantitative studies which are based on researchers' assumptions about the phenomenon in question, a systematic exploratory bottom-up approach would allow to map the emotional experience of climate change concern in a more comprehensive manner. While exploratory work on the emotional experience of changing climate in the societies profoundly and visibly affected by the changing climate (e.g. Canadian Inuits, Tuvalu islanders) revealed increased levels of negative affectivity, distress and functional impairment (Cunsolo Willox et al. 2013; Gibson et al. 2020), to our knowledge only one study took a qualitative exploratory approach in the study of the “symptoms” of “climate anxiety” in a society where the impacts of climate change are still mostly indirect. The study partially based on exploratory interviews conducted in Finland, concluded that “climate anxiety” can be viewed on a scale from mild to severe, and that even mild symptoms can be persistent and affect people’s well-being and their ability to function (Pihkala 2019). Nevertheless, empirical research on that topic remains scarce and the knowledge on the emotional aspects of climate change concern is only to a limited degree based on systematic empirical evidence.

To complement the emerging knowledge, we have conducted an exploratory qualitative study among a diverse sample of the Norwegian population, who self-identified as people who felt that concern for

climate change influenced their functioning in daily life. The effects of climate change in Norway remain mainly indirect, however, there are some clearly visible manifestations of the changing climate, e.g. rainfall in Norway has gone up by 18% and became more intense since 1900, which increased the frequency of devastating flooding and landslides (Hanssen-Bauer et al. 2015). When it comes to risk perception, a third of the Norwegian population notice the consequences of climate change around them, more than half of the population is worried about the effects climate change will have on them and their closest ones, and more than a third is concerned about having to move from their houses in the future (Gallup 2020). Nonetheless, the Norwegian society is also one of the most polarised societies among the Western nations when it comes to the belief in anthropogenic climate change (YouGov 2019), which highly influences the public discourse about the issue (Norgaard 2011).

In our study, we attempted to answer two broad research questions:

- (1) What is the range, intensity, and context of the emotional experience of climate change concern among highly concerned people?
- (2) What is the impact of these emotions on people's mental and psychosocial functioning? We relied on qualitative semi-structured in-depth interviews to gather rich data that allowed us to map and contextualise the complexity of participants' experience.

5. Methods

5.1 Participants

The selection of participants ($N = 33$) was based on intentional sampling - we explicitly recruited respondents who experienced strong emotions about climate change to enable gaining an insight into how the more extreme forms of worry about climate change could manifest. The sample comprised individuals who responded to the call for participants addressed to people who were "worried about climate change and felt that this worry affected their daily life". We expected that such sample would be the most psychologically affected by their strong concern. In addition, we assumed that such self-selection of participants would result in their high commitment and thus expand the quality of the collected data. We strived to reach a diverse sample of the Norwegian population in terms of age, gender, place of residence, and environmental engagement. Moreover, we took into account the available information about the groups found to be especially vulnerable to strong emotional experience of climate change, e.g. environmental science researchers or climate activists (Head and Harada 2017; Kleres and Wettergren 2017), and addressed our call for participants also to them. We approached the potential participants through various channels - emails to environmental organisations and research groups working with environmental science, various pro-environmental groups on Facebook, posters at the university campus, and snowball sampling through the word of mouth among students, colleagues and university staff around Norway. The characteristics of the sample are presented in Table 1.

Table 1. Characteristics of the study sample.

Age	
Generation Z (18 - 23)	4
Millennial (24 - 35)	12
Generation X (36 - 55)	11
Boomer (56 - 74)	6
Gender	
Female	18
Male	14
Non-binary	1
Place of residence	
Urban - major city (above 65 000 inhabitants)	24
Urban - small city (up to 65 000 inhabitants)	7
Rural	2
Education	
High school (incl. high school students)	5
Vocational school	2
University diploma	26
Environmental engagement	
Professionally engaged in environmental issues (incl. work within environmental sciences, NGO, or public administration/services)	7
Actively involved in an environmental organisation	16

5.2. Procedure

The study was based on semi-structured in-depth interviews, conducted between June and October 2020 in a conversational format (Kvale 1996), allowing for new themes to emerge beyond the initial themes of the interview guide. The topics in the interview guide were designed to be exploratory, i.e. they were not informed by existing conceptual frameworks or theories. The interviews were conducted either in person ($n = 7$) in places that were convenient for participants, or online/on the phone ($n = 26$) due to health concerns related to the COVID-19 pandemic. All interviews were audio-recorded. After a short collection of demographic data, each interview started with questions about the interviewees' emotions in the context of climate change. After the general spontaneous exploration of one's emotions, to facilitate an in-depth insight into emotional responses to climate change, we presented additional materials with emotional vocabulary to the participants - the *Plutchik's wheel of emotions* (Plutchik 2001), and the *List of emotions* (David 2016). The words that the participants indicated as relevant to what they felt served as anchors for conversationally deepening the context, intensity, and consequences of these emotions for mental and psychosocial functioning of the interviewees.

The research procedure, the written consent form and data protection issues were approved by the Norwegian Centre for Research Data (case number: 206971) and by the Regional Committees for Medical and Health Research Ethics (case number: 89334). All participants were informed about the aims of the study, the study procedure, how their data was going to be used as well as their rights, including the right to withdraw from the study. Each participant provided written informed consent before study inclusion.

5.3. Data analysis

The audio recordings were first transcribed verbatim with an extra focus on nonverbal expressions of emotions. The nonverbal emotional reactions were noted in the parentheses in the transcription together with the time when they occurred in the recording to enable the validation by the other members of the research team. The mean length of the interview was 59 minutes.

The transcriptions were analysed based on rigorous multi-step thematic analysis with a semantic approach (Braun and Clarke 2006). The interviews were read and re-read by three of the members of the research team, and each of them proposed an initial list of codes. Next, the final list of key codes and themes was created through discussing and merging the initial coding frames. All transcripts were then coded according to the final coding frame with the use of the NVivo software (QSR International Pty Ltd 2018). Each transcript was coded independently by at least two members of the research team to increase the validity of the emerging themes. The themes observed independently by the coders were then discussed and reviewed to arrive at the final results.

6. Results

The interview participants experienced a palette of mostly negative emotions in relation to their concern about climate change. When asked to describe their general feelings about this issue, many interviewees spontaneously spoke about the complexity of what they felt. Emotions related to sadness and anger were the two most frequently recurring themes, along with different shades of fear. These three basic emotions

were related to more nuanced feelings of insecurity, hopelessness, confusion, powerlessness, guilt, and isolation, and affected the participants psychologically in a number of ways. On top of negative emotions, positive emotions were occasionally present in interviewees' accounts. Below, we present the results in detail together with example corresponding quotations.^[1] A graphical representation of the negative emotional experience of concern for climate change is presented in figure 1.

6.1. *I guess sadness is the first that comes to mind*

Sadness was an emotion mentioned by many interviewees as the first and strongest one. The participants experienced it mostly in relation to irreversible changes in the natural environment, including the pace of species extinction and habitat depletion, and the violence that humans have been inflicting upon non-human beings. They spoke of sadness stemming from strong feelings of loss related to the degradation of the natural environment but also when speaking about the loss of a certain way of life and possibilities in the future. Some interviewees expressed sadness about the injustice of the impacts of climate change on humans and animals, that climate change first of all impacts those who contributed to it the least.

Most of the participants indicated experiencing strong, at times overwhelming sadness. They spoke of feeling grief, deep sorrow or emotional pain over the natural world that was changing in a rapid and violent manner. In the words of one interviewee:

You know, I don't think anybody likes to have changes forced upon them. I think there is – if you can change - the world of course, is perpetually changing... But this change has come so fast, and with such ramifications, for everyone, that it just feels threatening, in a way. And really I feel kind of grief stricken that this is actually happening. (15)

Many interviewees reported feeling tearful, mostly when encountering depressing news about climate change or when seeing changes in the environment around them. Several participants had tears in their eyes during the interview when describing their feelings. Many interviewees mentioned feeling at times depressed by the awareness of climate change. For some people lowered mood was related to the thoughts about the irreversibility of the loss in the natural world. Others pointed out strong sadness stemming from the overwhelming scope of climate change and feeling powerless about it.

The interviewees spoke about feeling disappointed by the indifference of people in power and by the lack of concern in the general society. Some participants expressed disappointment about the human species and human nature in general. Disillusionment about the ability of human societies to address climate change was another recurring theme. When speaking about disappointment and disillusionment, the interviewees would often turn into anger. As one interviewee put it:

I am very disappointed in how we and how the government in Norway, especially in Norway because that's where I live, that's the closest but in other countries as well.. How...!? How is it possible to prioritise like this?! [angry voice] And I'm disappointed when I read about how they prioritise money! (14)

6.2. *I can really feel rage*

The interviewees regularly felt annoyance, irritation, frustration, impatience, anger, disgust, rage, and fury when referring to the perceived lack of engagement in climate action at all levels of social organisation. Many times, when speaking about anger, they emphasised the time scope - that the scientific knowledge has been conclusive for decades about the causes and consequences of climate change, and, in their view, little has been done over the years to mitigate the problem.

Anger was expressed first and foremost towards the people in power. The participants were angry that the people who can change the situation do not work for the common good. The interviewees' emotions in this regard were very strong, people often spoke about feeling rage, fury and disgust towards politicians, but also towards corporate leaders, for pursuing their interests despite having the knowledge about the consequences of their actions for the environment. One interviewee spoke about their feelings in this regard:

Actually, the anger words are really not strong enough. Except maybe disgust, I am disgusted! But, still, I think the other words sound like I am just a little angry, but I'm really, you know... Raging! And I am gripping actually with how to not... not to let that rage overwhelm my life. (4)

Interviewees' anger at corporate greed trickled down to anger at the general society. Participants were frustrated at the ignorance of other people, their perceived carelessness, naivety, and short-sightedness. They were irritated that, in their view, other people did not accept the seriousness of the climate issues, could not change their ways of thinking, and limit their consumption, which perpetuated the power of corporations.

Another recurring theme was the feelings of irritation at family and friends. Many interviewees were annoyed about their close ones' everyday behaviours that they considered environmentally unfriendly and unnecessary. It was difficult for them to ignore these behaviours in the people that were close to them because they had higher expectations from them than from the general society. This anger would occasionally put a strain on the relationships with their relatives and friends leading to arguments, tensions and, sometimes, cutting the bonds.

Many younger interviewees (generation Z and millennials) were angry at older generations for depriving them of having an optimistic view about the future. They were also angry at older generations for talking down, minimising the threat of climate change, and ridiculing the urgency of the need to implement radical solutions. Some young people felt anger upon concluding that older generations are to blame for the environmental crisis.

Virtually every participant spoke about experiencing frustration in the context of climate change. Their frustration was related to the feelings of powerlessness that one person can only do so little to change the situation, as well as to the complexity of the climate crisis that makes it difficult to understand where to effectively direct one's energy. People also expressed frustration over being trapped in the socio-

economic system that is incompatible with the natural environment and for being a part of the self-centred culture that runs around destructive consumption patterns.

6.3. And my fear, I think, it's like terror sometimes

When it comes to the experience of fear, most of the time, the participants spoke about general apprehension about the future of the world under the unfolding climate change. At the same time, many interviewees mentioned experiencing, from time to time, strong, disturbing feelings of fear upon seeing media or scientific accounts about climate change or noticing changes in the natural environment around them. Many participants described feeling prolonged anxiety and uneasiness after realising the seriousness of the climate crisis and their own vulnerability. These temporary strong feelings of fear were amplified by the awareness that the success of actions to mitigate climate change is under time pressure while the policies around the issue are, in their view, insufficient and progressing with too slow a pace. As one gen Z interviewee said:

I have been quite good at not getting scared before, but in the recent months I get more scared. I don't exactly know why, but maybe because time goes by and nothing is happening. Maybe it just takes a toll on you, after some time. So, yeah, when I think about it now, I feel unrest and scared (10)

Fear about one's own future under the unfolding climate change was a prevalent topic in the accounts of gen Z and millennials. The recurring themes in this context were the uncertainty about the future, feelings of insecurity and lack of control. Younger participants were distrustful about the *narrative of progress* and they were confused about the validity of the rules guiding social organisation. One interviewee expressed it that way:

All the choices I make about my future and the way I live my life is based in, like, the future is very unstable. And everything we know is in a way in question, like everything we know about how to build your life, do things etc. but also about what I want in my life. There is no point in trying to build a career or build... not necessarily no point, but like a different kind of approach to building a career, building a life. Like climbing the ladder of success is difficult if you know that the rules can change at any point. (21)

Many participants, independently of their age, referred to feeling hopeless about the future which in most cases was related to the belief that human civilisation was heading towards a catastrophe. Terms such as *societal collapse, total disaster, serious breakdown, population crash, the end of time* were mentioned by the majority of the interviewees when asked about how they see the future, along with statements such as: *It's like getting a diagnosis of a terminal cancer* (16), *We know it's gonna collapse* (21), *It's too late to turn back, the [doomsday] clock is 2 minutes to 12* (25). One interviewee described their feelings this way:

When I think about the climate situation, it's just like... it's so sad that we reached this stage that's just slipping off a cliff, or running off a cliff, yeah, and it makes me question the human goodness that I anyhow think I see in myself or in others. But then this whole situation is just kind of... it's easier to... to...

to slip into [sighs heavily] maybe despair and... losing kind of... trust in human nature or human beings.
(19)

6.4. *It's just like, always in the back of my mind*

Many interviewees mentioned that their worry and hopelessness in the context of climate change was taking away from their enjoyment of life at times. For some it was difficult to dismiss worrisome thoughts. Many participants spoke about subtle long-lasting effects of climate change concern on their mood throughout the day on a regular basis. Their worry about climate change made them feel *grumpy*, *negative*, and *blue*. As one interviewee explained: *I don't think about it every hour of every day, but it's just like, always in the back of my mind. And when something comes up that's related to that, it just kind of resurfaces.* (11).

However, at times, these effects on mood were stronger and many participants spoke about falling into a *small depression* or having a *breakdown*" In their view, it usually happened in reaction to particularly negative information about climate change, as well as upon personal realisation of (*taking in emotionally*) the severity of the climate crisis and one's powerlessness. Such "breakdowns" were characterised by prolonged lowered mood (from several hours to several days), tearfulness, and hopelessness.

Although sadness and hopelessness were prevailing themes when it comes to participants' mood, feelings of stress and tension were also mentioned. Some interviewees spoke that sometimes they could feel the tension and anxiety around climate change in the body. They experienced tension in the muscles, increased heartbeat, headaches, as well as tiredness, especially upon new negative information about climate change. Some people found it difficult to control their negative thoughts around this issue which disturbed their concentration. One interviewee described their ruminative thoughts in these words:

When I read about the insects, that their extinction rate is high, or like – it's going faster than predicted before - it disturbed my concentration. On some days, really. And I was more afraid. More anxiety, more hopelessness, more impatience about people around me. And, yeah, that was – so it was purely in my head, all the time, it came back to me all the time: 'oh, it's hopeless, this is scary, oh, it's hopeless, scary'.
(12)

Some participants felt regularly overwhelmed by hopelessness which influenced their motivation to engage in everyday activities. The words of one interviewee illustrate well what other participants said: *It's like numbness... You think, or you read about climate change, and then suddenly – you had some plans, to go... and suddenly, you feel like, nah, this is worthless.* (12).

6.5 *I really, really want to have kids, but I don't feel like it's safe*

Many times, fear and hopelessness were expressed in the context of having children. The issue of having children was never brought up by the interviewer: it was our interlocutors, who would each time start this topic. Most gen Z and millennials confessed that they had serious doubts about starting a family and

having children. Some were confused whether it is ethical to have a child due to its environmental impact, while most young interviewees viewed having children as something irresponsible because of the challenges that the future generations are bound to face under the unfolding climate change. One interviewee described it that way:

I am thinking about my future in terms of having kids, and all of that. I don't know if I really dare to do that, and if that's kind to have kids in this kind of world. That is something I was thinking about lately, and that's a really big and scary thought, because I really, really want to have kids, but I don't feel like it's safe. (10)

Likewise, interviewees from the older generations held strong emotions about having children. They felt uneasy when somebody from their social milieu, including family, was speaking about having children or grandchildren. Several older interviewees were child-free, and they referred to their concern about climate change as a reason for that. At the same time, several interviewees who already had children questioned the responsibility of their decision about having a child on the grounds of looming climate change. Grandparents felt strong worry and sadness about the future of younger generations, in the words of one interviewee: *I can get tearful because I am thinking about the future of my children and grandchildren, and I am thinking: oh, God, what a miserable world they are going to live in.* (16).

6.6. I always relate everything to the climate, to the environment

A prevalent theme in how the interviewees spoke about their worry was in terms of a *prism* or *lens* of climate change through which they viewed the world, e.g. *It's like everything else is irrelevant* (7), *Climate change is somehow very much in the forefront in my mind, it puts a damper on it* (24), *I always relate everything to the climate, to the environment* (13). Climate change was considered during decision making regarding education, occupation, place to live, and planning for the future as well as regarding how to go about everyday life. It made the participants strictly evaluate their own and other people's choices in terms of their environmental impact.

A recurring theme in this context was a strong personal responsibility for climate action which led to engagement in pro-environmental behaviours at different levels. In fact, the majority of the participants were involved in long-term, effort-demanding, high-impact behaviours relevant for the climate (e.g. eating a plant-based diet, radically reducing or resigning from flying, radically reducing driving, investing in climate relevant technologies at home, radically cutting on consumption of goods). The interviewees' strived to behave in line with their standards, goals, and rules related to a low environmental impact lifestyle. For most participants their pro-environmental goals were central to how they lived their lives. The accounts of many interviewees echoed the words of one millennial participant: *It governs to a large degree how I choose to live my life* (2).

Such high standards about behaving in a climate-compatible way oftentimes were accompanied by strong and long-lasting feelings of guilt. Most of the time these feelings stemmed from small-impact everyday behaviours. The interviewees spoke about feeling strong guilt about, e.g. not having a chance to

sort garbage properly, using a car when there was a possibility to walk or cycle, being forced to or succumbing to social pressures to purchase something new (e.g. clothes or equipment) or purchasing products wrapped in plastic. In this setting, some participants spoke about guilt affecting their eating behaviours and appetite. As one interviewee put it: *I'd rather not feel guilt and be a little bit hungry than feel guilt and eat something that has a large footprint* (1). Many participants linked guilt about their actions in the context of climate change to the feelings of anxiety and tension.

Another recurring theme in terms of guilt was blaming oneself for not doing enough in the context of climate change, both in the past and in the present. Many participants felt an urge and obligation to use their time to learn about climate change, participate in collective action and to work out solutions for the climate. As a result, they often felt guilt for using their time to do something else, including paid work or worrying about other matters. In this context, many participants spoke about feeling, on a regular basis, the need to temporarily cut off information and, in turn, reduce their concern about climate change to protect themselves from bad emotions. Nevertheless, such a strategy aimed to reduce the tension often led to the feelings of guilt and restlessness.

Feeling guilty about one's privilege was a frequently recurring theme. The participants felt guilt for living in Norway where, on one hand, they felt sheltered from the consequences of climate change, while, on the other hand, they were inevitably part of a society that has a large impact on the environment. Many people felt ashamed on behalf of Norway - *Because we are so rich, because we have the knowledge and the opportunity to do a lot, and we don't [act]!* (12). Feeling ashamed, in some interviewees, was a global feeling which they referred to being a human - they felt ashamed for all the damage the human race has incurred on the natural world, as well as guilty for that their mere existence was related to having a carbon footprint. Some viewed the threat that climate change could lead to the extinction of human species as a punishment for people's irresponsibility, ignorance, and greed, and they expressed the opinion that the human species deserves to die out so that the natural environment can recover.

6.7. *I can't really do anything to change this situation*

Many participants felt guilt for not having the courage to radically change their lifestyle so that they could break free from the destructive system. At the same time, many were aware that their guilt was unproportionable to what individual behaviours meant in the context of mitigating climate change. They were aware about *green washing* and dead ends of *green capitalism*. The experience of paralysing powerlessness about being trapped in the consumer society where individual actions felt small and meaningless when compared to the levels of environmental impact ingrained in the functioning of the system was a common theme in the interviews. Another one was confusion about what an individual can and should do to commit meaningfully to mitigating climate change.

In that sense, powerlessness was one the most frequently recurring themes. The interviewees were aware of the need of a profound sociotechnical transformation to limit the consequences of climate change. Their powerlessness in the face of the inaction of the people in power led to strong anger and frustration

but also to anxiety and hopelessness. They felt paralysed at times because of the scale and complexity of the climate problem. One person described it that way:

I don't really feel that I know where to begin. With a lot of political issues there are some concrete things that I feel I could do, and I feel like I can see the powerful works solving the problem. Whereas here, it's so all-encompassing that it's difficult to see. Even if you fix one problem, it doesn't really fix the big problem.
(5)

Many interviewees felt powerless and hopeless to the point that they decided to embrace the idea that mitigation efforts are ultimately going to fail. Upon accepting it, they felt less anxious and restless about that topic. Nevertheless, such grim conclusions did not discourage them from engaging in pro-environmental behaviour.

6.8. I feel lonely, because I am alone in this situation

In many cases, strong emotions the participants experienced in relation to climate change made them feel isolated from the general society. In their experience, most other people have not understood and, in consequence, have not taken in emotionally the severity of climate change. On one hand their isolation led to anger and annoyance towards the general society, on the other - to loneliness and stress stemming from it.

Most of the interviewees felt that they could not share what they felt about climate change with other people, except some of their colleagues involved in collective climate action. Some experienced negative reactions when they brought the topic of climate change up - they felt ridiculed, ostracised, or not taken seriously. Many participants felt that they had to consciously put on a *positive mask* and conceal their worry to be accepted by others as they did not want to put a strain on their relationship with other people or be seen as a *party pooper, moralist, mood killer, or pain in the ass* (interviewees' own words). Others, especially older interviewees, adopted a more confronting strategy - they kept asking difficult questions, commenting on people's choices, signalling their disagreement through e.g. wearing worn out clothes, which excluded them from some social circles. In such cases, they were proud of cutting off bonds with people who did not share their concern and values.

Many interviewees felt lonely and stressed about being a minority that, in their view, fully grasped and emotionally took in the available knowledge about climate change, and therefore have a greater responsibility to act against it. Apart from powerlessness in this regard, they felt isolated and betrayed in their struggle - abandoned by other people and by the authorities. It shook their trust in society and its institutions. In fact, many interviewees were so distrustful and sceptical that they strived to keep away from a "profoundly sick society". Many others were balancing between feeling guilt about participating in the society which would inevitably be linked to making choices that were against their values, and behaving in line with their concern, which pushed them yet further away from other people and amplified their frustration and powerlessness.

6.9. "That makes me hopeful. And tearful"

Although the interviewees gave us predominantly rich accounts of their negative emotional experience of climate change, many spoke about occasionally having some positive emotions in this context. A recurring theme was feeling strong positive emotions about the empowering effects of collective climate action, both in terms of reading or watching media accounts about it and upon one's own participation in collective action, e.g. *I also feel very positive when I read about the regenerative cooperative that is working out. So, it's interesting, it's as if small things can almost balance out all the negativity and environmental news.* (7). Working out solutions and being among people who shared interviewees' values and concern were mentioned as bringing a sense of excitement and happiness: *It feels good", it gives empowerment, absolutely* (12), *I was filled with, you know, gratitude that I found other people that felt this issue is as serious as it is. And it was a lot of energy* (16). Some participants held an opinion that taking part in collective climate action helped them reduce their worry.

Another recurring topic was an expanded appreciation of nature; finding consolation in it, e.g. *Being in nature and especially [hearing the] sounds like... the wind in the trees or hearing insects or birds, this kind of helped me to... to find a kind of... something that can contain and embrace these challenging emotions* (19). The anticipation of loss in the natural environment made the participants more sensitive to its qualities: *I also sometimes feel grateful for the moment right now and everything that is still working* (17). Some interviewees spoke about discovering another level of connectedness to nature: *I am spending time to try to develop communion with nature, seeing nature as alive* (4), *Before that [becoming worried about climate change] I walked around with fly bibs. Now I take the fly into a glass and release it outside.* (24), *I am starting to have a slightly different connection with nature than before. (...) Having a growing, kind of, desire to see nature run wild.* (5).

The notion of hope was a recurring theme. However, similarly to other positive emotions mentioned by the participants of the study, hope was framed in the context of inevitable, overwhelming changes. Interviewees spoke about the struggle of finding the space for hope and optimism while remaining constantly aware of possible scenarios for the future under climate change:

I think I am hopeful, as well. And seeing the resilience of nature, life, seeing how nature can spring back and take over the area that has been destroyed, gives me a lot of hope. So, you know, even if – despite what we destroyed and continue to destroy, if something happens to stop that, whether that would be the crash of the human population, or we shape up, the world can recover. I believe that both animals and plants are so adaptable, a lot more adaptable than us, that nature will survive and thrive with or without us. (11)

At the same time, some people mentioned their highly conflicting emotions regarding hope. Sometimes giving it up was a relief. Some perceived hope as a concept that only obscured an honest public discussion about the inevitably gloomy future.

Footnotes:

^[1] The identification number of the interview is indicated in the parentheses after each quotation.

7. Discussion

7.1. Climate change emotions

In this explorative study, we sought to shed more light on the emotional experience of climate change concern and its impacts on mental and psychosocial functioning. Our study demonstrated that climate change concern was associated with a complex palette of strong, mostly negative emotions that affected people's lives in a number of ways. Thinking about climate change led to at times overwhelming and alienating feelings of sadness, anger, and fear, as well as confusion, insecurity, and hopelessness. These emotions were linked many times to lowered mood and decreased motivation to engage in activities unrelated to climate-relevant action, difficulties in social functioning, as well as concern about having children. At the same time, most participants felt an individual responsibility and an urge to learn about climate issues, as well as to engage in climate change mitigation and adaptation behaviours, which in turn was often linked to the isolating feelings of guilt, powerlessness, and, again, confusion.

Our findings expand upon the existing research on the emotional landscape of the environmental crisis and corroborate the view that people can be emotionally affected not only by traumatic climate change-related events but also by the mere awareness of the scale and implications of climate change. Our research indicates that the emotional experience of climate change concern can be broad and include emotions of different nature and intensity depending on the context. The emotions, which our interviewees spoke about, fall well into the framework of *psychoterratic* emotions outlined by eco-philosopher Glenn Albrecht to name affective states tied to the particular condition of a person's biophysical environment (Albrecht 2019). The feelings experienced by our participants can be seen as an expression of *solastalgia* (the feeling of distress about the unwanted transformation of the environment), *eco-anxiety* (a generalised worry about the future related to a changing and uncertain environment and a distress about one's individual behaviours), and *terrafurie* (the extreme anger experienced by individuals who see the destructive tendencies ingrained in the industrial-technological society and powerlessness about it) (Albrecht 2019).

In addition, certain parts of interviewees' accounts bear resemblance with *ecological grief*, a term signifying the intense feelings of grief due to climate-related losses, which emerged from the studies conducted in populations already acutely affected by the changing climate in Canada and Australia (Cunsolo and Ellis 2018). Our results suggest that people can experience *ecological grief* and other strong emotions also "from the distance", through cultural and social representations of climate change, stemming rather from their awareness and anticipation of climate change than from being personally physically acutely affected by the changing climate.

7.2. Climate change emotions and mental health

Our results indicate that the strong emotional experience of concern for climate change is not limited to the emotional and behavioural aspects of anxiety or depression, often discussed in the media and recently also in the scientific literature as “climate anxiety” or “climate depression” (Pihkala 2020; Clayton and Karazsia 2020). While some of our interviewees’ reactions were indeed common for the experience of clinical anxiety (e.g. the feelings of uncertainty, unpredictability, and uncontrollability), or depression (e.g. feelings of hopelessness, guilt, and lowered mood), in most cases they did not seem to cause a serious dysfunction in the individual, which is the definitional criterion of mental disorder (Stein et al. 2010). However, although we did include in-depth questions about the experience of psychophysical difficulties, our interview was not a clinical interview for diagnosing mental disorders, thus we cannot draw strong conclusions regarding mental health symptoms in our sample.

Nevertheless, the participants chronically experienced a range of strong negative emotions in relation to climate change. Seen from the perspective of the psychological theory of stress (Lazarus and Folkman 1987), emotions comprise a large part of an individual’s stress response. As Richard Lazarus noted in summary of his seminal work: “we should abandon the measurement of stress (...) in favor of measuring the degree and quality of the emotions of daily living” (Lazarus 1990, p. 3). While for many people acute stress responses may be adaptive and they do not put a strain on mental functioning in the long run, chronic experience of unrelieved stress, especially among risk groups, can impose a health burden both for mental and physical health (Schneiderman, Ironson, and Siegel 2005; DeSteno, Gross, and Kubzansky 2013). From this perspective, chronic negative emotional experience behind concern for climate change can put a strain on people’s health and well-being.

At the same time, strong emotional responses to climate change should not by default be seen as pathological. Objectively speaking, climate change constitutes a genuine existential threat and it could be argued that strong emotions are at scale with the state of scientific knowledge about the observed and predicted consequences of climate change. It is therefore important to differentiate between adaptive and maladaptive emotional responses (Clayton 2020). It has also been noted that the distress which people experience in relation to climate change can lead to problem-solving attitudes without correlating with symptoms of mental health issues (Clayton and Karazsia 2020; Verplanken and Roy 2013). Our findings support this view in the sense that many participants reported strong negative emotions in combination with extensive behavioural engagement in climate change mitigation.

7.3. Climate change emotions and socio-psychological struggles

As much as we did not find evidence for viewing the emotional experience of our interviewees in terms of psychophysical impairment indicating psychopathology, we did notice its negative impact on psychosocial functioning. While it did not exclude people from social functioning completely, as a result of disapproval regarding the socio-political aspects of climate change, participants tended to feel high levels of social alienation and they expressed critical opinions regarding the society. To cope with these feelings, they commonly engaged in two strategies: concealing their opinions and feelings and/or

seeking new social circles that could possibly share a similar outlook on the urgency of climate change, which would limit confrontational social interactions.

The reasons for abstaining from speaking their mind about climate change were complex. The majority of the interviewees spoke about the fear of breaking social norms, which aligns with the reasons for self-silencing regarding climate change described in the literature. For example, Kari Norgaard (2006) described how breaking the apathy regarding climate action might be uncomfortable for individuals not only because it makes them face the overwhelming scope of climate change but also because it breaks the norm of providing positive messages, and goes against the positive image of Norway as a country promoting environmental sustainability.

Interviewees' highly negative image of the society as not caring about climate change is in contrast with the current data showing that the majority of the Norwegian society expresses concern about this issue (Gallup 2020). "Pluralistic ignorance", a phenomenon describing wrongful assumptions about others' opinion, can be in part responsible for the skewed perception held by the interviewees who assumed they were isolated in their concern (Geiger and Swim 2016). However, it might be only an incomplete part of the bigger picture. An important element of this view seems to be the discrepancy between declaring worry and actual engagement in climate-compatible behaviour in the wider public. Bridging this gap is difficult to fulfil, taking into consideration that people are expected to individually navigate between the clashing sets of norms and behaviours. People trying to incorporate pro-environmental choices in their everyday life struggle to clearly delineate between behaviours of significantly different impact on carbon emissions (Berthou 2013). Such confusion about the extent to which an individual can contribute to climate change mitigation efforts was also commonly mentioned by our interviewees.

7.4. Emotional labour behind feeling individual responsibility for climate change

Apart from the strong negative emotional reactions to the threat of climate change and the social aspects of it, what we find particularly interesting in our results is the "secondary" negative emotional experience related to interviewees' concern about behaving pro-environmentally. In this context, oftentimes, the negative feelings, especially guilt and anxiety were related to behaviours which in fact have little relevance for mitigating climate change, e.g. not having the chance to sort the garbage or buying things wrapped in plastic (Wynes and Nicholas 2017). Feeling such strong emotions about behaviours of little importance can divert the energy and engagement needed to take more impactful action in the longer run. Although a great majority of our interviewees were engaged in impactful climate actions, existing research suggests that pro-environmental behaviours performed to avoid negative emotions can result in negative behavioural spillover (Truelove et al. 2014).

Such strong feelings about one's own and others' small-impact individual behaviours touch upon the issue of the individualisation of responsibility for climate change which sees high greenhouse gases emissions as the consequence of destructive consumer choices rather than ill institutional arrangements (Maniates 2001). While certain individual behaviours do have a large positive impact (e.g. living car-free, avoiding airplane travel, eating a plant-based diet (Wynes and Nicholas 2017)), and are thus important

for the successful mitigation of climate change, the “environmentally-friendly lifestyles” are to a large extent constrained and shaped by institutions and political forces (Maniates 2001; Klein 2015; Chomsky, Pollin, and Polychroniou 2020). Besides, having a strong pro-environmental identity and engaging in what is considered “eco-friendly behaviour” is in most cases not related to a true reduction in one’s individual carbon footprint (Moser and Kleinhüchelkotten 2018). Quite to the contrary, statistical evidence suggests that environmentally-aware people tend to have a larger carbon footprint than environmentally unengaged audiences because of the positive correlation between environmental concern and educational attainment which, in turn, is related to higher socio-economic status usually linked with greater consumption, which lies at the core of carbon footprint (Moser and Kleinhüchelkotten 2018).

These issues put the reasonability of public calling for mere individual consumer action into question. Instead of bringing about impactful change for the dire climate situation, many individual choices become a source of negative emotions, as exemplified in our data. We suggest that to ease the emotional burden of the behavioural aspects of concern for climate change, communications regarding climate action should change the emphasis from individual consumer behaviour to the need for collective action for systemic changes that would enable climate-compatible lifestyles for all, along with promoting pro-environmental values and sharing knowledge about high-impact pro-environmental behaviours. Such clear communications would possibly decrease the guilt, anxiety and confusion related to what an individual can do. In addition, fostering collective civic engagement not only has the potential to bring about the much needed societal sustainability transition, but it could also ease the feelings of powerlessness and isolation, and, as suggested by many participants, be a source of positive emotions counterbalancing the negative emotional experience of climate change concern.

7.6. Limitations and future directions

We are aware that the selection of the interlocutors and the design of the study might have produced the results highlighting the most difficult emotions related to climate change concern. While several interviewees did not experience such strong emotions, we decided to focus on the majority of the participants who carried a heavy emotional burden of climate change concern as we were interested in mapping how the emotional experience of climate change concern may affect people psychologically. Another issue might be the relatively small number of participants. However, the sample size may not be a significant problem here because of reaching data saturation - we collected rich data, to the point where adding new interviews did not bring in any new information relevant in the light of our research questions (Fusch and Ness 2015). Another shortcoming is that most of the interviewees had a university degree. It is possible that a sample with lower socioeconomic status would report different emotional responses. Our study was exploratory and, as such, it is limited in scope and generalisability. Nonetheless, the findings certainly generate valuable qualitative insights into the emotional experience of climate change and its effects on psychosocial functioning and provide foundations for more-representative research.

Future studies could use the insights from our research to construct and validate a psychometric tool to assess people’s emotional responses to climate change in a systematic manner. Such a tool would

prospectively enable investigating the determinants and effects of different patterns of emotions experienced in relation to climate change among more representative samples. Longitudinal studies could enable investigating more closely the links between climate change worry and the development of psychopathology (e.g. clinical anxiety, depression), as well as the risk factors behind it. Such research could shed light on the causal pathway leading to climate distress, as well as indicate who is the most likely to be affected, which would have practical implications for intervention design.

8. Conclusion

This study provides a contextualised descriptive map of complex emotional aspects of climate change concern and its implications in Norway, where the experience of climate change is to date mostly indirect and mediated by sociocultural factors. We did not find evidence for the existence of “climate change anxiety” or “climate depression” understood in terms of psychopathology (i.e. severe functional impairment). Nevertheless, the emotional burden of concern for climate change bore non-clinical resemblance to the affective aspects of anxiety and depression, and had a toll on people’s mental and psychosocial functioning in terms of, e.g. lowered mood, pessimism, and confusion about the future (especially in terms of family planning), as well as relationships with other people. Psychological theory of stress suggests that such negative emotional experience can be seen as a health stressor in the long run, especially for people in risk groups for developing health issues. Socially conditioned silence surrounding climate change significantly adds to the problem, increasing the feeling of isolation, anger, and powerlessness.

While contextually different shades of sadness, anger and fear could be described as the primary emotional responses to the imminent threat of climate change, the emotional labour behind feeling an individual responsibility for climate mitigation could be described as a secondary emotional impact of climate change concern. As we argue, it may be related to the issue of the individualisation of responsibility for climate change. As much as addressing the primary emotional reactions would demand immediate global climate action and therefore, while highly desirable, it is difficult to implement, we believe that a shift in the discourse about the individual responsibility for climate crisis could help reduce the emotional labour behind individuals’ personal engagement in climate change mitigation. A focus on collective action for systemic sustainability transition instead of guilt-tripping individuals for behaviours of little importance in climate action communications, could help shift the narrative. At the same time, promoting collective civic action has the potential to boost people’s positive emotions and motivation in the struggle for addressing the complex challenges of the climate crisis.

Declarations

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Conflicts of Interest

The authors have no relevant financial or non-financial interests to declare.

Ethics approval

The research procedure, the written consent form and data protection issues were approved by the Norwegian Centre for Research Data (case number: 206971) and by the Regional Committees for Medical and Health Research Ethics (case number: 89334). All participants were informed about the aims of the study, the study procedure, how their data was going to be used as well as their rights, including the right to withdraw from the study. Each participant provided written informed consent before study inclusion.

Data availability

Due to the fact that qualitative interview data cannot be viably fully anonymised, as well as owing to sensitivity of the collected data (e.g. accounts of psychological functioning in the context of mental health), according to the obtained ethical approvals, we cannot make our raw data publicly available. We encourage any interested researcher to contact the corresponding author for extended information about the content of the interview data.

Authors' contributions

MM and CK designed the study. MM and KCØ collected the data. MM, MW and KCØ analysed the data. MM, MW, KCØ and CK wrote the paper.

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Figures

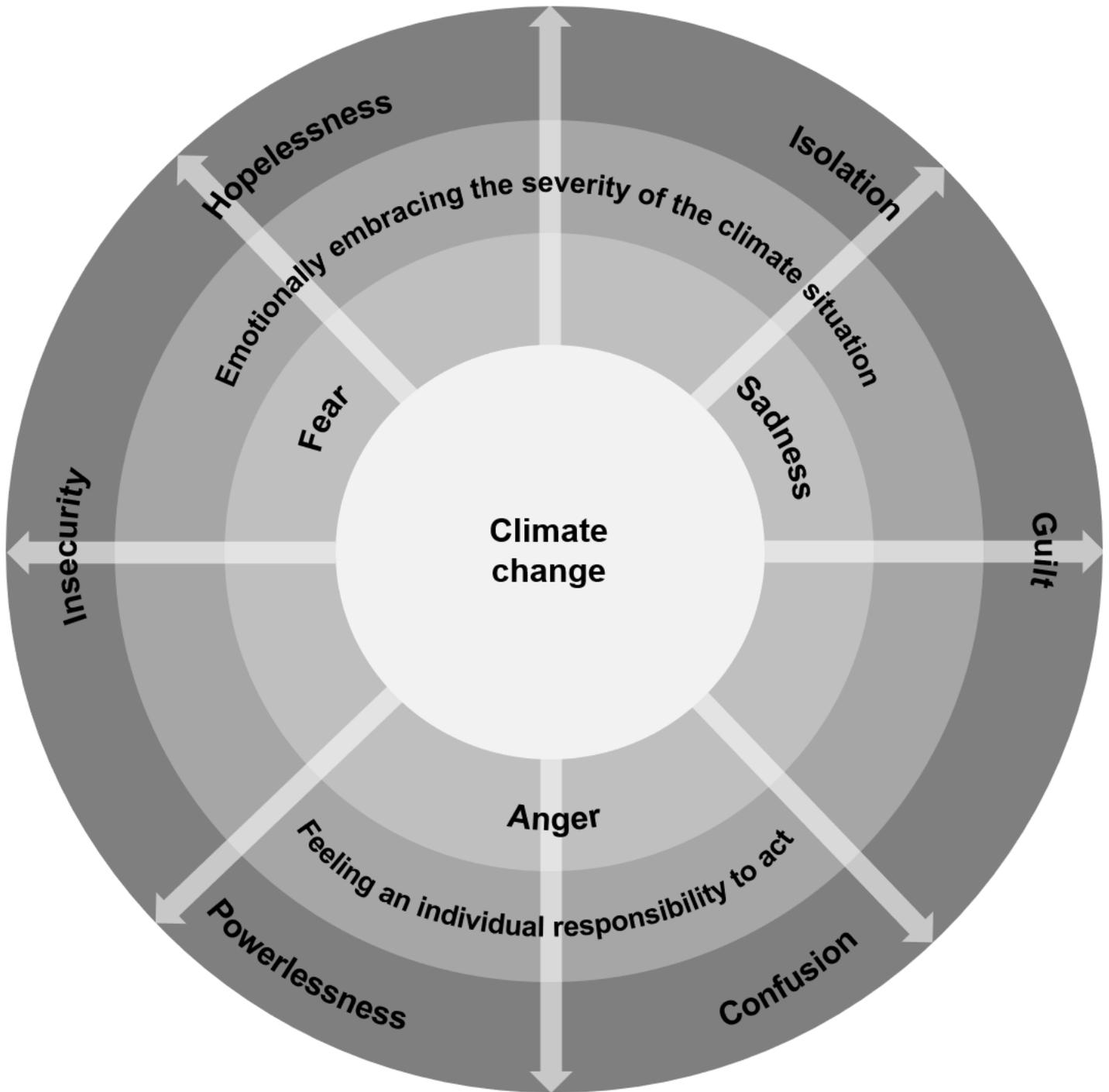


Figure 1

Schematic representation of the negative emotional experience of concern for climate change. Climate change was primarily experienced emotionally in terms of sadness, anger, and fear. Interviewees viewed their intense, at times overwhelming, emotions as a consequence of accepting and emotionally fully embracing the implications of climate change. These strong emotions urged participants to do as much as possible to mitigate climate change. This, in turn, resulted in a secondary emotional labour stemming from not denying the facts about climate change, and feeling an individual responsibility to act.