Climate anxiety: Psychological responses to climate change

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ARTICLE INFO

ABSTRACT

Climate change will affect psychological wellbeing. Substantial research has documented harmful impacts on physical health, mental health, and social relations from exposure to extreme weather events that are associated with climate change. Recently, attention has turned to the possible effects of climate change on mental health through emotional responses such as increased anxiety. This paper discusses the nature of climate anxiety and some evidence for its existence, and speculates about ways to address it. Although climate anxiety appears to be a real phenomenon that deserves clinical attention, it is important to distinguish between adaptive and maladaptive levels of anxiety. A focus on individual mental health should not distract attention from the societal response that is necessary to address climate change.

1. Introduction

Climate change is happening. We are already seeing the effects in terms of heatwaves, hurricanes, flooding, wildfire, and drought. Less visible but ultimately even more important, because of their potential to affect more people, are the slower changes in average temperature, sea level, and patterns of precipitation that will characterize our climate in the decades to come. Although climate change has sometimes been conceptualized as a problem primarily affecting polar bears (Born, 2019), it is increasingly apparent that human wellbeing is implicated. Physical health will be threatened by heat, the increased spread of water-borne and vector-borne diseases, and malnutrition in addition to the acute impacts of natural disasters and the socially-mediated impacts of forced migration and conflict (Watts et al., 2019). Some groups are particularly vulnerable due to greater exposure, to lack of political or economic power or to physiological factors: indigenous people, the elderly, children, and in some cases people with pre-existing health problems (Clayton, Manning, & Krygsman, 2017).

The link between mental health and climate change is less obvious. And yet there is substantial evidence for it. Climate change is associated with increased frequency and severity of extreme weather events, and the impacts of discrete events such as natural disasters on mental health has been demonstrated through decades of research showing increased levels of PTSD, depression, anxiety, substance abuse, and even domestic violence following the experience of storms (e.g., Morganstein & Ursano, 2020). Effects tend to be greater for people who have experienced greater harm, and they are moderated by sources of social support and resilience (Clayton et al., 2017; (Manning & Clayton, 2018). Natural disasters also have indirect effects on physical and social

infrastructure, disrupting educational, medical, economic, and transportation systems. This adds to the stress burden of individuals and threatens the mental health of those who are vulnerable.

The more gradual changes associated with a changing climate are likely to increase both migration and conflict. People may want, or be forced, to leave their homes due to a range of factors such as rising sea levels, thawing permafrost, melting glaciers, or desertification, all of which make it impossible or undesirable to remain. But migration can be highly stressful, especially when it involves crossing borders. The journey itself is uncertain and the process of adjusting to a new home is difficult, especially when people are not welcomed by the existing residents. Migration is frequently accompanied by economic challenges. This helps to explain why there is a high level of mental illness among involuntary migrants (Mindlis & Boffetta, 2017). Simply losing one's home, as an important source of support and resilience, can threaten mental health (Tapsell & Tunstall, 2008). Relatedly, competition over scarce environmental resources – such as fertile land, clean and sufficient water, or merely enough space to build a dwelling – can increase social conflict, another threat to mental health (Miller & Rasmussen, 2017).

Slow, gradual environmental changes also have significant effects. Heat, in particular, has been consistently associated with aggression and conflict (Miles-Novelo & Anderson, 2019), and more recently has been found to correlate with increased rates of suicide and of hospitalization for mental illness (Carleton, 2017; Obradovich, Migliorini, Paulus, & Rahwan, 2018). It is difficult to definitively link heat waves to mental health consequences, but decades of research in both lab and field settings can give increased confidence that there is a detrimental causal impact of heat on mental state. More speculatively, there is

growing evidence that poor air quality may have both short and long-term impacts on mental health (Buoli et al., 2018). Climate change is likely to be accompanied by greater levels of air pollution, as the burning of fossil fuels tends to produce pollutants such as particulate matter, ozone, and carbon. Warmer air also tends to retain higher levels of these pollutants. Several systematic reviews have found an association between the level of fine particulate matter (PM 2.5) and cognitive impairment in the elderly, or behavioral problems (related to impulsivity and attention problems) in children (Yorifuji, Kashima, Higa Diez, Kado, & Sanada, 2016; Younan et al., 2018; Zhao, Markevych, Romanos, Nowak, & Heinrich, 2018).

Children may experience the strongest effects. Children are already more vulnerable to effects of the direct experience of climate change. On average they have stronger responses to extreme weather events, such as PTSD, depression, sleep disorders, etc., partly due to their greater dependence on adult family members and social support networks that might be disrupted by the event (Bartlett, 2008). They are also more vulnerable to heat due to their bodies' incompletely developed ability to thermoregulate (Zivin & Shrader, 2016). Of particular concern is the possibility for long-term and/or permanent effects of early experiences of trauma, which can impair children's ability to regulate their own emotions and can lead to learning or behavioral problems. Early stress can also increase the risk of mental health problems later in life (Burke, Sanson, & van Hoorn, 2018).

2. Climate anxiety

All of this evidence suggests a link between geophysical climate change and detrimental effects on mental health. Recently, however, there is increasing attention to the possibility of a more indirect effect: anxiety associated with perceptions about climate change, even among people who have not personally experienced any direct impacts. Popular media are full of stories about climate anxiety, eco-anxiety, and climate grief, to the extent that Grist magazine called climate anxiety the "biggest pop-culture trend" of 2019 (McGinn, 2019). This anxiety response is important to understand in part because of the range of potential sufferers: anyone who knows about climate change – in other words, given the reach of communications technology, almost everyone – could be affected by climate anxiety regardless of their own personal vulnerability or relative safety.

The reasons for such mental health impacts range from the disruption to place identity and place attachment, for example among people whose homes are transformed or who are forced to leave, to anxiety associated with uncertainty about the future environment, to grief about the loss of valued places and things (Wang, Leviston, Hurlstone, Lawrence, & Walker, 2018), to concern about possible future harm to one's children. As an environmental stressor, climate change has some distinctive attributes: it is a real threat, so it is rational to experience some worry; it is ongoing and developing, so simple adaptation to the change is not completely possible; it is uncertain, so anxiety may be more a more common response than fear; it is globally shared, so the responses of others may be used as an indicator; and it is a major, significant threat. Several authors (e.g., Reser & Bradley, 2017) have used the term "existential" to describe the threat of climate change, reflecting the way in which climate change threatens core understandings and the current social system, if not life itself. This threat to our core understandings can be described as a potential loss of ontological security (Norgaard (2006): a feeling that one's knowledge, and the systems of understanding that one has relied upon, are no longer true (Stoknes, 2015). That feeling of uncertainty and lack of understanding is arguably one of the central aspects of climate change, given that no one can predict the exact impacts in a particular place and time, and scientists who model possible futures have emphasized the possibility of unknown feedback loops or tipping points.

There are many ways of thinking about the emotional response to the perception of environmental degradation. Some of the best-known

work was prompted by Australian philosopher Glenn Albrecht, who coined the term "solastalgia" to describe the chronic distress people experience in response to negative environmental change, particularly when it affects a home environment (Albrecht, 2005). Albrecht (2011) went on to differentiate a range of "psychoterratic" syndromes, that is, constellations of mental health impacts associated with environmental damage and change. Psychoterratic syndromes were described as including not only solastalgia but also ecoanxiety (dread associated with negative environmental information more generally), ecoparalysis (an inability to act on environmental challenges due to a perception that they are intractable; see also Moser, 2007), and econostalgia (a perception that a geographic location was better in the past). Albrecht (2011) described these syndromes as "existential and not biomedical" in origin, reflecting the idea that perceptions of change rather than direct sensory experience are the cause of the emotional response.

Others beside Albrecht have considered the relationship between mental health and thinking about climate change, providing further details or an operational definition. Searle and Gow (2010) measured negative emotions in response to climate change based on existing anxiety or stress scales among an Australian sample. They described a climate change distress scale with two subscales, which they labeled anxiety and hopelessness; their overall scale showed small but significant positive associations with general depression, anxiety, and stress. Doherty and Clayton (Doherty & Clayton, 2011) discussed a range of responses to climate change, including "intense emotions associated with observations of climate change effects worldwide and anxiety and uncertainty about the unprecedented scale of current and future risks" (p. 265). They describe a model of psychological impacts that incorporated mediators, such as direct experience as well as media representations, and moderators such as social vulnerability and access to coping resources.

Anxiety is not the only negative emotion associated with climate change – hopelessness, anger, and grief are also discussed – but it seems to be a particularly significant one in capturing the sense of worry and concern (cf. (Clayton, 2018). As such, it is worth giving some consideration to the nature of anxiety. Anxiety has been tied to sensitivity to negative outcomes and anticipated goal conflict, leading to active risk assessment and the inhibition of potentially conflictual behaviors (i.e., the BIS system; Corr, 2011). It is empirically distinguished from fear, although fear and anxiety often co-occur. According to Corr, it incorporates both automatic, nonconscious responses as well as higher-order, controlled reflection. Anxiety becomes maladaptive when the sensitivity to potential problems – differences between what is expected and what is encountered – is too great, triggering an emotional response and rumination that inhibit resolution of the anxiety.

3. Evidence for climate anxiety

Albrecht's greatest contribution was arguably drawing attention to the possibility for the perception of environmental change to have negative impacts on mental health. A growing body of empirical evidence attests to these impacts. For example of a specific environmental change, Higginbotham, Connor, Albrecht, Freeman, and Agho (2006) utilized an environmental distress scale (EDS) and found that the environmental damage associated with mining in the Hunter Valley in Australia was associated with mental distress among local residents, with greater environmental distress reported among residents of a highly affected area compared to a similar area unaffected by mining. It is not coincidental that much of the research has been done in Australia, where climate change has already had very visible impacts; it has been associated with significant levels of drought in the 21st century, cited as threatening the Great Barrier Reef, and recently and most visibly blamed for devastating wildfires (Yeung, 2020) that threatened communities and killed enormous numbers of iconic animals.

Australian psychologist Joe Reser and colleagues (e.g., Reser, Bradley, Glendon, Ellul, & Callaghan, 2012) undertook to characterize

the Australian response to climate change through surveys of large national samples of Australians. One of their findings was that climate change was the modal response to the open-ended question "What do you think will be the most serious problem facing the world in the future if nothing is done to stop it?", with a full 39 % of responses falling into the "climate change/environment" category. The researchers assessed not only the emotional responses of "experienced apprehension, anxiety, sorrow, or loss due to the threat and projected consequences of climate change" (p. 56), which they defined as psychological distress, but also objective knowledge and personal experience of climate change, as well as behavioral engagement and adaptation. They describe distress as "integral to the subjective experience and impacts of climate change" (Bradley, Reser, Glendon, & Ellul, 2014, p. 39). Reser et al. (2012) found that 86 % of their sample reported some concern, and 20 % reported feeling "appreciable distress" associated with climate change.

Other research is showing that climate change is a source of worry around the world. Between twenty and forty percent of Europeans, varying across countries, described themselves as "very worried" in 2016 (Steentjes et al., 2017). In a nationally representative 2018 survey (Minor et al., 2019), 38 % of Greenlanders reported that they felt fear "moderately" or very strongly"; 19 % reported moderate or strong sadness, and 18 % reported moderate or strong hopelessness. In Tuvalu, a country at significant risk from climate change, 95 % reported distress from climate change; it was described as impairing normal functionality in 87 % of cases (Gibson, Barnett, Haslam, & Kaplan, 2020).

The Yale Program on Climate Change Communication, which has documented emotional responses to climate change over the years, found in 2018 that 69 % of Americans are at least

"somewhat worried" about global warming and 29 % said they were "very worried." Almost half (49 %) think they are personally going to be harmed by it (Leiserowitz et al., 2018). In the American Psychological Association's 2018 "Stress in America" survey, 51 % of respondents listed climate change as "a somewhat or significant source of stress" (American Psychological Association, 2018). A more recent survey the American Psychological Association (American Psychological Association, 2020) found that about two-thirds of respondents felt as least a little "eco-anxiety" (defined as anxiety or worry they felt about climate change and its effects), and about one-quarter of them said they felt a lot of eco-anxiety.

4. Climate anxiety as a threat to mental health

Is climate anxiety pathological? Anxiety itself does not indicate a problem with mental health. In fact, anxiety can serve an adaptive function, as a future-oriented stance that can signal the approach of a threat and motivate people to prepare appropriately (Barlow, Durand, & Hofmann, 2019). It is important to avoid pathologizing the emotional response to climate change. A focus on mental health can imply that the emotional response is inappropriate, as well as directing attention toward individuals and away from the social causes and possible social responses to climate change. Anxiety can become clinically significant, however, when it is difficult to control and begins to interfere with a person's ability to sleep, work, or socialize. It may also become chronic and detached from a specific cause, as in Generalized Anxiety Disorder (Borkovec, Alcaine, & Behar, 2004). Doherty (2015) discussed the difference between "habitual ecological worrying" and "environmental anxiety," with the latter representing an excessive and "potentially disabling" response to a risk.

It is important to acknowledge that emotional responses to climate change that are not based on direct experience are mediated by the social context. The assessment of risk is somewhat subjective and the question of how much worry is appropriate or excessive in response to climate change will be affected by social interpretations. The cultural context also has the potential to contribute to the occurrence of climate-related anxiety, through the amount and framing of information about

climate change that is conveyed, e.g., through popular media (Pikhala, 2019). Media representations are likely to play a large part in determining people's perceptions of the risk, as are the behaviors and expressed attitudes of one's social context (Norgaard, 2006). To some extent, climate change is a culturally constructed threat; both perceptions and responses are likely to vary across cultures.

For some people, the negative emotions relating to climate change are likely to be intense enough to contribute to mental illness. Australian farmers experiencing local changes from a disrupted climate report an in increased self-perceived risk of depression and suicide (Ellis & Albrecht, 2017). In a United States sample, perceived ecological stress, defined as personal stress associated with environmental problems, predicted depressive symptoms (Helm, Pollitt, Barnett, Curran, & Craig, 2018). Among Inuit people in Canada, climate change was linked to reported increases in substance abuse and suicidal ideation (Cunsolo Willox, Harper, Edge et al., 2013; Cunsolo Willox, Harper, Ford et al., 2013).

In recent work (Clayton & Karazsia, 2020), we have developed and validated a scale to measure climate change anxiety. In order to evaluate whether or not it represented a threat to mental health, we adapted items from existing scales assessing some clinically-relevant symptoms such as rumination, as well as generating new items. Results showed an internally reliable measure of climate anxiety with two correlated subscales, one assessing cognitive-emotional impairment and one assessing functional impairment. Cognitive-emotional impairment was represented by items such as "Thinking about climate change makes it difficult for me to sleep" or "I find myself crying because of climate change." Functional impairment was assessed with items such as "My concerns about climate change make it hard for me to have fun with my family or friends" and "My concerns about climate change undermine my ability to work to my potential." Both subscales were associated with negative emotional responses to climate change (in two studies: r's = .52, .62, cognitive impairment; r's = .45, .50, functional impairment) and with a general anxiety and depression scale (r's = .54, .60, cognitive impairment; r's = .47, .56, functional impairment).

Although we do not yet have data assessing national prevalence, results from our studies using online participants indicate that a small, but not inconsequential, proportion of the public (17–27 %) reported a degree of climate anxiety that was having some impact on their ability to function. In general, younger age groups reported higher scores than older adults. However, we only assessed adults. Reported experience of climate change impacts was, unsurprisingly, also associated with both climate anxiety subscales (Clayton & Karazsia, 2020).

It is important to be aware of the existence of climate anxiety, in order to provide help and coping resources to those who are experiencing it. One of the questions that has permeated the research has been whether climate anxiety is or is not correlated with more general measures of anxiety (as found by Clayton & Karazsia, 2020). Research results to date have been inconsistent, possibly due to variance in the way in which climate anxiety has been conceptualized and measured. More research into this topioc is needed.

5. Who experiences climate anxiety?

Climate anxiety is not evenly distributed; not surprisingly, it is more common among those who care more about environmental issues (Clayton & Karazsia, 2020; Searle & Gow, 2010) or who have experienced some impacts of climate change (Reser et al., 2012). Susceptibility to climate anxiety will also vary according to personality. Research shows that the personality trait of neuroticism is associated with vulnerability to psychiatric disorders, suggesting that there are stable brain mechanisms underlying the tendency to experience different negative emotions such as fear and anxiety (Gray & McNaughton, 2000).

In addition, climate anxiety appears to be particularly prevalent among younger adults (APA) (American Psychological Association, 2018; Clayton & Karazsia, 2020; Searle & Gow, 2010). A national poll in

the U.S in the summer of 2019 found that 57 % of teens said that climate change makes them feel afraid (Kaplan & Guskin, 2019). Surveys around the world indicate that most older children know something about climate change, and are more interested and concerned than adults (Corner et al., 2015), with some of them reporting that it is a source of worry or stress. Ojala (2012), who has studied children's responses to climate change, discusses developmental differences that may affect their response: in particular, they have less control over their own behavior. It is also possible that older adolescents and young adults, compared to older adults, are thinking more about plans for the future. Alternatively, they may have more time to think about broader societal issues, while adults are focusing on day-to-day obligations.

There is not yet research allowing for much comparison across groups, but it seems likely that climate anxiety may be or may become more prevalent among indigenous groups. Indigenous communities are often more vulnerable to the effects of climate change, because they live in areas that are more vulnerable, such as coastal areas that are subject to erosion; low-lying islands; mountainous areas dependent on glaciers; or arctic areas affected by melting permafrost. In addition, indigenous cultures often emphasize greater interdependence with, and respect for, the natural world, so that changes to the natural environment mandate changes in traditional practices. Cunsolo Willox (Cunsolo Willox, Harper, Edge et al., 2013; Cunsolo Willox, Harper, Ford et al., 2013) has studied the impacts of climate change on mental health among Inuit communities. She describes several reasons for impacts on mental health, among which are actual displacement, due to changes in the land; changes in familiar places and the loss of place-based solace (cf. the earlier discussion of solastalgia); stress due to impacts on finances or nutrition; and changes in cultural identity due to the inability to engage in traditional land-centered activities and the way in which traditional ecological knowledge becomes outdated or irrelevant. Her research participants report a personal connection between the land and mental health, and describe perceived increases in substance abuse and suicidal ideation in their communities.

6. Climate anxiety and behavior

In addition to the association between anxiety and mental health, It is also important to understand the possible relation to behavior. One might speculate that climate anxiety could serve as a source of motivation to encourage behavioral engagement with the issue of climate change. Alternatively, climate anxiety could serve as a source of (to use Albrecht's, 2011 term) eco-paralysis: inhibiting people from taking effective action. Some data exist that help to address this question. In Reser et al.'s (2012) research, distress about climate change was a strong predictor of adaptation as well as behavioral engagement, suggesting that it did serve a useful function in prompting an adaptive behavioral response. In the 2019 APA survey (American Psychological Association, 2020), people who reported "eco-anxiety" were more than twice as likely (87 %) as those who did not (40 %) to say that they are motivated to change their behavior in order to reduce their contribution to climate change. Clayton and Karazsia (2020), using perhaps a more stringent definition of "anxiety," found that climate anxiety was neither positively nor negatively correlated with behavior – in fact, the correlation was very close to zero. We suspect that this reflects a state of tension between the motivating and paralyzing effects.

It may be that there are subgroups for whom there would be a positive relationship and others for whom the relationship is negative. This is a question for further research, and may benefit from attention to self-efficacy. Higginbotham, Connor, & Baker (2014) described a model in which responses to climate change begin with experiences, which can be both direct and indirect; these experiences lead to threat and coping appraisals as well as an emotional response, which in turn can lead to problem-solving, self-protection, and emotional expression. The connection from perceived threat, to climate action will be based in part on assessments of one's own ability to cope with the threat, which

could be described as self-efficacy (or more specifically, climate self-efficacy). Research has shown that self-efficacy is an important predictor of behavior (Bandura, 1977).

Climate anxiety could have other impacts beside its effect on climate activism and sustainable behavior. In a largely still anecdotal illustration of the impact of climate anxiety, some people are questioning the choice to have children, based on their concerns about climate change. A nationally representative 2018 survey for the New York Times found that about 25 % of 1800 Americans said they expected to have fewer children than they considered ideal; of these, 33 % cited worry about climate change. A 2019 poll reported by Business Insider found almost 30 % of Americans at least somewhat agreed that couples should consider the impacts of climate change when deciding whether or not to have children (Relman & Hickey, 2019). According to an essay in Sierra magazine, one therapist who focuses on counseling women who are deciding whether or not to have children has reported an uptick since about 2014 in women who report climate anxiety as part of the context for their ambivalence (O'Reilly, 2019). The UK-based BirthStrike movement has provided a public platform for people to discuss their climate-change-fueled reluctance to procreate.

7. Responding to climate anxiety

Among the important remaining research questions is an examination of what is to be done about climate anxiety. Two potential goals can be identified: individual wellbeing, and engagement in efforts to mitigate climate change in an attempt to promote societal wellbeing.

At the level of individual wellbeing, coping with the threat of climate change implies a focus on how effectively people manage their own emotional responses, but the idea of coping can include behavioral as well as cognitive and emotional strategies. The extent to which people engage in responses of behavioral engagement or emotional management – what could be loosely described as problem-focused or emotion-focused coping – is dependent on an appraisal of the ability to effectively cope with a stressor 4(Higginbotham, Connor, and Baker, 2014). Generally (and perhaps ironically), problem-focused coping tends to be associated with greater wellbeing in the long run, because emotion-focused coping does not address the underlying problem. However, when problems are not amenable to solution, problem-focused coping could lead to greater distress. In general, when it comes to climate change it is unlikely that any one individual's coping response can completely diffuse the threat of climate change.

Emotion-focused coping strategies rely on techniques such as cognitive reframing to de-emphasize the threat, or outright denial. Cognitive behavioral therapy to deal with anxiety may incorporate this type of strategy in order to encourage the individual to reduce their assessment of threat (Carpenter et al., 2018). This may help reduce anxiety in the short term, but to the extent that the problem of climate change remains, it is unlikely to be effective over the long term. In addition, it does nothing to promote societal wellbeing. However, problem-focused coping might focus on re-evaluating one's ability to make individual behavioral responses, or on working to promote societal changes.

Ojala (2012), (2015) studied responses to climate change among children and adolescents in order to identify their commonly used strategies for coping, as well as the effectiveness of different strategies. She found that children who used problem-focused coping to respond to climate change – that is, informed themselves about the problem or talked to others about it – showed higher levels of behavioral engagement and efficacy, but were also higher in general negative affect. Those who used emotion-focused coping were low in behavioral engagement and efficacy, but were still high in negative affect. However, Ojala identified a third strategy in addition to emotion-focused and problem-focused coping. Some children showed a positive reappraisal/ cognitive restructuring response, in which they tried to gain perspective on environmental problems by putting the problems into historical

perspective, and/or attempted to find hope by trusting societal actors such as scientists to find solutions. Ojala characterized both of these responses as meaning-focused coping.

Meaning-focused coping involves strategies to draw on one's beliefs, values, and goals to elicit positive feelings associated with a stressor, which do not eliminate the negative emotions but buffer the detrimental effect of those emotions on wellbeing. These strategies may eliminate or at least mitigate the anxious response to climate change. Put simply, both meaning-focused and emotion-focused strategies can involve hope, but in the first case hope is based on optimism and in the second case it is based on denial. In Ojala's (2012) research, the use of meaning-focused coping was linked to higher environmental engagement and efficacy, as well as to life satisfaction and positive affect, and accompanied by lower levels of negative affect. Thus meaning-focused coping may serve to facilitate individual wellbeing while still allowing for engagement in attempts to address the problem.

Research into therapeutic interventions that promote individual wellbeing is at a fairly early stage. Among those who are already experiencing climate anxiety, validating people's emotional responses, within reason, may help them to feel understood. One of the characteristics of the way in which climate change is currently encountered is the degree of social polarization, which may discourage people from discussing their feelings about it for fear of encountering disapproval or prompting an argument (Geiger & Swim, 2016). The backlash in social media against BirthStrikers illustrated this polarization (Rodrigo, 2019). This self-silencing may inhibit people from expressing their feelings and lead them to feel isolated from the rest of society, weakening the social connections that are a powerful source of resilience.

Because people who are experiencing climate anxiety are likely to be people who have strong connections to the natural environment, tapping into the restorative potential of experiences in nature may be an important therapeutic response (Martin et al., 2020). There is already a strong tradition of utilizing the natural world as part of therapy, such as through wilderness therapy or horticultural therapy (Russell, 2012). Doherty (2016) discusses a more general ecotherapeutic approach, which he defines as "psychotherapeutic activities undertaken with an ecological consciousness or intent" (p. 14). In other words, it is focused on coupled human and natural systems and often utilizes natural settings or processes as a part of the therapeutic process. So, it is most associated with activities in natural settings and taking therapy "outdoors", which may provide restorative experience, but may also involve asking people to be mindful of place and of the natural systems they exist within, for example by encouraging attention to patterns in nature and respect for other species. Both of these activities can serve to increase a sense of connection to nature, which has been associated with greater subjective wellbeing among both adults (Martin et al., 2020) and children (Barrera-Hernández, Sotelo-Castillo, Echeverría-Castro, & Tapia-Fonllem, 2020). Interestingly, the Inuit community studied by Cunsolo Willox et al. (Cunsolo Willox, Harper, Ford et al., 2013) also report that spending more time on the land would increase their mental health. Going out on the land was seen not only as restorative in itself, but as a way of participating in traditional culture, which itself was a source of resilience (Cunsolo Willox, Harper, Edge et al., 2013). Doherty also notes that ecotherapy tends to have a political aspect; the goal of such therapy is not exclusively human wellbeing but healing the division between humans and nature, and as such may include social or environmental activism.

Efforts to mitigate climate change are directed at societal wellbeing, but active engagement in addressing climate change may itself have positive effects on the mental health of those who are involved. Indeed, involvement in climate change activism could be described as a form not just of coping but of adaptation – adjusting to a new way of life. Doherty (2015) has emphasized the importance of empowerment; encouraging people who are experiencing climate anxiety to engage in conservation actions can promote perceived efficacy and competence, leading to an "adaptation-mitigation cascade" (p. 208) whereby

working to mitigate climate change facilitates adaptation to the threat. Reser et al. (2012) suggest that engagement in climate activism, by those who have not been directly affected, could be considered a form of proactive or anticipatory coping. Several studies show positive correlations between happiness and environmental action (Corral-Verdugo, Mireles-Acosta, Tapia-Fonllem, & Fraijo-Sing, 2011; Howell & Passmore, 2013), and even those who perceive the threat from climate change as severe show reduced distress and depressive symptoms when they are involved in behavior to mitigate the problem (Bradley et al., 2014). In addition to increasing efficacy, engagement in mitigation can entail social engagement and promote social ties that are a source of positive emotions as well as resilience (e.g., Bamberg et al., 2018). Another benefit may be an enhanced sense of meaning, so that this becomes equivalent to the meaning-focused coping that was apparent among the children studied by Ojala (2012) (Clayton, 2018). However, engagement and activism may not be effective for those who are severely distressed by climate anxiety and engage in excessive rumination about their worry and negative emotions. This strongly affected group may need to be helped to gain some distance from the topic, for example by reducing their attention to media coverage, focusing on more immediate issues, and finding alternative sources of activity and meaning. Anxiety can take different forms, and appropriate interventions will need to be attentive to these distinctions (Corr, 2011).

8. Conclusion

Climate change is not just an environmental, but also a psychological problem. Although psychologists have been involved in addressing implications of climate change for decades, most of that work has focused on risk perception, ways to communicate about climate change, attitudes about climate change, and interventions to promote mitigation through more sustainable behavior. There has been relatively little acknowledgement of the mental health implications of climate change, although the last decade has brought increasing attention to the issue. Based on the growing evidence, it is time to think seriously about the ways in which climate change can impair mental health. As a mental health profession, psychology and psychologists should have climate change on their radar. That might mean awareness and education about the issue should be part of clinical training. It might mean a focus on developing best practices for helping people who are experiencing what could be defined as climate anxiety.

Climate change is also a social problem. The anxiety that characterizes some people's response to climate change is structured in part by the way in which society is addressing, or not addressing, the problem. Interventions to protect individual mental health are unlikely to be fully effective in the absence of societal, or even global, attention to the issue. As with other social issues that affect mental health, such as sexism, racism, and poverty, we must find a way to respond to individual problems without losing sight of the social consequences – to talk about climate anxiety as a psychological experience without implying that the causes, and appropriate responses, are intrapsychic.

Finally, climate change is a *real* problem. Societal adaptation cannot be accomplished by individual coping responses, but societal adaptation will have to incorporate individual adaptation. If people do not find effective ways to mitigate or cope with emotional responses to the changing climate, there is the potential for societal functioning to be threatened by rising levels of climate-related anxiety. International planning for adaptation, mitigation, and resilience will need to recognize the importance of providing resources that enable individuals to come to terms with this new reality.

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