Perspectives

Eco-emotions and Psychoterratic Syndromes: Reshaping Mental Health Assessment Under Climate Change

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Human activities like greenhouse gas emissions, pollution, and deforestation are largely responsible for climate change and biodiversity loss. The climate is a complex system and scientists are striving to predict, prevent, and address the aforementioned issues in order to avoid reaching tipping points. The threat to humankind is not only physical (ie, heat waves, floods, droughts) but also psychological, especially for some groups. Insecurity, danger, chaos, and an unstable system due to climate change have both short- and long-term psychological effects. In this scenario, the need for new psychological categories is emerging, namely, eco-emotions and psychoterratic syndromes which include eco-anxiety, ecological grief, climate worry, and climate trauma. This paper focuses on these new categories, presenting a summary of each one, including definitions, hypotheses, questions, and testological evaluations, as a useful tool to be consulted by researchers and clinicians and to help them in the therapeutic work. Also, this paper endeavors to distinguish between a psychological stress resulting in a positive outcome, such as pro-environmental behavior, compared to a stress that leads to a psychopathology. Prevention and intervention strategies including social and community support are fundamental to help cope with and mitigate the effect of climate change on mental health. In conclusion, the climate crisis has led to an enormous increase in research on climate change and its consequences on mental health. Researchers and clinicians must be prepared to assess this complex phenomenon and provide help to those who cannot cope with anxiety and climatic mourning.

INTRODUCTION

Climate Change

Our planet has been affected many times by climate change, which has significantly impacted humanity from its origin and played an important role in the evolution of our species, leading to biodiversity losses, collapses of societies and reshaping of cultures [1]. Although some natural variations in the Earth's climate are due to factors that are independent of human activity (ie, solar irradi-

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ance, orbital variations, autonomous activity of the planet such as volcanic eruptions), changes in climate in the last decades have been attributed to human activity above all, ie, the alteration of the atmospheric composition through the use of fossil fuels, pollution, and deforestation that led to greenhouse effect and, consequently, to global warming. Scientists are monitoring several phenomena related to climate change, nevertheless, predictions are impervious because our climate is a complex system characterized by chaotic fluctuations [2] as well as being entangled in biophysical and socio-political systems. The change is deemed to be gradual with sporadic extreme climate events (eg, floods, drought, heat waves, and storms) until a critical threshold is reached; thus, compromising the state of the system. This process is known as a "tipping point" and is seen in deforestation, arctic ice retreating, and loss of biodiversity. When different tipping points are activated, they can overcome the actual climate equilibrium causing a global change, ie, a "regime shift" [3-5].

The consequences and damages are not always clear at the very beginning as the exact cause-effect chain is not known. Although not all effects are equally significant to human adaption, they are considered to be an existential risk to humankind, threatening means of support and human capital (eg, loss of resources, agricultural crisis, epidemics). Humans are facing a global ecological crisis in which their demands are exceeding the regenerative capacity of the biosphere [6] and this will inevitably impose alterations to our lifestyles. In fact, according to the IPCC (Intergovernmental Panel on Climate Change), 50 to 75% of the global population could be exposed to life-threatening climatic conditions by the end of the century [7] not only in the form of extreme weather events, but also of more slow and hidden changes, which are considered to be more dangerous (eg, warmer ocean and atmosphere, rising sea levels, ocean acidification, ecosystem changes, alterations in land and fresh-water, and biodiversity loss).

Impact on Mental Health

In a guaranteed and quite stable climate system, living organisms may be biologically more sensitive to atmospheric events or perturbations on mind and body ("meteorosensitivity"), such as temperature, humidity, rain, barometric pressure, brightness, rate of air flow, air ionization, thunderstorms, and sudden shifts of some of these factors, with symptoms below the pathological threshold. Sometimes, individuals may react to weather changes showing psychopathological phenomena ("meteoropathy") and developing a specific illness, such as seasonal affective disorder, or experiencing psychophysical symptoms (eg, irritability, mental and physical weakness, hypertension, headache, hyperalgesia, and pain and autonomic symptoms) or the worsening of an existing

disease [8,9].

By contrast, in the context of climate change, the whole system becomes unstable. Climate change can affect mental health, both directly and indirectly, with consequences in the short- and long-term. More specifically, the direct effects of climate change may occur rapidly, usually from extreme weather events and natural disasters (heat waves, floods, droughts, tornadoes, hurricanes, storms, and wildfires), as well as slowly and not immediately life-threatening (eg, changing temperature and rising sea levels). When it comes to the indirect effects of climate change, these can be caused by several elements. First, by poor physical health which is associated with mental wellbeing; second, by environmental risk factors such as smoke, dust, pollen density, plant disease, infestations, water scarcity and disease, food reduction, living in urban slums, and loss of sense of place; finally, through their impact on human activities and change to the social environment via adaptation and mitigation (eg, travel by alternative means, availability of air conditioning). Furthermore, psychological symptoms may also arise from a "disconnection" from the natural world [10]. It is interesting to note that the effects of climate change are described in different ways across the literature and many of which could be perceived as indirect due to the fact that the impact of climate change on mental health is not the result of a single event. Therefore, a clear distinction between direct and indirect impacts is often impossible to be drawn in practice [11].

Mental health effects range from minimal distress to clinical disorders, such as acute stress disorder and post-traumatic stress disorder (PTSD), depression and anxiety (eventually chronic), psychosomatic disorders, substance abuse, increased self-harm and increased suicide rates, as shown by several studies in the recent years [3,12]. Moreover, environmental factors can induce congenital neural defects and impair normal neurodevelopment, while gene-environment interactions and epigenetic changes play a role in triggering endogenous mental diseases and evoking psychosomatic and soma-to-neurologic (somatopsychic) disorders [13].

The effects of climate change on mental health can be difficult to detect immediately, they can be delayed and may persist over several years. In addition, they do not tend to be uniform and may differ based on the type of climate event to which one is exposed. What seems relevant is not only the change itself, whether in the climate or in the environment, but the difference between the "before" and the "after" state, the speed of the disruption, and the time needed to reach a new stable state [3].

In this scenario, the so-called "recurrent acute disasters" (RADs) [14] are a concerning circumstance. They are sequential natural disasters in the same specific area, and they create conditions that alter the effects of

subsequent disasters (eg, fires in the US, floods in Europe). Each new disaster can reshape the psychological experience of past and future ones being a repeated and often similar disturbance, thus, causing symptoms more quickly and more severely on the subsequent exposure [15,16]; therefore, resulting in a repeated trauma, especially if there has not been enough time between events to recover or to prepare to face a new disaster, with effects also on a community and social level (inevitability, resignation, loss of trust) [17,18]. This kind of trauma is usually endured by the populations living in those areas most frequently exposed to extreme climate events, nevertheless, it can also affect those who did not have direct experiences of natural disasters but are particularly sensitive to climate change and hence tend to be influenced by the news and the worsening trends. Such ongoing distress can lead individuals who have been repeatedly exposed to become afraid of further events and to feel doomed to their inevitability, while it can lead those who are sensitive to climate change to become increasingly fragile because of the worsening news they are exposed to.

We are witnessing a "climate chaos," a phase of instability and transformation, which is leading humans into a psychological condition of "systemic insecurity" and a shared feeling of uncertainty [19]. Indeed, difficult emotions arise not only from experiencing the ecological loss itself, but also from living with the awareness of the global scale and complexity of climate change and the harmful social system that contribute to the problem, thus containing ethical dilemmas and deep social criticism of modern society [20,21]. In its essence, climate crisis questions the relationship of humans with nature and the meaning of being human in the Anthropocene [22]. It is believed that global warming starts in the late 20th century, possibly around 1980, becoming unquestionable after the year 2000, but there is little consensus on when does Anthropocene precisely begin: it is the current geological age in which human activity has been the dominant influence on the environment, now showing the signs that humans brought environment to the brink of collapse and must prepare to face serious transformations. This new phase is accompanied by the emerging of new syndromes, which are typical of postmodern societies: Postmodernity (which starts between 1970 and 1980 and coincide with neoliberal hegemony) could turn out to be the apex of Anthropocene.

From a clinical point of view, it is expected that the ongoing pressure of climate change will likely lead to new forms of mental distress despite the lack of a univocal consensus. Given the novelty of the matter, varied working hypothesis and recently coined terms have been proposed. Nevertheless, clinicians are not yet prepared to handle such a potential mental health crisis. Therefore, the aim of the paper is to present these new categories with a critical approach as a tool to orient clinicians and researchers and to engage them in a constructive debate on definitions, hypotheses, questions, and psychotherapy.

First of all, the paper will focus on the recently coined terms exploring the development of new forms of psychopathological conditions and providing an extensive table including definitions and different perspectives. Then, it will introduce vulnerable groups with three illustrative examples and an overview of the validated psychometric instruments. Finally, critical approaches to psychotherapy in the context of climate change are presented.

TOPICS

Eco-emotions and Psychoterratic Syndromes

Recently, researchers have coined terms such as *climate emotions* to address the emotional experience of global climate change, sometimes used interchangeably with *ecological emotions*, that refers also to the emotional impact of environmental degradation of other origins, or more generally speaking, *eco-emotions*. They often include phenomena which are not exactly "emotions" (ie, strong feelings) but rather mental states (ie, global and relatively constant mental conditions, which include more than emotions, such as thoughts and behaviors) and mental health syndromes (ie, conditions characterized by a group of symptoms) [23], making classifications a bit confusing and not always easy to compare.

Furthermore, the number of words beginning with the prefix "eco" has increased over the years, and we are witnessing the use of various terms for similar phenomena and with different supporting evidence, since there is not yet a common interdisciplinary field of studies on the subject [24,25]. An intriguing conceptualization was first made by Albrecht: in contrast to "*somaterratic syndromes*" (soma = body, terratic = Earth-related) that threaten physical wellbeing mainly by living in ecosystems that have been contaminated by pollutants and toxins, he created the category of "*psychoterratic syndromes*," defined as an Earth-related mental syndromes where people's mental wellbeing (psyche) is threatened by the severing of healthy links between themselves and their home/territory [26,27]. In this latter category, Albrecht included some of the numerous eco-emotions that have been conceived.

In Table 1 we summarized names and definitions of the most widespread and relevant terms in the psychological and psychiatric field, knowing that there are more of them [23,28] and that others may emerge in the next future. The search on PubMed/MEDLINE database was conducted starting from the combination of the following keywords: "climate change," "mental health," "psychiatry," "psychology," "eco-emotion," "psychoterratic syndrome." The resulting titles and abstracts were

Table 1. List of Mental States Related to Climate Change

Term	Explanation
Environmental Stress	Health impacts and psychological distress from various environmental conditions, such as noise, crowding, poor housing quality, poor neighborhood quality, traffic congestion [68], not necessarily related to climate change (even if it can be affected by it).
Climate Change Distress or **Eco-distress**	A term preferred by some authors because people usually describe a whole range of painful feelings and difficult emotions (not only anxiety), and because it doesn't have the overtones of a diagnosis since those emotions can be considered largely appropriate reactions and related to pro-environmental beliefs and behaviors [69-73].
Eco-guilt and **Eco-shame**	Guilt and shame are emotions that can be considered "backward looking" in the sense that they tend to be concerned with things that have already happened [74] and they can be individual or collective. In a broader definition, guilt is felt over one's actions, shame is felt over who one is, but they are terms that often overlap or converge, because what one does reflects who one is. Nevertheless, it is useful to address them as distinct emotions related to environmental behavior/behavioral intentions [75]: they are moral emotions that are common among environmentally friendly segments of the population often in the form of action-oriented guilt and identity-oriented shame about participation in environmental degradation [76]. Eco-guilt: arises when people think about their potentially harmful behavior to the environment and their failure to protect it, because they realize they have violated personal or social standard of behavior [75]. It's characterized by prophetic individual responsibility, self-criticism, self-examination, self-blame, and dissatisfaction with one's actions [77], and can manifest as anxiety. It helps to learn from past mistakes and avoid similar actions in the future, motivating an eco-friendly behavior [75]. Eco-shame: arises when people conclude that their harmful action is not a temporary slip but a sign of a flawed character. It can promote withdrawal from the transgression in the form of denial or avoidance rather than eco-friendly behavior [75], accompanied by the fear of rejection or ostracism by the group due to the emerging of a shaming culture (eg, in tourism) [78].
Climate Change Worry	A cognitive process involving thoughts on the increases in severity of climate crisis colored by negative affect, associated with tension, nervousness, irritability, difficulties in remaining calm. It is a component of anxiety and may be related to fear of climate events experienced in the past or anticipate for the future [79].
Eco-anxiety or **Ecoanxiety**	It refers to anxiety related to the ecological crisis, and frequently used to refer to anxiety related to climate change in general, that is a reaction to the changing state of the planetary ecosystem, a "chronic fear of environmental doom" [26,80], as the differences become blurred because climate change has an effect on many ecological problems [36]. It emerges directly from an experienced environmental problem (sometimes traumatic), but often indirectly from the simple awareness of the problem (eg, through the media), because it is principally a "forward looking" emotion concerned with upcoming threats about which there is uncertainty, unpredictability, uncontrollability, and that is taking away the future [25,74]. It is characterized by frustration, powerlessness, feeling overwhelmed, hopelessness, helplessness [74,77], and it may show a combination of clinically relevant symptoms, such as worry, rumination, irritability, sleep disturbance, loss of appetite, panic attacks, physical symptoms of anxiety [81,82]. It may lead to different forms of disavowal and denial, that in turn breeds more anxiety, that many people try to deal with by more denial and increasing emotional pressure, causing a vicious circle [25]. Previous or existing mental health issues and anxiety sensitivity may contribute to its probability and severity [36]. However, it is experienced by numerous people who do not suffer from existing mental health issues [36] and it may not have a clinically significant negative effect on mental health or impaired functioning [46]. Instead, it could be a pro-active emotion that alerts to the environmental challenges, prompts cognitive engagement, and lead to pro-environmental behavior [74,83]. It has been suggested to conceptualize it as a form of "practical anxiety," ie, the anxiety experienced when there is uncertainty about what the right thing to do is, leading to problem-solving attitudes [36,74], engaging in climate actions and environmental activism (eventually buffering the mental health consequences of anxiety and transforming their feelings into optimism and determination) [46,84], and having also a transformative role in society: the people who experience climate anxiety can be seen as signalers who alert the others that a critical level has been reached and urgent actions are needed [6]. This may depend upon the severity of climate anxiety, since highest level anxiety causes more distress and impairment with an impact on the ability to function, and therefore is no longer adaptive [85].

Climate Anxiety or **Climate Change Anxiety** or **Climate Change-related Anxiety**	Anxiety related specifically to climate change [36]. It often summarizes a negative emotional response to the impact of climate change, mainly characterized by an increase in anxiety (in the sense of a future-oriented concern) but sometimes including a constellation of emotions [81,86,87] referring to the perception of the existential risk and the potential loss of ontological security related to anthropogenic climate change [36]. It should not be considered primarily a disease or a presumable psychological impairment [87], because it is an understandable and appropriate reaction to the threat posed by climate change and it can be a potential resource as well [81,86,88]. It should be considered along a continuum, with only the higher levels of anxiety having the potential to increase the mental health burden [86], showing symptoms from mild (eg, occasional insomnia, restlessness, temporary paralysis when making decisions) to severe (eg, serious insomnia, difficulty maintaining functioning, self-destructive behaviors), and sometimes results in a clinically definable anxiety (Climate Anxiety Disorder) [88]. Moreover, it is often combined in people's lives with other anxieties [88]. Often used interchangeably with eco-anxiety (see above) or considered a subset of it [82,87,88].
Eco-Fear	The fear in relation to climate change and to environmental issues, which has to be considered completely appropriate and useful, because it is a natural and even healthy response to a frightening situation, a signal that something must be done and action must be taken, alerting from future threats especially when mediated by hope [63,89]. Sometimes this fear is disturbing and paralyzing, and the line between fear and anxiety become blurred, but some authors warn not to exclusively assume that there is a dysfunctional mental health problem or that a person suffering from eco-anxiety is somehow ill [63].
Eco-phobia	Sometimes used to refer to heightened concern and fear of looming environmental problems. But this term has also been used to refer to fear and loathing of the environment, an irrational and groundless hatred of the natural world, what allows humans to do bad things to the natural world, the cause of environmental despoliation [90].
Eco-paralysis	An apparent state of apathy as a result of eco-anxiety, which inhibits taking real actions, maintaining people in a state of limbo. It is not a lack of concern, on the contrary it reflects the dilemma of facing the enormous scale of the climatic and ecological challenges but being unable to do something meaningful to solve it, resulting in what appears as complacency and disengagement [26,85,91].
Climate Burnout or **Eco-burnout**	Overstimulation and constant exposure to disturbing information about climate change can lead to the feeling of being overwhelmed and anxious. This is often worsened by technology and social media due to the access to information potentially on a constant basis [36,84,92]. Symptoms of burnout are arising in more and more environmental activists and scientific researchers as their efforts to change the situation are ignored and rebuffed [63].
Ecological Trauma or **Environmental Trauma** or **Climate Trauma** or **Climate-related Trauma** or **Eco-trauma** and **Eco-PTSD** and **Climate-related Pre-traumatic Stress Disorder** (**Pre-TSS**)	Experiencing extreme weather events and natural disasters associated to climate change can lead to traumatic reactions, similarly to the known Acute Stress Disorder and PTSD [3,12], with a state of hypervigilance, over-arousal, and extreme sensitivity to anything that reminds of that event. But climate change is a trauma that is ongoing and accelerating [63]. That's why some authors are referring to the climate crisis itself as a new and superordinate form of trauma that pervades the circumstances of our life, the greatest trauma on the grandest scale, an ever-present-existential threat, and not merely a crisis that can induce trauma under certain circumstances as episodic events (that, once passed, will leave sufficient time for recovery, reflection, and healing) [22,93]. It has also been proposed to call it pre-traumatic stress disorder (Pre-TSS) in relation to climate change, a before-the-fact version of classic PTSD with similar symptoms (ie, flash-forwards, nightmares, fear-induced disassociation, disturbance of sleep, constant vivid worry), emerging from extreme anxiety about anticipations of a catastrophic future, thus caused by reference to a future (and not happened) event rather than a past one [80,94]. Pre-traumatic reactions have been previously studied in soldiers, but clinicians are not used to look out for Pre-TSS in relation to climate change, even if they collect evidence of ecological concerns that may imply a climate-related anticipatory trauma [94]. Hence, there is no consensus on its prevalence. Nevertheless, a growing number of people are reporting a pre-traumatic condition, especially the young and women [80,95,96], and it may be quite common among groups that have already experienced disrupting climatic conditions (such as Indigenous people) [94].
Eco-anger or **Climate Anger** or **Eco-rage** or **Climate Rage** or **Terrafurie**	Anger at those perceived as responsible for the ecocide or at leaders and structures that failed to respond effectively to it, often accompanied by frustration and usually unleashed among those who feel they must protest and act for a change [28,31,63]. It can be considered an adaptive response that encourage engagement in both personal and collective pro-climate behavior more than other eco-emotions, and seems to be less associated with negative effects on well-being [30].
Environmental Melancholia	The state of loss of relation with "nonhuman objects" in nature (eg, rivers, fields, lakes, natural setting, etc.). It is characterized by ambivalence because of the affective investment in local industries and object of progress and development that are the cause of degradation of the environment. Ambivalence reflects the highly complicated nature of our deep investments in practices that are both life-affirming and life-degrading. The inability to resolve this ambivalence leads to an introjection of the ambiguous loss and a state of melancholy, hence causing an impasse, halting engagement with protest, anger, care, and concern allied with agency, showing apathy on the surface but concealing something deeper [97].

Environmental Grief or **Climate Grief** or **Ecological Grief**	It can be experienced in three climate-related contexts (that can overlap): 1) grief associated with physical ecological losses (eg, disappearance, degradation, death of species, ecosystems, landscapes) than can occur in the aftermath of acute climate disasters or through slow and gradual ecological changes (eg, longer-term changes to weather patterns), often accompanied by strong emotional reactions (ie, anger, sadness, frustration, anxiety, distress, hopelessness, depression, despair, physical pain); 2) grief associated with loss of environmental knowledge and identity, especially when personal and collective understanding of self-identity are constructed in relation to the land (ie, for people who retain close living and working relationships with the natural world), and when they are no longer confident in their traditional ecological knowledge which is getting lost, along with a cultural system that was passed through generations, possibly accompanied by sense of failure, responsibility, guilt, and self-blame because of the inability to prevent the loss; 3) grief associated with anticipated future losses that had not yet happened, also tied to grief over future losses to culture, livelihoods, ways of life, developing over time based on previous experienced changes and projected changes [29]. Consequences can be adaptive and/or maladaptive: in particularly vulnerable regions where people may be exposed to multiple natural disasters over time, the presence of ecological grief may hinder from coping with the traumatic events, but, at the same time, it seems to be a reasonable response to ecological loss, also motivating environmental behavior [77,98]. It has also been suggested to apply the theoretical concept of "disenfranchised grief," ie, a grief that is deemed not socially acceptable so that others tend to disregard the feelings of those who experience them. Therefore, the grief is not given its due voice and its due place, eventually resulting in negative consequences for both the psychic life of individuals and social groups, and maladaptive behaviors [25].
Climate-related Despair or **Environmental Despair** or **Eco-despair**	Symptoms may overlap with clinical depression but there are differences that are worth making. There are feelings of emptiness, loss and meaninglessness, but people are preoccupied with climate issues and ideas of diminished future for self and progeny, while they still experience humor and joy about other subjects, their self-esteem is generally preserved and their self-critical thoughts usually involve failure to achieve climate-related goals, rather than persistent and pervasive thought of guilt, self-loathing, and worthlessness [66].
Climate Depression or **Eco-depression**	When ecological issues are heavily involved in the development of a clinical depression. The emotional reactions to the loss of nature can be unbearable and the conflict between the living world and industrialism (that portrays destruction positively in terms of progress or development) can re-emerge as a psychological inner struggle [65]. Nevertheless, feelings of sadness, at times overwhelming, grief, deep sorrow, tearfulness, emotional pain, are common, even if the manifestations do not result in a clinical impairment [31,83] and may lead to greater engagement in collective action behaviors [30].
Eco-nostalgia	The desire of people to return to a biophysical location that has been totally transformed in their absence by development or by climate change (so that they have no lived experience of the change process) and can cause serious melancholia [26]. It has the potential to strengthen the appeal of authoritarian leaders and movements emphasizing local and national identity [25].
Solastalgia	The distress caused by the gradual loss of solace from one's home environment and territory because of the lived experience of its physical degradation, either from climate change consequences or from natural events or from human activities. It has its origins in the concepts of nostalgia, solace, desolation. Contrary to nostalgia, home still exists and there is no dislocation, nevertheless it can have quite serious existential and psychological consequences, leading to the fading of the sense of belonging and identity [26,99,100].
Anticipated Solastalgia	It refers to the expected or imminent environmental degradation and ecological loss (contrary to solastalgia that refers to experiencing actual environmental change) during the lived experience of a desired transformation of the natural environment, that is a restored environment or the process of environmental restoration. A paradoxical situation of experiencing solace and simultaneously realizing fragility and imminent loss (firstly encountered during COVID-19 restrictions) [101,102].

screened selecting publications centered on the topic of the consequences of climate change on mental health and the emerging of new forms of psychopathology. Then, the search was expanded to include each one of the identified eco-emotions and psychoterratic syndromes to obtain a comprehensive overview of the literature. The reference lists of these studies were also examined for additional relevant studies.

The terms that gained more attention and became more widespread are mainly "eco-anxiety," "ecological grief," and "solastalgia," definitions of which are also partially overlapping. For example:

- ecological grief resonates with solastalgia because of triggering conditions, phenomenology and conceptual foundations, even though solastalgia is mostly referring to the home environment while ecological grief could be evoked by all ecological losses.

- eco-anxiety shares few phenomenological features with ecological grief, but eco-anxiety is inherently future-oriented, thus it is mostly a reaction to anticipated future ecological losses, while ecological grief is much more about actual and past ecological losses or a reaction to future situations that trigger the current losses [29]. Moreover, eco-anxiety is often used interchangeably with climate anxiety (or climate change anxiety) which is usually considered a subset of eco-anxiety. However, there is still no consensus on eco- or climate anxiety definition.

The strong emotional response and the distress that

people may experience in relation to climate change should not be seen as pathological by default: even if they correlate to a lower wellbeing, they often do not meet the criteria for a mental disorder and eventually they can contribute to a more pro-environmental behavior. They mediate between climate-related stimuli and our cognitions, behaviors, health, and wellbeing: the way we emotionally experience climate change concerns steers our reactions and the social mechanisms of climate change mitigation and adaptation [30,31]. Indeed, the practical dimension of exploring climate emotions is the efforts of researchers, communicators, and educators to support pro-environmental behavior [23].

Nonetheless, there is not a univocal consensus on the development of these mental states and syndromes. From a psychological and psychiatric perspective, a possible explanation is that an occasional and temporary emotional distress related to climate crisis issues (mainly characterized by worry, feeling of powerlessness, frustration) may deteriorate if an appropriate reassurance or coping strategy are not found, such as in the absence of community capacity [17] and cultural changes [32] that support adaptation and promote social change; eventually leading to a sense of loss, grief, and anxiety especially in case of exposure to repeated discrete events or to a slowly progressive one. At this point, the condition is likely to be more complex and multifaceted, as described in the ecological grief and eco-anxiety conditions. Sometimes, the distress and anxiety may become so overwhelming that a state of apparent apathy and inaction or total inertia may occur, as described in the ecoparalysis condition. These mental states may be so intense that could eventually impair daily functioning, meeting the criteria for a mental disorder, and even cause suicide.

Climate change syndromes can be considered cultural syndromes [32], triggered by the perception of threats or chaos that penetrate deeply into a stable system and by the crisis of the cosmos as we know it, leading to apocalyptic perceptions similar to the so-called "crisis of the presence" that has been described in Italy in the first half of the 20th century [33]. Despite climate change had occurred before in Earth's history, such processes had happened throughout periods of time which had been too long to be witnessed by human eyes. As such, climate change confronts people with human fragility and mortality and causes conscious and unconscious thoughts and feelings about death and the possible breakdown of civilization and human extinction [25,34], bringing those frightening and disorientating feelings closer to other apocalyptic foreboding such as atomic war fear [34] and to a potential cultural trauma [22,35]. For young people, anxiety related to climate change replaced previous worries of the older generations (especially the nuclear holocaust), whereas fears related to global pandemic and war

are more recent. Indeed, we are witnessing the spread of anxiety spectrum emotions, with our historical time being defined as the "age of anxiety" [36], as well as experiences of grief and mourning related to ecological crisis as we move deeper into the Anthropocene [29]. However, it's important to acknowledge that such syndromes are culturally dependent, with the great majority of studies conducted in Western societies [37]; experiences of existential concerns of persons living in more collective and traditional culture could be very different [24,34].

While the impact of the changing climate is mainly local and often depends on the resilience resources of the communities, emotional and psychological responses to climate crisis are affecting humans globally, sharing a wide range of deeply uncomfortable feelings [38] and widespread distress. That's why climate change syndromes are "glocal" syndromes, thus, consistent with the postmodern syndromes of the globalization. From a sociological and a psychological point of view, the clash is between indifferent authorities that prioritize governance issues and corporations that prioritize their interests spreading misinformation and continuing business as usual, and the young and exposed communities that support a radical change in energy supply, pollution, and deforestation.

Vulnerable Groups

Climate change is deemed to multiply the experience of mental disorder symptoms, intensifying existing symptoms and distress, and reducing resources available. As a global issue it affects all humans, thus, threatening complex societies and undermining their institutions. Having said that, it is worth to note that certain populations are more vulnerable than others and experience a heavier burden, especially those living in regions affected by climate change and whose livelihood, culture and, spirituality depend strongly on land and natural environments such as indigenous communities and farmers. Furthermore, there are numerous more groups of people that are considered to be at increased risk, namely: those with mental or physical conditions, children, young and elderly people, women, homeless, refugees, ethnic minorities, disadvantaged urban population (such as people living in slums and recent migrants), climate migrants, those with climate-related careers and researchers in fields correlated to climate, and climate activists [3,11,19]. In this paper, we decided to mention three groups that are illustrative: firstly, the young people because they will be inevitably more involved and showed a surprising responsiveness to the climate crisis; secondly, the indigenous communities, considered to be the most significantly affected and deemed to become an example of survival behavior; and, thirdly, scientists due to their role in raising awareness as well as influencing the public opinion by disseminating

evidence and information.

Young people are considered to be one of the most vulnerable groups to the impacts of climate change. Due to the rise in frequency, intensity, duration, and spatial extent of extreme climate events, the younger generations are expected to be exposed to more distressing events in their lifetime [39] and information related to climate events, (eg, through social media) [40] compared with older generation. Therefore, the burden of climate change on future generations is expected to increase progressively over the coming years, despite their negligible contribution to causing such crisis and lack of decision-making power. They are more prone to trauma which, especially in early childhood, adds gravity to the expectation of future chaos [20]. Moreover, they are the weakest part of the population (especially in developing countries) due to fewer personal resources, low income, minimal work experience, and lack of professional authority [38,41]. The youth are mainly depicted as fierce activists, adultified children, innocent victims, and ultimate saviors [42]. By contrast, adults, often in their role of parents, are not able to fully understand and handle those feelings, showing cognitive dissonance and judging the young as naïve and immature; as a result, young people experience anger, distress, and feelings of betrayal due to poor support and involvement in meaningful climate-related work, social inertia, and the inaction of political and corporate leaders [38,43,44].

It has also been suggested that exposing children and young people to stressful news and events related to climate change and to social inertia without adequately addressing and responding to such challenges may influence their neurodevelopment and interfere with their psychological development and growth [45]; thus, resulting in a potential collective trauma. On the one hand, climate change anxiety and the lack of opportunities to address environmental issues are thought to increase concerns about the future, to be detrimental to wellbeing and to contribute to clinical anxiety and depression in emerging adults. On the other hand, engaging in individual and collective action might be protective against mental symptoms [41,46], with many young people taking part in awareness campaigns and protest movements. Seen from this perspective, younger generations should not be excluded from policy dialogues in order for their mental resilience to thrive. On the contrary, their knowledge and life experience should be considered, and they should be incorporated in addressing emerging challenges; thus, empowering and allowing them to develop knowledge for the future [17,41].

Indigenous communities are exposed to more than one factor of vulnerability. First, they are often located in geographically peripheral and vulnerable regions; second, they face ethnic discrimination, racism, prejudice, bullying, disempowerment, and institutional barriers from exercising their rights as resource managers. Moreover, they are excluded from decision-making processes, they have been subjected to colonial intrusion into their traditional lifestyle, rapid modernization, and cultural assimilation policies, they experience grief associated with the loss of homelands, traditional knowledge and way of life, which limit traditional adaptation strategies and expose them to mental illness, substance abuse, violence, and suicide [3,12,47]. All these circumstances are thought to be aggravated by climate change, not only impacting Indigenous communities' lifestyle, but also affecting their strong relationship with the Earth, leading to the disruption of social relations and community structure due to the spiritual loss caused by the disappearance of sacred ritual sites as well as the disruption of their relationship with the land [48], considered to be the source of ancestral linkages [49].

On the other hand, Indigenous communities may help to inspire new ways of thinking and designing interventions to deal with ecological emotions in industrialized neoliberal societies in the Global North and build our social being on interconnectedness and accountability. An idea of relationality inspired by certain indigenous approaches could serve as a counternarrative for the concept of individual resilience [24], such as the belief that an efficient collective resilience is intertwined with the rest of the natural world, in a reciprocal set of duties and responsibilities between humans and non-humans entities, and not only to the advantage of humans, who are seen as receivers of goods from the Earth (food, water, resources, shelter) and hence have the duty to take care of it in return [24,50].

This was acknowledged by the most authoritative and influential reference on climate change in the world, the IPCC. In the IPCC Assessment (AR4) published in 2007, indigenous knowledge is described as "an invaluable basis for developing adaptation and natural resource management strategies in response to environmental and other forms of change," and this was reaffirmed at the 32nd Session of the IPCC in 2010, stating that "indigenous or traditional knowledge may prove useful for understanding the potential of certain adaptation strategies that are cost-effective, participatory and sustainable." The United Nations University's Traditional Knowledge Initiative (UNU-TKI) and the IPCC have been working together to address the gap in available information on traditional knowledge (TK) and climate change adaptation and mitigation, and to promote respect for TK and the role of indigenous peoples in policy development. Building on UNU-TKI's previous work (such as the book *Advance Guard*), a series of workshops has been organized to ensure that the experience of climate change impacts of Indigenous and traditional peoples and their

adaptation and mitigation strategies are fully integrated in the following IPCC Assessment Report (AR5), published in 2014 and widely available to the global community [51].

Finally, climate change is taking a toll also on the scientists that study it or do research in correlated fields. Due to the nature of their work, they collect evidence on the subject and they usually have pro-environmental values. Despite that, they are often unheard in their warnings, therefore, enduring distress and increased mental health risk (eg, eco-burnout, eco-depression, eco-anxiety, climate trauma, and pre-traumatic stress disorder). On the other hand, their role makes them more prepared and actively involved in addressing the issue with a sense of empowerment, and they usually still express motivation to continue their work and their research despite frustration [52-54].

Psychometric Evaluation

Giving the increasing interest in the mental consequences of the climate crisis, new psychometric instruments are being studied and validated. They are an attempt to outline new phenomena that are still not well understood. The aim is mainly to define the threshold between appropriate human feelings or adaptive emotions and mental state that can be considered impairing and consistent with mental illness, and if they eventually need a medical or psychological intervention. Moreover, having a valid and specific measurement tool for climate change-related emotions and syndromes helps researchers and clinicians to define them more accurately, differentiating these new conditions both amongst each other and from known psychiatric syndromes, allowing clinicians to evaluate them in context and across time and to measure the impact of therapeutic responses.

Nevertheless, there are few specific tests as the relationship between mental health and climate change is a recent object of study and there are still quite confusing and overlapping definitions of the mental states and syndromes proposed. The majority of tests that have been used are validated for syndromes that have already been studied for several years (solastalgia, eco-anxiety) or for the *Diagnostic and Statistical Manual of Mental Disorders, Fifth edition* (DSM-5) pathologies in relation to natural disasters (such as PTSD). We may suppose that some of these instruments will become more widely used if they will prove a practical application and in regard to which of these new syndromes will prevail epidemiologically.

In Table 2 we listed the instruments available. A comprehensive computer literature search of PubMed/ MEDLINE and ResearchGate databases was carried out to identify relevant peer-reviewed articles on the psychometric instruments to validate for psychoterratic syndromes. The search string was based on combinations of the terms such as "psychometric," "instrument," "validation," "scale," "test," "measure" and "measurement" have been combined with keywords such as "eco-," "climate-," "environmental-" with "-paralysis," "-worry," "-anxiety," "-anger," "-grief," -"guilt," "-shame," "-despair," "-stress," "-distress," "-trauma," "-phobia," "-fear," "rage," "PTSD," "emotion," "climate change," "solastalgia," "econostalgia," "rage," "melancholia." Due to the lack of consensus for many definitions, different combinations of terms were tried to broaden the search as much as possible. The inclusion criteria are for the articles in which new tests for psychoterratic syndromes were validated. All the descriptive, review, metanalysis, or survey articles were excluded.

From Prevention to Intervention

First of all, if intervention is needed either for individual or group treatment, it is important to provide a safe space in which the realistic nature and gravity of climate crisis can be acknowledged, the suffering legitimated, and the adaptive nature of emotions recognized (including their cognitive, emotional, relational, and spiritual elements). In this way, distressing and paradoxical emotions and ideas can be felt and thought through, exploring existential themes such as uncertainty, relatedness, spirituality, meaning, agency, and responsibility [20,55]. Loss of hope and meaning and a sense of passivity and resignation are often connected to distress [20].

It is important to differentiate eco-anxiety and ecological grief from the treatment of distress experienced as the direct result of a natural disaster or any climate-change-related weather event, which are closer to disaster resilience and PTSD [56]. Dealing with anxiety, it is useful to distinguish eco-anxiety from anxiety as an adaptive primary emotion, from pathological, nonadaptive anxiety, or anxiety as a defense mechanism [20] accompanying the individual to the conceptualization of eco-anxiety itself [55]. Indeed, anxiety seems like an outburst from a closed system, the result of feeling trapped in a menacing situation without reassuring explanations or solutions.

Some authors identified five main targets for eco-anxiety treatment: I) fostering inner resilience: a) cognitive interventions (shifting from catastrophizing towards a less black-and-white picture), b) meaning-focused and existential interventions (discussing and relativizing the social and systemic dimensions of climate change, fostering optimism and hope), c) emotion-focused interventions (grief, differentiating between distress related to their history and distress related to eco-anxiety), d) self-care interventions, e) connecting with the lyrical self (interventions focused on creative expression and the arts, and dreams); II) helping find social connection

Table 2. Psychometric Tests Validated for Eco-emotions and Psychoterratic Syndromes

Test	Explanation
The Inventory of Climate Emotions (ICE) [103]	A 32-item self-report measure of multiple emotions experienced related to climate change. This scale highlights the complex role of climate emotions and the social dimension of climate change. Anger, enthusiasm, anxiety, and sorrow are positively interlinked with pro-climate engagement and better mental health.
Climate Change Worry Scale (CCWS) [79,104]	A 10-item self-report measure designed to assess the level of troubling disturbing thoughts that people experience about climate change. Worry is considered a core process of anxiety and depression.
Climate Change Anxiety Scale (CCAS) [81,105-107]	Originally a 22-item with four dimensions, more commonly used is the 13-item questionnaire version for assessing climate anxiety as a psychological response to climate change. The two subscales, cognitive impairment and functional impairment, are strongly associated with anxiety-depressive symptoms and negative emotions.
Eco-anxiety Scale [82]	A 13-item scale for eco-anxiety that consists of four factors: affective symptoms, rumination, behavioral symptoms, and anxiety about one's negative impact on the planet.
Eco-anxiety Questionnaire (EAQ-22) [108]	A 22-item questionnaire for eco-anxiety which evaluates two factors: habitual ecological worry and negative consequences of eco-anxiety.
Eco-guilt Questionnaire (EGuiQ-11) [108]	An 11-item questionnaire that covers different forms of eco-guilt (eg,, self-blame, dissatisfaction with one's own actions, guilt because of one's family's or friends' behavior, to be part of a system that harms the environment, and existential guilt.
Ecological Grief Questionnaire (EgriQ-6) [108]	A six-item questionnaire that investigates a sense of loss due to changes in wildlife, eco-grief over the destruction of distant and local places, and also uncertainty due to these changes.
Environmental Distress Scale (EDS) [109,110]	An 81-item scale that measures six environmental distress components including solastalgia, either from direct experience of environmental disturbance or from the anticipation of potential disturbance.
Scale of Solastalgia (SOS) [111]	An 11-item scale to measure solastalgia and PTSD.
Climate Change Distress and Impairment Scale (CC-DIS) [112]	A 23-item scale to distinguish the affective experience of distress over climate change (covering anger, anxiety, and sadness) from resulting general, social, and work/school related impairment.
Disaster Psychosocial Assessment and Surveillance Toolkit (Disaster-PAST) [113]	The toolkit is designed to guide assessment and surveillance of psychosocial and mental health needs following a disaster. Surveillance can begin immediately following the disaster and can continue years after the disaster to monitor changes throughout the recovery process. It can also be used to evaluate effectiveness of an ongoing services program.

and emotional support by joining groups (join established group and organizations, rituals); III) encouraging to take action (individual and collective); IV) practitioner's inner work and education; V) connecting with nature [55]. It is important to address losses and attacks on identity because of climate change before guiding towards ecological lifestyle changes [57]. The first step is to assess the loss: what has been lost (eg, water, plants, clean air, glaciers) and the context of the loss (eg, if it is a total or a partial destruction, and if it was an untouched or an already damaged environment). The second step is to assess to what extent the changes in the habitat are affecting the identity of the local population (eg, what changed in the ecosystem so that it is not providing the vital support to its identity anymore and why its identity has been affected, and if the resulting changed identity of individuals and communities can be considered irreversible, and if they still match with the current environment).

Treatment should embrace a holistic model involving a shift from human and individual-centeredness towards a balance of power and attention between individual, community, the natural world, and their inter-dependent relationship [55,58,59], recognizing that our well-being is also linked to the well-being of our ecological surroundings; thus, nature should be seen as a reciprocal "other" to have a meaningful relationship with rather than a "thing" for recreation, tourism, investment [58]. Therapists need first of all to be aware and educate themselves about climate crisis, in order to familiarize themselves with this kind of grief and trauma, to engage in reflexivity regarding their own handling of related existential issues, and to be adequately trained: treatment for eco-anxiety should be democratic, much like pro-environmental actions require from every member of the collectivity to share responsibility [20,55]. Mental health consequences of climate change are such a relevant issue that therapists must have an appropriate expertise, like it is expected from leaders for the common good [17]. In our societies therapists are entitled to take care of these kind of deep psychological and existential dimensions [25] and they

have an ethical obligation to take steps to minimize harm and improve their interventions [60].

That said, many practitioners are not adequately prepared to deal with eco-anxiety, even if they acknowledge that climate change is relevant for their field [61]. Talking about the distress related to climate change is difficult also in the psychotherapeutic setting and for patients it's important to perceive that the therapist is aware and has a reliable knowledge on the topic, creating a safe space to explore the theme, to overcome their painful isolation, to feel validated and normalized in their fear [20]. Therapists must acknowledge that even severe worries about climate change should not be seen solely as a symptom of a mental disorder and an individual pathology; instead, they are legitimate and are the evidence of a connection to a greater whole [61,62]. Therefore, mental health professional must not reduce all the uncomfortable and distressing feelings about climate crisis and the current state of the world to individual pathology: as said, they do not necessarily indicate the presence of a disorder, instead, they should be understood as a sign of integrity and awareness in the face of a frightening situation that motivate action and foster change on individual and collective levels [34,38,63].

In order to engage in eco-anxiety, many authors pointed to the importance of community-based and culturally-sensitive supports targeting a wide range of people, such as young people, students, climate professionals, policymakers, and people working in industries that contribute to the crisis. Support should include a span of offers, environmental education, reflective journaling prompts, listening circles, group mourning rituals, and advice helplines. That, on a collective level, provides space for the expression of emotion and for action, including activism (knowing that it could also be frustrating) [20,38,46,55].

Challenges posed by climate change exposes tensions between the individual and the collective, calling into question a shared moral responsibility (ie, political) [64]. Talking about eco-emotions and climate change-related syndromes exposes the debate about the role of psychotherapy in the contemporary world and its anthropocentric and individualistic perspective [58], critically questioning the dichotomy between the focus on individual solutions and the need for collective (thus political) transformative interventions [21,24,34,57].

Actually, in Western societies, the key to success and hence people's focus are mainly individuality and personal responsibility, therefore, dealing and treating ecological emotions is usually through the focus on resilience, coping and adapting to stressful experience while going on with one's own life tasks.

This is consistent with the neoliberal system based on competitiveness, economic growth, and market su-

premacy, where each person feels committed to pursue personal achievement and realization, as long as they become overwhelmed by the growing expectation along with exhaustion and breakdown [24]. Moreover, living in a more and more uncertain and unsafe world undermines people's confidence, leading them to look for distraction and comfort engaging in pleasure activities and consumerism [25,57]. But both economic demands and compensative actions unveil as destructive to the environment and human population, enhancing the feelings of guilt, shame, and inadequacy [24,57]. Indeed, climate change is challenging the neoliberal ideology of unlimited growth and everlasting progress that has been promoted for the last 40 years.

Labeling this inner conflict and the distressful feelings solely through psychopathological and medical terminology, focusing exclusively on symptom management and individual cognitive-behavioral treatment, without stressing the economic and political accountability, is a harmful oversimplification as it invalidates them as a basis for action and change, weakens their potential for social criticism and protest, possibly leading to failure and increased feelings of powerlessness, thus, becoming maladaptive [24,63,65,66]. Indeed, putting on the individual the responsibility to tackle a global problem reinforces the reasons for depression and anxiety [24].

It is essential to prevent mental health interventions from legitimizing and consolidating unsustainable socio-political status quo, acknowledging the importance of becoming active in the real world on a collective level to tackle a systemic problem [24,34]. The risk is that obtaining a new classification of mental disorders related to the climate crisis, validated through specific psychometric evaluations, leads mental health professionals to stick to the role of healthcare-workers and induces affected people to identify themselves as patients, instead of sparking a debate on how to build a fair and sustainable lifestyle on the planet Earth. In this crucial time, critical thinking is an essential tool.

CONCLUSIONS AND OUTLOOK

Populations' mental health follows system stability criteria. Whenever the social system is threatened by chaos or too abrupt variations, the mental health of individuals and communities is also affected. It happened repeatedly through human history in local and global crises. Today, the climate crisis is an existential threat that undermines our structural solidity, and the surge of psychopathological conditions along with the proposed new syndromes is indeed the indicator of a system instability. Climate change influences consciousness reactivity and creates a new system among humans, climate, change, and instability. If changes keep happening and the climate

remains unstable, crises will multiply due to loss of security or worsening of living conditions. We can possibly foresee intertwined anxieties, repeated failed efforts to adapt (at least for a while) with a stratification of chronic distresses and unsuccessful coping strategies [3,36].

Societies are facing this challenge through different responses: structured (identification of critical issues with the development of an action plan and an active intervention), indifferent (lack of interest and low priority), concerned (risk perception followed by an alarm reaction with uncoordinated responses), paralyzed (unfocused alert and terror inducing a state of inaction). The differences in social responses are based on social cohesion, leadership, and information, and reflect the community capacity to adapt to critical situations, ie, to promote a change towards a more resilient society to climate-driven disturbances [17,67]. Therefore, we are witnessing an exponential increase in research and papers focusing on climate change and its threat on human health, in the effort to understand this extremely complex phenomenon, untangle the association between climate change and mental health, and propose proper interventions.

Researchers and clinicians are expected to support who is facing difficulties in controlling the distress, hence they must examine in depth whether the new terms proposed and the psychometric instruments are actually helpful in defining and explaining such issues and whether the psychotherapeutic approaches are effective, and if not, develop suitable tools and strategies, since we may expect an increase in the need for help, especially in the most exposed groups. On the other hand, mental health professionals must be aware of the political implications of their role, striving to avoid the exploitation of their medical and psychological interventions to minimize the responsibilities of policymakers and benefit economic interests.

Moreover, the feeling of betrayal and lack of support by governments and policymakers [38,44] may become a possible trigger for political and social instability and turmoil. Hence, promoting an informed awareness, although inflamed with some anger, is crucial to support the demand from society for trustful actions by policymakers. Presenting a positive picture of an alternative future seems to motivate pro-environmental behaviors [30] whereas a communication overly stressing on threat and damage can be unsuccessful or even dangerous as it may make people feel excessively anxious and depressed [25,30], facilitating maladaptive reactions and inaction.

In the meantime, the risk of a cultural trauma with loss of identity and meaning as a consequence of climate change is real and increasing. That's why both caution and a sense of urgency are necessary in addressing such a decisive issue for mental health and the future of our post-modern societies.

REFERENCES

1. Behringer W. A cultural history of climate. Cambridge, UK; Malden, MA: Polity; 2010. 295 pp.

2. Scheffer M. Critical transitions in nature and society. Princeton, N.J: Princeton University Press; 2009. 384 p. (Princeton studies in complexity). https://doi.org/10.1515/9781400833276.

3. Cianconi P, Hanife B, Grillo F, Zhang K, Janiri L. Human Responses and Adaptation in a Changing Climate: A Framework Integrating Biological, Psychological, and Behavioural Aspects. Life (Basel). 2021 Aug;11(9):895.

4. Folke C, Carpenter S, Walker B, Scheffer M, Elmqvist T, Gunderson L, et al. Regime Shifts, Resilience, and Biodiversity in Ecosystem Management. Annu Rev Ecol Evol Syst. 2004 Dec;35(1):557–81.

5. Scheffer M, Carpenter SR. Catastrophic regime shifts in ecosystems: linking theory to observation. Trends Ecol Evol. 2003 Dec;18(12):648–56.

6. Ripple WJ, Wolf C, Gregg JW, Levin K, Rockström J, Newsome TM, et al. World Scientists' Warning of a Climate Emergency 2022. Bioscience. 2022 Nov;72(12):1149–55.

7. Portner HO, Roberts D. Climate Change 2022: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [Internet]. 2022. Available from: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FrontMatter.pdf

8. Janiri L, Spinetti G, Mazza M, Di Nicola M. Meteoropathy: A New Disease. In: Advances in Psychiatry [Internet]. Beta Medical Publishers; 2009. p. 45–52. Available from: https://www.researchgate.net/profile/Marco-Bertelli/publication/233912320_New_contributions_of_psychiatric_research_in_the_field_of_intellectual_disability/links/02e7e52bd4b8a48557000000/New-contributions-of-psychiatric-research-in-the-field-of-intellectual-disability.pdf#page=60

9. Mazza M, Di Nicola M, Catalano V, Callea A, Martinotti G, Harnic D, et al. Description and validation of a questionnaire for the detection of meteoropathy and meteorosensitivity: the METEO-Q. Compr Psychiatry. 2012 Jan;53(1):103–6.

10. Cianconi P, Hirsch D, Chiappini S, Martinotti G, Janiri L. Climate change, biodiversity loss and mental health: a global perspective. BJPsych Int. 2022 Nov;19(4):83–6.

11. Lawrance EL, Thompson R, Newberry Le Vay J, Page L, Jennings N. The Impact of Climate Change on Mental Health and Emotional Wellbeing: A Narrative Review of Current Evidence, and its Implications. Int Rev Psychiatry. 2022 Aug;34(5):443–98.

12. Cianconi P, Betrò S, Janiri L. The Impact of Climate Change on Mental Health: A Systematic Descriptive Review. Front Psychiatry. 2020 Mar;11:74.

13. Loganovsky KN, Loganovskaja T, Marazziti D. Ecological Psychiatry/Neuropsychiatry: Is it the Right Time for its Revival? Clin Neuropsychiatry. 2019 Apr;16(2):124.

14. Machlis GE, Román MO, Pickett ST. A framework for research on recurrent acute disasters. Sci Adv. 2022 Mar;8(10):eabk2458. https://doi.org/10.1126/sciadv.abk2458.

15. Sansom GT, Thompson C, Sansom L, Fawkes L, Boerlin E. Compounding impacts of hazard exposures on mental health in Houston, TX. Nat Hazards. 2022 Apr;111(3):2809–18.

16. van den Berg B, Wong A, van der Velden PG, Boshuizen HC, Grievink L. Disaster exposure as a risk factor for mental health problems, eighteen months, four and ten years post-disaster—a longitudinal study. BMC Psychiatry. 2012 Sep;12(1):147.

17. Fergen JT, Bergstrom RD, Steinman AD, Johnson LB, Twiss MR. Community capacity and climate change in the Laurentian Great Lakes Region: the importance of social, human, and political capital for community responses to climate-driven disturbances. J Environ Plann Manage. 2022 Nov:1–20.

18. Kelman I, Ayeb-Karlsson S, Rose-Clarke K, Prost A, Ronneberg E, Wheeler N, et al. A review of mental health and wellbeing under climate change in small island developing states (SIDS). Environ Res Lett. 2021 Mar;16(3):033007.

19. Cianconi P, Hanife B, Hirsch D, Janiri L. Is climate change affecting mental health of urban populations? Curr Opin Psychiatry. 2023 May;36(3):213–8.

20. Budziszewska M, Jonsson SE. Talking about climate change and eco-anxiety in psychotherapy: A qualitative analysis of patients' experiences. Psychotherapy (Chic). 2022 Dec;59(4):606–15.

21. Kemkes RJ, Akerman S. Contending with the nature of climate change: phenomenological interpretations from northern Wisconsin. Emot Space Soc. 2019 Nov;33:100614.

22. Woodbury Z. Climate Trauma: Toward a New Taxonomy of Trauma. Ecopsychology. 2019 Mar;11(1):1–8.

23. Pihkala P. Toward a Taxonomy of Climate Emotions. Front Clim. 2022 Jan;3:738154.

24. Kałwak W, Weihgold V. The Relationality of Ecological Emotions: An Interdisciplinary Critique of Individual Resilience as Psychology's Response to the Climate Crisis. Front Psychol. 2022 Apr;13:823620.

25. Pihkala P. Eco-anxiety, tragedy, and hope: psychological and spiritual dimensions of climate change: with Karl E. Peters, "Living with the Wicked Problem of Climate Change"; Paul H. Carr, "What Is Climate Change Doing to Us and for Us?"; James Clement. Zygon. 2018 Jun;53(2):545–69.

26. Albrecht G. Chronic Environmental Change: Emerging 'Psychoterratic' Syndromes. In: Weissbecker I, editor. Climate Change and Human Well-Being [Internet]. New York, NY: Springer New York; 2011 [cited 2023 Jan 8]. p. 43–56. (International and Cultural Psychology). Available from: http://link.springer.com/10.1007/978-1-4419-9742-5_3

27. Albrecht G, Sartore GM, Connor L, Higginbotham N, Freeman S, Kelly B, et al. Solastalgia: the distress caused by environmental change. Australas Psychiatry. 2007;15(1 Suppl 1):S95–8.

28. Albrecht G. Earth emotions: new words for a new world. Ithaca: Cornell University Press; 2019. 1 pp.

29. Cunsolo A, Ellis NR. Ecological grief as a mental health response to climate change-related loss. Nat Clim Chang. 2018 Apr;8(4):275–81.

30. Stanley SK, Hogg TL, Leviston Z, Walker I. From anger to action: differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and wellbeing. J Clim Change Health. 2021 Mar;1:100003.

31. Marczak M, Winkowska M, Chaton-Østlie K, Morote Rios R, Klöckner CA. "When I say I'm depressed, it's like anger." An exploration of the emotional landscape of climate change concern in Norway and its psychological, social and political implications. Emot Space Soc. 2023 Feb;46:100939.

32. Adger WN, Barnett J, Brown K, Marshall N, O'Brien K. Cultural dimensions of climate change impacts and adaptation. Nat Clim Chang. 2013 Feb;3(2):112–7.

33. De Martino E, Massenzio M, Fabre D, Charuty G. La fine del mondo: contributo all'analisi delle apocalissi culturali. Torino: Einaudi; 2019.

34. Budziszewska M, Jonsson SE. From Climate Anxiety to Climate Action: An Existential Perspective on Climate Change Concerns Within Psychotherapy. J Humanist Psychol. 2021 Feb:002216782199324.

35. Brulle RJ, Norgaard KM. Avoiding cultural trauma: climate change and social inertia. Env Polit. 2019 Jul;28(5):886–908.

36. Pihkala P. Anxiety and the Ecological Crisis: An Analysis of Eco-Anxiety and Climate Anxiety. Sustainability (Basel). 2020 Sep;12(19):7836.

37. Tam K, Leung AK, Clayton S. Research on climate change in social psychology publications: A systematic review. Asian J Soc Psychol. 2021 Jun;24(2):117–43.

38. Diffey J, Wright S, Uchendu JO, Masithi S, Olude A, Juma DO, et al. "Not about us without us" - the feelings and hopes of climate-concerned young people around the world. Int Rev Psychiatry. 2022 Aug;34(5):499–509.

39. Thiery W, Lange S, Rogelj J, Schleussner CF, Gudmundsson L, Seneviratne SI, et al. Intergenerational inequities in exposure to climate extremes. Science. 2021 Oct;374(6564):158–60.

40. Parry S, McCarthy SR, Clark J. Young people's engagement with climate change issues through digital media - a content analysis. Child Adolesc Ment Health. 2022 Feb;27(1):30–8.

41. Barford A, Mugeere A, Proefke R, Stocking B. Young People and Climate Change [Internet]. The British Academy; 2021 Apr [cited 2023 Jan 21]. Available from: https://www.thebritishacademy.ac.uk/publications/knowledge-frontiers-cop26-briefings-young-people-and-climate-change/

42. Benoit L, Thomas I, Martin A. Review: ecological awareness, anxiety, and actions among youth and their parents - a qualitative study of newspaper narratives. Child Adolesc Ment Health. 2022 Feb;27(1):47–58.

43. Hickman C. I'm a psychotherapist – here's what I've learned from listening to children talk about climate change [Internet]. 2019. Available from: https://theconversation.com/im-a-psychotherapist-heres-what-ive-learned-from-listening-to-children-talk-about-climate-change-123183

44. Hickman C, Marks E, Pihkala P, Clayton S, Lewandowski RE, Mayall EE, et al. Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. Lancet Planet Health. 2021 Dec;5(12):e863–73.

45. Vergunst F, Berry HL. Climate Change and Children's Mental Health: A Developmental Perspective. Clin Psychol

Sci. 2022 Jul;10(4):767–85.

46. Schwartz SE, Benoit L, Clayton S, Parnes MF, Swenson L, Lowe SR. Climate change anxiety and mental health: Environmental activism as buffer. Curr Psychol [Internet]. 2022 Feb 28 [cited 2022 Nov 26]; Available from: https://link.springer.com/10.1007/s12144-022-02735-6

47. Cianconi P, Lesmana CB, Ventriglio A, Janiri L. Mental health issues among indigenous communities and the role of traditional medicine. Int J Soc Psychiatry. 2019 Jun;65(4):289–99.

48. Jones R. Climate change and Indigenous Health Promotion. Glob Health Promot. 2019 Apr;26(3_suppl suppl):73–81.

49. Cunsolo Willox A, Harper SL, Ford JD, Edge VL, Landman K, Houle K, et al. Climate change and mental health: an exploratory case study from Rigolet, Nunatsiavut, Canada. Clim Change. 2013 Nov;121(2):255–70.

50. Weaver HN. The Routledge International Handbook of Indigenous Resilience [Internet]1st ed. London: Routledge; 2021.[[cited 2023 Mar 19]], Available from https://www.taylorfrancis.com/books/9781003048428 https://doi.org/10.4324/9781003048428.

51. Raygorodetsky G. Why Traditional Knowledge Holds the Key to Climate Change [Internet]. United Nations University. 2011 [cited 2023 Mar 23]. Available from: https://unu.edu/publications/articles/why-traditional-knowledge-holds-the-key-to-climate-change.html

52. Clayton S. Mental health risk and resilience among climate scientists. Nat Clim Chang. 2018 Apr;8(4):260–1.

53. Is this how you feel? [Internet]. Is this how you feel? [cited 2022 Dec 31]. Available from: https://www.isthishowyoufeel.com/

54. Thomas M. Climate depression is for real. Just ask a scientist. [Internet]. 2014 [cited 2022 Dec 31]. Available from: https://grist.org/climate-energy/climate-depression-is-for-real-just-ask-a-scientist/

55. Baudon P, Jachens L. A Scoping Review of Interventions for the Treatment of Eco-Anxiety. Int J Environ Res Public Health. 2021 Sep;18(18):9636.

56. Hayes K, Blashki G, Wiseman J, Burke S, Reifels L. Climate change and mental health: risks, impacts and priority actions. Int J Ment Health Syst. 2018 Jun;12(1):28.

57. Randall R. A new climate for psychotherapy? Psychother Politics Int. 2005 Sep;3(3):165–79.

58. Bednarek S. Who needs to change? The change process in psychotherapy during troubling times. Milton Park, Abingdon, Oxon; New York, NY: Routledge; 2021. https://doi.org/10.4324/9781003111511-11.

59. Skelding M. On Equilibrium – People, Patterns and Psychosphere [Internet]. [cited 2023 Apr 1]. Available from: https://www.academia.edu/48904006/On_Equilibrium_People_Patterns_and_Psychosphere

60. Doherty TJ, Clayton S. The psychological impacts of global climate change. Am Psychol. 2011;66(4):265–76.

61. Seaman EB. Climate change on the therapist's couch: how mental health clinicians receive and respond to indirect psychological impacts of climate change in the therapeutic setting [Internet]. Masters Thesis. Smith College, Northampton, MA; 2016. Available from: https://scholarworks.smith.edu/theses/1736

62. Doherty TJ. Theoretical and Empirical Foundations for Ecotherapy. Ecotherapy [Internet]London: Macmillan Education UK; 2016. pp. 12–31. [[cited 2023 Jan 22]], Available from http://link.springer.com/10.1057/978-1-137-48688-2_2

63. Buzzell L, Chalquist C. It's Not Exo-Anxiety - It's Eco Fear! [Internet]. 2019. Available from: https://www.chalquist.com/post/it-s-not-eco-anxiety-it-s-eco-fear

64. Thompson A. The Virtue of Responsibility for the Global Climate. In: Ethical Adaptation to Climate Change: Human Virtues of the Future [Internet]. The MIT Press; 2012. Available from: https://direct.mit.edu/books/book/3360

65. Kidner DW. Depression and the natural world: towards a critical ecology of psychological distress. Crit Psychol. 2007:19.

66. Woodward B. Climate Disruption and the Psychiatric Patient. Psychiatr Times. 2019 Mar;36(3):8–9.

67. Davenport MA, Seekamp E. A Multilevel Community Capacity Model for Sustainable Watershed Management. Soc Nat Resour. 2013 Sep;26(9):1101–11.

68. Bilotta E, Uchita V, Evans GW. Environmental Stress. In: Environmental psychology: an introduction. Second edition. Hoboken, NJ: Wiley-Blackwell; 2018. p. 36–44. (BPS textbooks in psychology). https://doi.org/10.1002/9781119241072.ch4.

69. Australian Conservation Foundation, The Climate Reality Project Australia, Australian Psychological Society, Psychology for a Safe Climate. Coping with climate change distress [Internet]. 2019. Available from: https://www.psychology.org.au/getmedia/cf076d33-4470-415d-8acc-75f375adf2f3/coping_with_climate_change.pdf.pdf

70. Latkin C, Dayton L, Scherkoske M, Countess K, Thrul J. What predicts climate change activism?: an examination of how depressive symptoms, climate change distress, and social norms are associated with climate change activism. J Clim Change Health. 2022 Oct;8:100146.

71. Randall R. Climate anxiety or climate distress? Coping with the pain of the climate emergency [Internet]. 2019. Available from: https://rorandall.org/2019/10/19/climate-anxiety-or-climate-distress-coping-with-the-pain-of-the-climate-emergency/

72. Royal College of Psychiatrists. The climate crisis is taking a toll on the mental health of children and young people [Internet]. 2020. Available from: https://www.rcpsych.ac.uk/news-and-features/latest-news/detail/2020/11/20/the-climate-crisis-is-taking-a-toll-on-the-mental-health-of-children-and-young-people

73. Searle K, Gow K. Do concerns about climate change lead to distress? Int J Clim Chang Strateg Manag. 2010 Nov;2(4):362–79.

74. Kurth C, Pihkala P. Eco-anxiety: what it is and why it matters. Front Psychol. 2022 Sep;13:981814.

75. Mallett RK. Eco-Guilt Motivates Eco-Friendly Behavior. Ecopsychology. 2012 Sep;4(3):223–31.

76. Fredericks SE. Environmental guilt and shame: signals of individual and collective responsibility and the need for ritual responses. 1st ed. Oxford, United Kingdom: Oxford University Press; 2021. 225 pp. https://doi.org/10.1093/oso/9780198842699.001.0001.

77. Ágoston C, Csaba B, Nagy B, Kőváry Z, Dúll A, Rácz J,

et al. Identifying Types of Eco-Anxiety, Eco-Guilt, Eco-Grief, and Eco-Coping in a Climate-Sensitive Population: A Qualitative Study. Int J Environ Res Public Health. 2022 Feb;19(4):2461.

78. Mkono M, Hughes K. Eco-guilt and eco-shame in tourism consumption contexts: understanding the triggers and responses. J Sustain Tour. 2020 Aug;28(8):1223–44.

79. Stewart AE. Psychometric Properties of the Climate Change Worry Scale. Int J Environ Res Public Health. 2021 Jan;18(2):494.

80. Clayton S, Manning C, Krygsman K, Speiser M. Mental Health and Our Changing Climate: Impacts, Implications, and Guidance. ecoAmerica; 2017.

81. Clayton S, Karazsia BT. Development and validation of a measure of climate change anxiety. J Environ Psychol. 2020 Jun;69:101434.

82. Hogg TL, Stanley SK, O'Brien LV, Wilson MS, Watsford CR. The Hogg Eco-Anxiety Scale: development and validation of a multidimensional scale. Glob Environ Change. 2021 Nov;71:102391.

83. Schwaab L, Gebhardt N, Friederich HC, Nikendei C. Climate Change Related Depression, Anxiety and Stress Symptoms Perceived by Medical Students. Int J Environ Res Public Health. 2022 Jul;19(15):9142.

84. Gunasiri H, Wang Y, Watkins EM, Capetola T, Henderson-Wilson C, Patrick R. Hope, Coping and Eco-Anxiety: Young People's Mental Health in a Climate-Impacted Australia. Int J Environ Res Public Health. 2022 May;19(9):5528.

85. Heeren A, Mouguiama-Daouda C, Contreras A. On climate anxiety and the threat it may pose to daily life functioning and adaptation: a study among European and African French-speaking participants. Clim Change. 2022;173(1-2):15.

86. Clayton SD, Pihkala P, Wray B, Marks E. Psychological and Emotional Responses to Climate Change among Young People Worldwide: Differences Associated with Gender, Age, and Country. Sustainability (Basel). 2023 Feb;15(4):3540.

87. Ogunbode CA, Doran R, Hanss D, Ojala M, Salmela-Aro K, van den Broek KL, et al. Climate anxiety, wellbeing and pro-environmental action: correlates of negative emotional responses to climate change in 32 countries. J Environ Psychol. 2022 Dec;84:101887.

88. Pihkala P. Climate Anxiety [Internet]. Helsinki: Faculty of Theology Helsinki Institute of Sustainability Science (HELSUS) Systematic Theology; 2019 Oct. Available from: http://hdl.handle.net/10138/307626

89. Kleres J, Wettergren Å. Fear, hope, anger, and guilt in climate activism. Soc Mov Stud. 2017 Sep;16(5):507–19.

90. Fisher RM. Why Ecocriticism Now?: Pathways to the Eco-Fear Problem and Ecophobia. 2017 [cited 2022 Dec 31]; Available from: https://prism.ucalgary.ca/handle/1880/110033

91. Lertzman R. The myth of apathy [Internet]. Ecologist. 2008 Jun;38(5): Available from: https://theecologist.org/2008/jun/19/myth-apathy

92. Australian Psychological Society, Australian Conservation Foundation, The Climate Reality Project Australia. Climate change and dealing with burnout [Internet]. Available from: https://psychology.org.au/for-the-public/psychology-topics/climate-change-psychology/climate-change-and-dealing-with-burnout

93. White B. States of Emergency: Trauma and Climate Change. Ecopsychology. 2015 Dec;7(4):192–7.

94. Kaplan EA. Is Climate-Related Pre-Traumatic Stress Syndrome a Real Condition? Am Imago. 2020;77(1):81–104.

95. van Susteren L. Our children face "pretraumatic stress" from worries about climate change [Internet]. BMJ Opinion. 2020 [cited 2023 Apr 1]. Available from: https://blogs.bmj.com/bmj/2020/11/19/our-children-face-pretraumatic-stress-from-worries-about-climate-change/

96. Patrick R, Snell T, Gunasiri H, Garad R, Meadows G, Enticott J. Prevalence and determinants of mental health related to climate change in Australia. Aust N Z J Psychiatry. 2022 Jul:48674221107872.

97. Lertzman R. Environmental melancholia: psychoanalytic dimensions of engagement. London: Routledge; 2015. 221 p. (Psychoanalytic explorations). https://doi.org/10.4324/9781315851853.

98. Comtesse H, Ertl V, Hengst SM, Rosner R, Smid GE. Ecological Grief as a Response to Environmental Change: A Mental Health Risk or Functional Response? Int J Environ Res Public Health. 2021 Jan;18(2):734.

99. Albrecht G. 'Solastalgia': a new concept in health and identity. PAN Philos Act Nat. 2005;3:44–59.

100. Kumar P, Kumar N, Sarthi PP. Feeling solastalgia: A study of the effects of changing climate in rural India. Asian J Soc Psychol. 2021 Jun;24(2):208–20.

101. Moratis L. Proposing Anticipated Solastalgia as a New Concept on the Human-Ecosystem Health Nexus. EcoHealth. 2021 Dec;18(4):411–3.

102. Moratis L. A new form of solastalgia? Australas Psychiatry. 2020 Dec;28(6):670–670.

103. Marczak M, Wierzba M, Zaremba D, Kulesza M, Szczypiński J, Kossowski B, et al. Beyond Climate Anxiety: Development and Validation of the Inventory of Climate Emotions (ICE): a Measure of Multiple Emotions Experienced in Relation to Climate Change [Internet]. PsyArXiv; 2022 Sep [cited 2023 Jan 22]. Available from: https://osf.io/s9gzb https://doi.org/10.31234/osf.io/s9gzb.

104. Innocenti M, Santarelli G, Faggi V, Ciabini L, Castellini G, Galassi F, et al. Psychometric properties of the Italian version of the climate change worry scale. J Clim Change Health. 2022 May;6:100140.

105. Cruz SM, High AC. Psychometric properties of the climate change anxiety scale. J Environ Psychol. 2022 Dec;84:101905.

106. Feather G, Williams MN. A psychometric evaluation of the Climate Change Anxiety Scale [Internet]. PsyArXiv; 2022 Sep [cited 2023 Jan 22]. Available from: https://osf.io/uzf7j https://doi.org/10.31234/osf.io/uzf7j.

107. Innocenti M, Santarelli G, Faggi V, Castellini G, Manelli I, Magrini G, et al. Psychometric properties of the Italian version of the Climate Change Anxiety Scale. J Clim Change Health. 2021 Aug;3:100080.

108. Ágoston C, Urbán R, Nagy B, Csaba B, Kőváry Z, Kovács K, et al. The psychological consequences of the ecological crisis: three new questionnaires to assess eco-anxiety, eco-guilt, and ecological grief. Clim Risk

Manage. 2022;37:100441.

109. Higginbotham N, Connor L, Albrecht G, Freeman S, Agho K. Validation of an Environmental Distress Scale. EcoHealth. 2007 Jan;3(4):245–54.

110. Warsini S, Buettner P, Mills J, West C, Usher K. Translation, cultural adaptation, and psychometric testing of the environmental distress scale with Indonesian survivors of a volcanic eruption. Disaster Med Public Health Prep. 2014 Jun;8(3):229–38.

111. Cáceres C, Leiva-Bianchi M, Serrano C, Ormazábal Y, Mena C, Cantillana JC. What Is Solastalgia and How Is It Measured? SOS, a Validated Scale in Population Exposed to Drought and Forest Fires. Int J Environ Res Public Health. 2022 Oct;19(20):13682.

112. Hepp J, Klein SA, Horsten LK, Urbild J, Lane SP. The climate change distress and impairment scale: Introduction of the measure and first findings on pro-environmental behavior [Internet]. PsyArXiv; 2022 Aug [cited 2023 Jan 22]. Available from: https://osf.io/j6pbu

113. Ciccone A, Bodley G, Hansel T, McDonough M, McShan L, Osofsky H, et al. Disaster Psychosocial Assessment and Surveillance Toolkit (Disaster-PAST): Methods to Enhance Disaster Preparedness, Response and Recovery. Louisiana State University Health Sciences Center Department of Psychiatry; 2014.