Psychology and Climate Change

By Bayley E. Camp

Climate change is one of the most pressing issues of our time. It is a global phenomenon that is caused by human activities such as deforestation, the burning of fossil fuels, and industrial processes. The effects of climate change are far-reaching and include rising sea levels, extreme weather events, and increased exposure to environmental toxins. Much of the attention surrounding climate change has focused on the physical consequences, but its impact on mental health has received less attention. There is developing evidence from scientific research that climate change and the adverse weather events caused by it significantly impact mental health. Seasonal Affective Disorder (SAD) is a subtype of major depression that occurs during specific seasons; usually during the fall and winter months. Environmental factors, such as changes in daylight hours and increased exposure to inclement weather, have been proven by various researchers to influence the onset of SAD. The impacts of climate change may be worsening the symptoms of SAD in affected individuals. This paper aims to explore the relationship between climate change, mental health, and Seasonal Affective Disorder (SAD). The paper will begin by discussing SAD disorder and its connection to climate change. It will then delve into the impact of airborne allergens and pollution on mental health, the benefits of spending time in nature, and the ethical responsibility of psychologists to address the psychological impacts of climate change.

As stated above, Seasonal Affective Disorder (SAD) is a type of depression that occurs at specific times of the year, usually during the fall and winter months (W-SAD) when daylight hours lessen, although some individuals may experience summer-pattern SAD (S-SAD). The symptoms of SAD include low mood, loss of interest in activities, and a lack of energy. The

National Institute of Mental Health discusses studies that found that individuals who suffer from SAD might experience lower levels of serotonin, a neurotransmitter that regulates mood in the brain. Further research indicates that sunlight has a role in maintaining healthy serotonin levels. In individuals with SAD, this process fails to function correctly, causing a decline in serotonin levels during the winter season (NIMH). Mirzakhani and Poursafa state, "Some people, however, are vulnerable to a type of depression that follows a seasonal pattern. For them, the shortening days of late autumn are the beginning of a type of clinical depression that can last until spring" (Mirzakhani & Poursafa 2014). While a person without SAD would typically adjust to the time change and reduced sunlight during winter, someone with SAD struggles to maintain serotonin levels due to decreased neural activity. It is believed that changes in daylight hours may be a primary cause of SAD.

Climate change exacerbates the symptoms of SAD in affected individuals. One example of this is the increase in extreme weather events such as prolonged winter storms, which can worsen the symptoms of SAD. Climate change has led to a shift in seasonal patterns, which can further impact individuals with SAD. For example, this rainy winter season in California has been longer and more intense than in the past. People who suffer from SAD typically have a declining mood throughout the fall and winter months, and start to bounce back as the weather improves in Spring. This prolonged exposure to rain and gray skies this winter season has likely prolonged SAD symptoms for Californians who suffer from this mental health disease.

Research has also shown that the warming of the Arctic region, which is happening at a faster rate than other regions, can lead to changes in weather patterns such as the polar vortex. The disruption in the polar vortex has increased extreme weather events. An article from the Washington Post states, "Global warming may be altering atmospheric patterns and pushing

harsh outbreaks of polar air to normally moderate climates" (Dance 2022). These altered weather patterns in various places throughout the world and the United States increase each year. Harsh weather has become more commonplace in places where it was not previously the norm. In the current winter season, California has seen storms producing record rain and snow throughout the state. This was after California experienced an extensive period of record-breaking heat in the summer of 2022. In the last few years, Texas has seen severe snow storms, with unprecedented temperatures for its history. These extreme weather events can lead to increased stress and anxiety, which can worsen the symptoms of SAD as well as other mental health disorders.

Studies have demonstrated the negative impact of climate change on mental health, including SAD disorder. For example, Mirzakhani and Poursafa investigated the relationship between depression and climatic conditions in Iran. The study incorporated spatial distribution maps of depression with geographical mapping of depression and climate conditions. Depression was determined to be more prevalent in areas of the country that experienced more cold and rainy weather. The authors indicate, "Patients with climatic conditions affective disorder have episodes of major depression that tend to recur in cold weather" (Mirzakhani & Poursafa 2014). The finding emphasizes the need to account for environmental factors in preventing and treating depression, as colder climates see an increase in mental health issues.

Similarly, Karatas and Ocak explored the relationship between climate change and psychiatric disorders, including SAD. The authors submitted that "When the heat reduces on distal part of body, it affects both circadian rhythm of body temperature and the sleep–wake cycle that causes sleep" (Karatas & Ocak 2018, pg 269). This suggests that climate change can have a significant impact on mental health, as extreme weather events and changes in temperature and light can disrupt circadian rhythms and lead to an increased risk of mental

health disorders. The authors also note that climate change can have a particularly significant impact on vulnerable populations, such as those with pre-existing mental health conditions, low socioeconomic status, and limited access to healthcare. The article emphasizes the need for a comprehensive approach to addressing the impact of climate change on mental health, including preventative measures, early detection, and effective treatment strategies.

Exposure to pollution and airborne allergens can lead to an increased risk of depression, anxiety, and other mental health diseases, including SAD. Weather experts believe that inversions, which trap pollution and haze over lower-lying areas, can increase SAD in some people. When a pronounced low-level inversion is present, it limits visibility and decreases the amount of natural light because of the dust, smoke, and other air pollutants trapped by the lack of upward air movement from the layers below. Increased air pollutants impact air quality, which can impact the ability for people to get out to get more sunlight or exercise as well. Meteorologist Larry Gebert stated that inversions are more common in winter months, which can exacerbate W-SAD (Gerbert 2021). Climate change has increased these weather inversions significantly. Shiliang Wu, an atmospheric chemist and associate professor at Michigan Technological University, studied the long-term changes in extreme air pollution meteorology through a review of six decades of global meteorology data to learn how events such as inversions changed over time. Wu stated, "For the last at least 60 years we have data for, we can clearly see a trend of increasing temperature inversions in midlatitude regions. I believe this trend will continue in the coming decades, which will likely lead to an increase in extreme air pollution episodes" (Marusic 2020).

In addition to air pollution, exposure to high pollen counts is associated with the summer pattern of seasonal affective disorder (S-SAD). While this is a less common variation of SAD, it

has the same detrimental impact on mental health. Recent studies have shown a link between allergies and mental health disease. A study by Akram, et al. “Mood Worsening on Days with High Pollen Counts is Associated with a Summer Pattern of Seasonality” confirmed some linkage between high pollen counts, the ensuing allergic reaction, and S-SAD.

> Our findings are only partially consistent with the previous study by Guzman et al. (2007) who reported that mood sensitivity with a high pollen count is associated with a greater seasonality of mood and predicts SAD of non-winter type [31]. (Akram et al. 2019).

Climate change is increasingly causing worse pollen allergy seasons. Warm weather signals plants to bloom, and with lengthening warm weather seasons, pollen seasons increase as well. These impacts of increasing warm weather patterns are being seen in places that have historically been cooler climates for much of the year. Also associated with climate change, greenhouse emissions increase atmospheric levels of carbon dioxide that stimulate plants to increase the production and release of pollen. These concerns regarding aeroallergen exposure linked to climate change and its impact on S-SAD are noted in the study by Akram, et al.

One potential strategy for mitigating the negative impacts of climate change on mental health is to increase access to nature. Spending time in nature has been shown to have a positive impact on mental health outcomes, and this could be particularly beneficial for individuals with SAD disorder. Research on the topic indicates the following, “These studies have shown that time in nature is an antidote for stress: It can lower blood pressure and stress hormone levels, reduce nervous system arousal, enhance immune system function, increase self-esteem, reduce anxiety, and improve mood” (Robbins, 2020). Although getting outside to get sunlight and exercise has proven beneficial for people with SAD, the weather and even pollution can lessen

the benefits of going outside. People with SAD don't get enough energy from the sun during weather or pollution events that interrupt this process. That is why light therapy lamps are recommended to those suffering from W-SAD in addition to getting outside early in the day when the sun is at its brightest. However, urgent and significant changes must be made to counteract climate change and sustain the world's natural habitats to ensure they are available as a resource for the wellness of human beings.

Furthermore, it is important to recognize that the impact of climate change on mental health is not limited to SAD disorder, but can also include other mental health issues such as anxiety, depression, and post-traumatic stress disorder, as highlighted by Cianconi, Betrò, and Janiri in their study. Cianconi et al. state the following in their paper, "This impact implies psychological effects (45) especially in vulnerable groups like children, the elderly, the chronically ill, people with mobility impairments, pregnant and postpartum women, people with mental illness, and those with lower socioeconomic status" (Cianconi et al., 2020). This suggests that climate change can lead to increased anxiety and depression due to various climate-related factors, such as extreme weather events, food and water scarcity, and displacement of populations. The study emphasizes the need for healthcare professionals to consider the mental health impacts of climate change in their work and for policymakers to take action to mitigate these impacts.

Another tool in a multifaceted strategy to reduce the impact of climate change on mental health is to reduce greenhouse gas emissions. Greenhouse gas emissions are the leading cause of climate change. An article states the following: "mental health impacts caused by extreme weather events, which will become increasingly frequent or severe without meaningful and urgent action to reduce emissions of greenhouse gases" (Lawrence et al., 2021, pg 8). It is

imperative that we include a reduction in greenhouse gas emissions as part of our efforts to curtail the impact of climate change on mental health diseases. As has been noted above, there is a substantial impact on people with SAD due to the acceleration of erratic weather patterns caused by climate change along with the increase of aeroallergens and pollution related to it.

Additionally, it is important to recognize the role of policymakers in addressing the psychological impacts of climate change. Policies that address climate change and its impacts on mental health can be implemented at the local, national, and international levels. For example, policies could be put in place to promote the use of renewable energy sources and reduce greenhouse gas emissions, increase access to green spaces and other natural environments, and promote resilience among vulnerable populations.

Moreover, healthcare professionals have an ethical responsibility to address the psychological impacts of climate change. Mental health professionals can play a critical role in identifying and treating mental health disorders that are exacerbated by climate change. For example, mental health professionals could incorporate information on climate change and its impacts on mental health into their treatment plans, or work to develop new interventions that specifically address the mental health impacts of climate change. Doherty and Clayton assert,

> There is sufficient evidence to merit a response to the psychological impact of climate change; that these impacts co-occur on multiple, simultaneous levels; and that psychologists have an ethical obligation to take immediate steps to minimize harm, reduce disparities in climate impacts, and continually improve their climate-related interventions (Doherty & Clayton, 2011, pg 266).

To summarize, they stress the ethical responsibilities of psychologists in addressing the psychological impacts of climate change, reducing global disparities in climate impacts, and

continually improving climate-related interventions. The authors highlight the need for further research to ensure that psychologists can meet the needs of various populations worldwide as they are impacted by global climate change. Ultimately, psychologists have a responsibility to work on preventative measures to counter worsening mental health.

It is important to recognize that the impacts of climate change on mental health are not evenly distributed across populations. Vulnerable populations, such as those with pre-existing mental health conditions, low socioeconomic status, and limited access to healthcare, may be particularly susceptible to the negative impacts of climate change. As such, it is important to consider the unique needs and experiences of these populations when developing policies and interventions to address the psychological impacts of climate change.

Lastly, climate change's effect on mental health will not only have a lasting impact on our generation but future generations. Mental health is a critical component of our lives. It affects our daily functioning, thought processes, and decision-making. If we fail to take action to reduce the impact of climate change, the mental health of future generations will continue to suffer. It is, therefore, critical that we prioritize the reduction of greenhouse gas emissions and the transition to renewable energy sources to prevent the worst-case scenarios of climate change from becoming a reality. By taking action to mitigate the effects of climate change, we can protect the mental health and well-being of current and future generations.

In closing, the relationship between climate change, mental health, and SAD disorder is complex and multifaceted. The evidence suggests that climate change can have significant negative impacts on mental health outcomes and that these impacts are likely to become more pronounced if climate change continues unabated. However, there are strategies that can be implemented to mitigate the negative impacts of climate change on mental health, including

increasing access to nature, reducing greenhouse gas emissions, and developing policies and interventions that address the unique needs of vulnerable populations. As the global community continues to grapple with the challenge of climate change, it is critical that we prioritize the mental health impacts of this issue and work to develop effective strategies for addressing them.

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