

## PSYCHOLOGY AND CLIMATE CHANGE

Susan Clayton

The College of Wooster

*La Psicología tiene un papel importante que desempeñar para ayudar a la sociedad a entender y a adaptarse al crecimiento de las amenazas del cambio climático. Las investigaciones psicológicas han explorado las percepciones de las personas y sus creencias sobre el cambio climático, desvelando algunos de los importantes factores que inhiben o promueven la consciencia. Igualmente, los investigadores han comenzado a explorar las repercusiones actuales y potenciales del cambio climático en el bienestar social, incluyendo tanto los impactos a corto plazo de los desastres naturales como los graduales, impactos del peligro a largo plazo y del clima menos predecibles. Adicionalmente a la amenaza de la salud mental, la evidencia pone de manifiesto que el cambio climático conllevará un incremento del suicidio y del conflicto social. La distribución de los impactos seguramente aumentará la injusticia social y la falta de equidad. Investigaciones sobre el cambio en el comportamiento sugieren formas de afrontar adaptaciones positivas y un comportamiento más sustentable. Para maximizar la efectividad de esos estudios, los psicólogos necesitan trabajar colaborativamente con otras personas de otras profesiones.*

**Palabras clave:** Cambio climático, Percepciones, Salud mental, Bienestar, Cambio comportamental, Adaptación.

*Psychology has an important part to play in helping society understand and adapt to the growing threat of climate change. Psychological research has explored people's perceptions and beliefs about climate change, uncovering some of the important factors that inhibit or promote awareness. Researchers have also begun to explore the current and potential impacts of climate change on psychosocial wellbeing, including short-term impacts of natural disasters as well as more gradual, long-term impacts of a warming and less predictable climate. In addition to threatening mental health, evidence is accumulating that climate change may lead to increase suicide and social conflict. The distribution of impacts is certain to heighten social injustice and inequity. Research on behavioral change suggests ways of encouraging positive adaptations and more sustainable behavior. To maximize the effectiveness of their research, psychologists need to work collaboratively with people from other professions.*

**Key words:** Climate change, Perceptions, Mental health, Wellbeing, Behavior change, Adaptation.

**C**limate change is one of the most pressing issues facing society. Although it is often described as an environmental problem, it is better understood as a human problem. Indeed, the significance of human influence is recognized by the term "anthropocene," which is often used to describe the current geological era as one whose characteristics have been fundamentally affected by humans. As a science that is focused on an exploration of human cognition, behavior, and wellbeing, psychology has an important role to play in understanding and responding to the problem of climate change, and an increasing number of psychological researchers are devoting their attention to addressing this topic. The goal of this paper will be to describe and summarize some of the relevant research. I will discuss three different areas in which psychological research is relevant: understandings of climate change, impacts of climate change, and behavioral changes in response to climate change. It is important to recognize, however, that this separation does not indicate a clear

distinction among topics. Behavioral responses, for example, are fundamentally tied to perceptions, and impacts are mitigated by and dependent upon responses. The paper will close by emphasizing the need for psychologists to interact with professionals from other disciplines in order to ensure that the knowledge gained through psychological research has maximal impact.

### PERCEPTIONS

One of the ways in which climate change frequently appears in the popular press concerns the lack of agreement about whether it exists, who is responsible, and what is an appropriate response. There is wide variability in perceptions both around the world and within specific countries (Feldman, 2018; Leiserowitz, Maibach, Roser-Renouf, Rosenthal, Cutler, & Kotcher, 2018). Psychological analysis of risk perception, attitudes, and persuasion can help to understand this lack of agreement. Given the complexity of the issue and the uncertainty about the degree and timing of impacts, it is not surprising that people are confused. Notably, however, attitudes about climate change do not track knowledge; that is, rather than becoming more certain as the scientific knowledge increases, attitudes appear to be more strongly affected by other factors (Whitmarsh & Capstick, 2018).

---

Received: 30 November 2018 - Accepted: 5 March 2019  
Correspondence: Susan Clayton. Whitmore-Williams Professor - Department Chair Department of Psychology. The College of Wooster. 1189 Beall Avenue, Wooster, Ohio 44691, US.  
E-mail: sclayton@wooster.edu

The limited role of information and knowledge on attitudes toward climate change in part reflects the nature of the issue. It is cognitively difficult to comprehend, not only because of its complexity and uncertainty but also because it is psychologically distant for most people: they see the effects as occurring at a geographic and temporal remove. Beyond this, it is emotionally difficult to comprehend. The prospect of a fundamental and irrevocable change to climate on a global level is frightening enough to activate emotional defenses such as denial. The fact that it is attributed not, for the most part, to evil intent but to our general way of life, particularly the lifestyle in Western nations, motivates a tendency toward system justification. People want to believe that the system they live in is good and fair, not that it is responsible for the end of civilization. This can be seen not only in countries such as Norway (Norgaard, 2011) and the US, but also among some religious communities (McConnell & Loveless, 2018): people may deny the reality of climate change because it is incompatible with an important belief system, such as that God has designed the earth and its resources for human use and will protect it for their benefit.

Group identities are another potential barrier in accepting the reality of climate change. A great deal of research has examined the factors that most strongly predict belief in climate change. Among the most important factors, particularly in the United States, is political party (McCright, Xiao, & Dunlap, 2014). Because the acceptance or rejection of climate change has become linked to one's political identity, denying the reality of the problem, or at the very least denying the need for governmental interventions to address the problem, has become a symbolic marker for identity within the Republican Party.

Personal experience has also been found to predict acceptance of climate change. People's experiences of extreme weather events or of unusually warm temperatures are associated with belief that climate change is happening, but it is far from a perfect relationship and these experiences can be mediated by beliefs; those who are skeptical about climate change in general are less likely to interpret particular climate events as having been caused by climate change (Ogunbode, Demski, Capstick, & Sposato, 2019; Whitmarsh & Capstick, 2018). The media can also play a role in attributing or not attributing events to climate change. Given the increased discrepancies in the media sources used by different groups, this can be another source of polarization as one group may be told that a particular event is due to climate change whereas another group is not exposed to that information.

Psychological research, in addition to exploring predictors of people's belief in climate change, should inform the ways in which we think about the topic. For example, belief in climate change should not be considered as a dichotomous state in which people either believe or do not, nor as a unidirectional process in which belief is achieved and then retained. Rather, it may be more accurate to describe it as a dynamic state, in which the salience of climate change as well as belief in its existence, causes, consequences, and implications all show some degree

of variability in response to the immediate social and physical context. Indeed, some research has found that belief in climate change increases when people are in a warmer versus a colder room (Risen & Critcher, 2011).

For this reason, it is important to consider the ways in which information about climate change is communicated. Because the complexity of the issue makes it difficult to think about, a narrative approach – telling stories – may more clearly and memorably illustrate its existence and potential impacts. Because the threat that climate change poses makes it too frightening to think about, communications that include a positive aspect, stressing the possibilities for change and/or the co-benefits, may be easier to accept. Because of the role of group identities, communicators need to think about the audience and the source for any message that is delivered. It is important to use trusted communicators, and to link the message to values that are important to the audience.

One value that is significant to many groups is health. Whereas conservatives may accuse “extreme” environmentalists as prioritizing the interests of polar bears rather than the interests of workers, stressing the consequences of climate change for human wellbeing can be an effective message across political parties. (Bain et al., 2016; Stern, 2012)

## IMPACTS

As climate change transforms our world, it will necessarily also transform society. Human wellbeing is fundamentally tied to ecological wellbeing, and people are already experiencing the effects of changes in the global climate. Psychologists have a lot to add to our understanding of the impacts of climate change, which have primarily been described as impacts on weather and other species. There is increasing awareness of the potential impact of climate change on physical health, for example through food insecurity, increased temperatures, disease vectors, and exposure to extreme weather events. To this list, psychologists have added an emphasis on mental and social consequences (e.g., Manning & Clayton, 2018).

The geophysical impacts of climate change include, in the short term, increased exposure to extreme weather and natural disasters, including major storm as well as drought, flooding, and wildfires. Decades of research have illustrated the potential impacts of such events on mental health. Those who experience natural disasters are at greater risk of post-traumatic stress disorder (PTSD), depression, anxiety, and suicide; they also face increases in phenomena that are not themselves always classified as mental health disorders, such as substance abuse, sleep disorders, and risky behaviors. Acute traumatic stress is the most commonly reported response. The stress of the event will also tend to depress immune system functioning, leaving people more vulnerable to disease. Those who are more directly and more strongly affected by the disaster are more likely to experience the mental health consequences (Fritze, Blashki, Burke, & Wiseman, 2008). Many of these effects can linger long after the initial disaster is past (Johannesson et al., 2015).



Long-term impacts of climate change include rising sea levels, increased temperatures, and changing patterns of precipitation. There is less research on the mental health consequences of these types of changes, yet a growing body of studies indicates the likelihood of serious effects. Heat is one aspect that is fairly well studied, and recent studies have provided strong statistical support for the negative impact of heat on mental health. Drought and heatwaves, in particular, have been shown to lead to significant increases in suicide (Williams, Hill, and Spicer, 2015). Analysis of county-level data from the US and Mexico over several decades showed a clear relationship between heat and suicide rates that was not accounted for by income level or air conditioning penetration (Burke et al., 2018). Psychiatric hospitalizations also increase during heatwaves (Hansen et al., 2008). A number of studies examining the impact of prolonged or repeated drought have found that it is associated with emotional distress, particularly among those in rural areas whose livelihoods are more connected to the land (Austin et al., 2018).

An indirect but powerful way in which climate change threatens mental health is through its impact on migration. Rising sea levels and changing precipitation patterns have already displaced many people, and are projected to displace many more in the coming decades. Due to the difficulties associated with travel to a new country, migration presents a direct threat to physical and mental health (Bourque, van der Ven, & Malia, 2011; Mindlis & Boffetta, 2017). Less well studied is the impact of losing one's homeland. Given what we know about place attachment and its association with wellbeing, this is likely to be an additional source of stress as well as a loss of a source of support.

Some of the impacts of climate change will come directly from climate and weather; others are mediated by personal interpretations and social relationships. Migration can clearly stimulate social conflict as well as personal risk, as citizens of the new country are not always welcoming to the incoming group. Degraded environmental resources lead to social conflict as well, as groups come into conflict over access to things like the increasingly rare sources of fresh water and arable or habitable land. A meta-analysis of studies examining the link between climate conditions and various types of violence found a causal relationship between heat and aggression: as the temperature goes up, so do interpersonal violence and larger-scale intergroup violence (Carleton & Hsiang, 2016). Environmental conditions can stimulate conflict on their own, perhaps by increasing stress levels: heat is strongly associated with increases in interpersonal aggression, and domestic violence tends to increase in the wake of natural disasters.

A significant impact of climate change on social relations comes from its tendency to increase inequity. A number of different sources of vulnerability put some groups at greater risk than others, and this disparate impact can itself threaten mental and social wellbeing (Wilkinson & Pickett, 2011). Inequity is a source of personal stress and social conflict.

Tensions have already emerged internationally over the disparity between those who have made the biggest contributions to climate change and those who will suffer the greatest consequences.

One clear source of disparity is due to geographic vulnerability. Those who live in low-lying or coastal areas are already beginning to face the loss of their homeland due to the impacts of climate change, from coastal erosion, rising sea levels, thawing of the permafrost, or land subsidence due to groundwater depletion. In less dramatic ways, other areas are facing major changes in patterns of precipitation that make the land less suitable for human habitation and cultivation. In either case, communities are dispersed and they lose places that may have great personal and cultural significance to them.

Another source of vulnerability is economic. Those with greater financial resources can protect themselves more easily from the consequences of climate change – e.g., by moving to more desirable locations and installing air conditioning. They can also more easily recover when they do experience effects. If they lose their home in a natural disaster, they can buy another one. At a country level, economic security enables investment in infrastructure that can buffer the geophysical and climatic impacts. Around the world, it is already clear that the poorer nations are the ones that are disproportionately suffering the effects of climate change.

Social factors can also increase vulnerability. Having lower social status and social power can prevent groups of people from affecting policy and from having access to the information that will help them protect themselves from a changing climate. The United Nations, for example, has described gender as a risk factor for climate change impacts, because women's gender roles can impair their ability to effectively respond to a changing climate. Other groups are vulnerable because their social roles require greater exposure to environmental conditions: farmers, fishers, and first responders, for example. Indigenous communities are particularly vulnerable, partly because they tend to be poorer and located in geographically vulnerable areas, partly because they are socially marginalized and have less ability to influence public policies, and partly because their cultural lifestyle is more closely linked to interactions with the natural world (Durkalec et al. 2015).

Finally, some categories of people are physiologically vulnerable. Children, the elderly, and people with certain pre-existing conditions may respond more strongly to changes in temperature or be more vulnerable to the impacts of trauma because their physiological systems are not functioning at peak capacity.

It is important not only to understand these potential consequences but also to consider how to minimize them: how individuals and communities can be resilient. Psychologists from a therapeutic background have much information to share about predictors of resilience. At the individual level, social connections, optimism, and a sense of efficacy are particularly important in allowing a person to bounce back and even



potentially experience personal growth after a traumatic experience. But individuals are nested within communities, and the community itself can be a source of resilience.

Community resilience comes from being informed and prepared. The first step is to gather information about local vulnerabilities, and share it with those who are implicated: those who are likely to be affected, and those (which may be a different group) who are able to take appropriate action. Some communities are vulnerable to specific geographic threats; others are vulnerable because of deficiencies in their physical infrastructure, which may make them particularly vulnerable to flooding, heat waves, or water shortages. The next step is to make a plan for avoiding the negative impacts before they happen, if possible, and for quickly responding to the effects that can't be avoided. Communication networks should be established so that everyone gets the information they need in case of a disaster.

Though many of these preparations are about policy and technology, psychological factors are also important. Communities with strong social networks tend to be more resilient. As the third step in promoting resilience, communities can create opportunities that facilitate the formation of such networks. They can also establish policies that attempt to minimize inequities, recognizing the different needs and vulnerabilities of different members of the community. Importantly, they can provide community members with the chance not only to inform themselves but also to get involved with efforts to mitigate and respond to climate change.

Such opportunities for involvement can have positive effects on mental health by enhancing social bonds and encouraging a sense of meaning. Bradley et al. (2015) found that engaging in behavior to mitigate climate change reduced the relationship between risk perception and distress; a similar finding was reported by Helm et al. (2018), who showed that ecological coping, which was positively associated with perceived ecological stress, was negatively related to depressive symptoms. Involvement in collective social action is likely to strengthen social ties, an important source of resilience in the face of both physical and mental risk factors. Not only does participation in group-level initiatives have the potential to strengthen a sense of efficacy and empowerment; it can also build a feeling of belonging and collective identity that are associated with positive emotions, as the group becomes a source of support that is linked to subjective wellbeing (Bamberg, Rees, & Schulte, 2018).

### BEHAVIORAL CHANGE

Climate change is now inevitable, and so it is important to talk about adaptation. However, this should not prevent us from also considering how to mitigate it. The degree of climate change is very important in determining its impacts, as was highlighted in the 2018 IPCC report delineating the differences between a temperature increase of 1.5 versus 2.0 degrees Celsius. Behavioral and policy choices now will determine which of these

future alternatives is likely to be realized. Individual attitudes and habits have a significant role to play in affecting the policies and practices that will ultimately be adopted.

Psychologists have a long history of engaging in behavior-change interventions in order to promote more healthy living and positive social interactions. Promoting sustainable behavior can be viewed in the same light. Some of the important things that have been learned about effective behavioral interventions can be applied to the climate change arena. One is the basic insight that behavior that is reinforced is more likely to be repeated. Those who are trying to encourage sustainable behavior should pay close attention to the relevant reinforcement contingencies. Is the situation set up to make unsustainable behavior easier or cheaper? Sustainability initiatives can try to reverse or override such incentives, perhaps by providing rebates, or reconfiguring the environment in order to make the sustainable behavior easier; perhaps by encouraging social rewards that compensate for the greater cost of the sustainable behavior.

As most psychologists recognize, the social context has an immense impact on behavior. People are willing to incur financial costs, or expend effort, in order to get approval from others. Research has shown that the motivation to appear "green" in the eyes of others is a significant influence (Griskevicius, Tybur, & Van den Bergh, 2010). The social context does not only provide rewards; it also provides information. We use other people as a guide to our own behavior. This was perhaps most famously illustrated in field studies by Goldstein, Cialdini, and Griskevicius (2008) that examined ways to encourage towel reuse among hotel guests in order to save water and energy. Providing (fictitious) descriptive norms that described most guests as reusing their towels produced significantly greater towel reuse compared to an appeal to save the environment, and especially when the descriptive norm was specific to the immediate situation. The importance of providing social norms that support pro-environmental behavior is the principle behind a social marketing approach, which has been successfully used in a variety of field sites (McKenzie-Mohr, 2011).

Psychologists also emphasize the importance of feedback. People seem to have a fairly poor understanding of the behaviors they can engage in to reduce their carbon emissions. The importance of food choices, for example, is widely underrecognized (Whitmarsh & Capstick, 2018). It is difficult to effectively change one's behavior without any information about the effectiveness of particular changes, and some researchers have tested interventions that incorporate such information. Van Vugt, for example, found that people are more likely to reduce their water usage when they have individual water meters. Schultz et al. combined this approach with an approach based on social norms when he worked with a California utility company to provide individual households with feedback about their energy use. In addition to their usage, people were told that they were using less energy than their neighbors, or more



than their neighbors. Those who were told that they were using more than their neighbors tended to reduce their energy use. In a further twist, people who were using less than their neighbors sometimes increased their usage, but not when they were given evaluative feedback in the form of smiley face indicating approval for their lower rate of use (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007).

A last principle is that people do not always know how to engage in the desired behavior; they may need not only to be encouraged but also to be trained in the necessary behavioral skills. Sometimes people may fail to recycle, or to save energy, because they are not sure how to do it; communications need to include informational content as well as motivational content. This has the potential for also, as a useful side effect, increasing people's perceived efficacy in affecting climate change.

Beyond these principles, an important meta-lesson about behavioral interventions is the importance of selecting the right target behavior. It is important that it be sufficiently plastic, that is, amenable to change. Some behaviors are so culturally embedded or technologically prescribed that they are resistant to alteration. It is also important, however, that the behavior actually have a significant impact on climate change mitigation. A great deal of relevant psychological research has focused on sustainable behaviors that are easy to study but have very little impact on greenhouse gas emissions, such as recycling. Tom Dietz and his colleagues have described a model of "Reasonably Achievable Emissions Reduction" or RAER in order to evaluate the most promising behaviors to target for interventions (Dietz et al., 2009). Such a model requires working with non-psychologists who are better able to assess the political feasibility or the technological potential of a particular behavior change.

## CONCLUSION

The challenge of climate change can only be met through the combined efforts of scientists from many disciplines alongside policymakers and other public officials. Psychology has an important role to play by calling attention to the role of individuals as perceivers, behavers, and responders. By helping to illuminate that factors that promote or inhibit the accurate understanding of climate change, psychological research can be used to enhance general awareness. By describing the ways in which climate change threatens psychological wellbeing, psychological research can provide a more compelling message as well as suggest ways to make individuals more resilient. By applying research and theory on behavior modification, psychologists can highlight effective ways to promote more sustainable behavior. However, all of this will only be useful to the extent that psychologists work with other professionals to understand the geological, technical, and political/legal context. In the absence of such information sharing, psychological research is likely to be ignored as insufficiently relevant to the significant practical challenge represented by climate change.

## CONFLICT OF INTERESTS

There is not conflict of interests

## REFERENCES

- Austin, E. K., Handley, T., Kiem, A. S., Rich, J. L., Lewin, T. J., Askland, H. H., ... & Kelly, B. J. (2018). Drought-related stress among farmers: Findings from the Australian Rural Mental Health Study. *The Medical Journal of Australia*, *209*, 159-165. doi: 10.5694/mja17.01200.
- Bain, P. G., Milfont, T. L., Kashima, Y., Bilewicz, M., Doron, G., Garðarsdóttir, R. B., ... & Saviolidis, N. M. (2016). Co-benefits of addressing climate change can motivate action around the world. *Nature Climate Change*, *6*, 154-157. <https://doi.org/10.1038/nclimate2814>
- Bamberg, S., Rees, J. H., & Schulte, M. (2018). Environmental protection through societal change: What psychology knows about collective climate action - and what it needs to find out. In S. Clayton & C. Manning (Eds.), *Psychology and Climate Change: Human Perceptions, Impacts, and Responses* (pp. 185-213). Bielefeld, Germany: Elsevier Inc. <https://doi.org/10.1016/B978-0-12-813130-5.00008-4>
- Bourque, F., van der Ven, E., & Malla, A. (2011). A meta-analysis of the risk for psychotic disorders among first-and second-generation immigrants. *Psychological Medicine*, *41*, 897-910. doi: 10.1017/S0033291710001406
- Bradley, G., Reser, J., Glendon, A. I., & Ellul, M. (2014). Distress and coping in response to climate change. In K. Kaniasty, K. A. Moore, S. Howard & P. Buchwald (Eds.), *Stress and Anxiety: Applications to Social and Environmental Threats, Psychological Well-Being, Occupational Challenges, and Developmental Psychology* (pp. 33-42). Germany: Logos Verlag
- Burke, M., González, F., Baylis, P., Heft-Neal, S., Baysan, C., Basu, S., & Hsiang, S. (2018). Higher temperatures increase suicide rates in the United States and Mexico. *Nature Climate Change*, *8*, 723-729. <https://doi.org/10.1038/s41558-018-0222-x>
- Carleton, T. A., & Hsiang, S. M. (2016). Social and economic impacts of climate. *Science*, *353* (6304). doi: 10.1126/science.aad9837
- Dietz, T., Gardner, G. T., Gilligan, J., Stern, P. C., & Vandenbergh, M. P. (2009). Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proceedings of the National Academy of Sciences*, *106*, 18452-18456. <https://doi.org/10.1073/pnas.0908738106>
- Durkalec, A., Furgal, C., Skinner, M. W., & Sheldon, T. (2015). Climate change influences on environment as a determinant of indigenous health: Relationships to place, sea ice, and health in an Inuit community. *Social Science & Medicine*, *136-137*, 17-26. doi: 10.1016/j.socscimed.2015.04.026
- Feldman, S. (2018). *Global climate change beliefs* [Digital image]. Retrieved November 30, 2018, from <https://www.statista.com/chart/15716/global-climate-change-beliefs/>.



- Fritze, J. G., Blashki, G. A., Burke S., & Wiseman, J. (2008). Hope, despair and transformation: Climate change and the promotion of mental health and wellbeing. *International Journal of Mental Health Systems*, 2: 13. <https://doi.org/10.1186/1752-4458-2-13>
- Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research*, 35, 472-482. doi: 10.1086/586910
- Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going green to be seen: status, reputation, and conspicuous conservation. *Journal of Personality and Social Psychology*, 98, 392-404. doi: 10.1037/a0017346
- Hansen, A., Bi, P., Nitschke, M., Ryan, P., Pisaniello, D., & Tucker, G. (2008). The effect of heat waves on mental health in a temperate Australian city. *Environmental Health Perspectives*, 116, 1369-1375. doi: 10.1289/ehp.11339
- Helm, S. V., Pollitt, A., Barnett, M. A., Curran, M. A., & Craig, Z. R. (2018). Differentiating environmental concern in the context of psychological adaptation to climate change. *Global Environmental Change*, 48, 158-167. <https://doi.org/10.1016/j.gloenvcha.2017.11.012>
- IPCC (2018) *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (Eds.)]. In Press. . *World Meteorological Organization* (pp 32) Geneva, Switzerland: IPCC.
- Johannesson, K. B., Arinell, H., & Arnberg, F. K. (2015). Six years after the wave. Trajectories of posttraumatic stress following a natural disaster. *Journal of Anxiety Disorders*, 36, 15-24. doi: 10.1016/j.janxdis.2015.07.007
- Leiserowitz, A., Maibach, E., Roser-Renouf, C., Rosenthal, S., Cutler, M., & Kotcher, J. (2018). *Climate change in the American mind: March 2018*. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication.
- Manning, C., & Clayton, S. (2018). Threats to mental health and wellbeing associated with climate change. In S. Clayton, & C. Manning, (Eds.). *Psychology and climate change: Human perceptions, impacts, and responses* (pp. 217-244). San Diego, CA: Elsevier. <https://doi.org/10.1016/B978-0-12-813130-5.00009-6>
- McConnell, D. L., & Loveless, M. D. (2018). *Nature and the environment in Amish life*. Baltimore, MD: Johns Hopkins University Press.
- McCright, A. M., Xiao, C., & Dunlap, R. E. (2014). Political polarization on support for government spending on environmental protection in the USA, 1974–2012. *Social Science Research*, 48, 251-260. <https://doi.org/10.1016/j.ssresearch.2014.06.008>
- McKenzie-Mohr, D. (2011). *Fostering sustainable behavior: An introduction to community-based social marketing*. Gabriola Island, Canada: New Society Publishers.
- Mindlis, I., & Boffetta, P. (2017). Mood disorders in first-and second-generation immigrants: Systematic review and meta-analysis. *The British Journal of Psychiatry*, 210, 182-189. doi: 10.1192/bjp.bp.116.181107.
- Norgaard, K. M. (2011). *Living in denial: Climate change, emotions, and everyday life*. Cambridge, MA: MIT Press.
- Ogunbode, C. A., Demski, C., Capstick, S. B., & Sposato, R. G. (2018). Attribution matters: Revisiting the link between extreme weather experience and climate change mitigation responses. *Global Environmental Change*, 54, 31-39. doi: 10.1016/j.gloenvcha.2018.11.005
- Risen, J. L., & Critcher, C. R. (2011). Visceral fit: While in a visceral state, associated states of the world seem more likely. *Journal of Personality and Social Psychology*, 100, 777-793. doi: 10.1037/a0022460.
- Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, 18, 429-434. doi: 10.1111/j.1467-9280.2007.01917.x
- Stern, P. C. (2012). Fear and hope in climate messages. *Nature Climate Change*, 2, 572-573. <https://doi.org/10.1038/nclimate1610.2>
- Whitmarsh, L., & Capstick, S. (2018). Perceptions of climate change. In S. Clayton & C. Manning (Eds.), *Psychology and Climate Change* (pp. 13-33). San Diego, CA: Elsevier.
- Wilkinson, R., & Pickett, K. (2011). *The spirit level: Why greater equality makes societies stronger*. Bloomsbury Publishing: USA.
- Williams, M. N., Hill, S. R., & Spicer, J. (2015). Will climate change increase or decrease suicide rates? The differing effects of geographical, seasonal, and irregular variation in temperature on suicide incidence. *Climatic Change*, 130, 519-528. doi: 10.1007/s10584-015-1371-9