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Primer

Psychology and climate change

Susan Clayton

Humans are having a fundamental impact on environmental conditions in the current era: hence the increasing use for this era of the term 'Anthropocene'. The climate change resulting from this impact is thus better understood as a human problem, rather than an environmental problem. Early explorations of climate change focused on the physical sciences in order to answer questions about the processes by which greenhouse gasses affect the climate, and about the climate changes that were likely to result; but as we have gained understanding and certainty about these processes (though our understanding is far from complete), other questions have emerged with increasing urgency. Why have people not changed their behavior to mitigate the problem, or mobilized to demand policy changes? How will people be affected? What adaptations will allow society to be resilient in the face of climate change?

As a science focused on the exploration of human cognition, behavior, and wellbeing, psychology has an important role to play in understanding human responses to climate change. In this Primer, I will discuss three different areas in which psychological research is relevant: public perceptions of climate change; impacts of climate change; and behavioral changes in response to climate change.

Perceptions of climate change

A well-established field of research on risk perception has resulted in models and findings that can help to understand peoples' perceptions of the risk presented by climate change. Unfortunately, misperceptions of climate change are overdetermined, having multiple causes. Some of these are rooted in cognitive challenges. Climate change is difficult to understand, and many people do not comprehend the complex systems that connect human behavior to global climate. Furthermore, humans are not good at coping with uncertainty, and routinely misperceive probabilities; they are also inclined to focus on the short-term rather than the long-term, engaging in *temporal discounting* that assigns less weight to the future than to the present. People are also overly influenced by things that are easy to visualize, rather than amorphous and abstract possibilities such as an average increase in temperature; this may partly explain why so many people focus on particular weather events (storms, heat waves) rather than on climate when trying to understand climate change. Some evidence suggests that personal experiences of unusual weather predicts 'belief' in climate change, and even that people are more likely to accept climate change when the temperature is warm than when it is cool.

Limitations on cognitive abilities are not the only barrier: emotional responses also make it difficult for people to accept the reality of climate change. Although some people's emotional responses are minimal, leading to a problematic lack of urgency, messages that are too frightening may elicit a defensive response, such as denial of the facts or mistrust of the messenger. People are also motivated to defend not only a belief in their own safety, but also an ideological support for their way of life, a phenomenon described as *system justification*. It is difficult to accept that a system one has accepted as more or less fair, such as the Western lifestyle, could be responsible for ecological catastrophe. A similar phenomenon occurs when one's worldview is incompatible with an acceptance of climate change, as can be seen in religious communities, whose faith in a benevolent and all-powerful deity, and belief that the earth has been created for humans to use, are challenged by the idea that people could inflict irreversible damage on the environment. If one has benefitted financially or socially from the current sociopolitical system, there is even greater motivation to avoid calling it into question because of the perceived financial or social risks of change. There is evidence that powerful actors with financial or political interests at risk have invested in deliberate miscommunication campaigns to

discourage some climate change policies.

As this last example makes clear, group dynamics create a third, powerful barrier to the accurate perception of climate change. Social psychological studies have demonstrated that people in groups often fail to respond to emergencies. In a manifestation of *collective ignorance*, everyone assumes that other people are not taking action because they know no action is needed — whereas in fact they are all looking to each other for cues. A great deal of research in the United States (and in some, but not all, other countries) has identified political identification as a strong predictor of attitudes toward climate change, more powerful even than education. For many conservatives, denial of climate change has become a way of signaling their political identity. The upshot is that people who might in private acknowledge at least some reason for concern feel compelled to make public statements rejecting the necessity to address climate change. Such statements, repeated in the conservative media, have a strong influence on those who have neither the ability nor the motivation to research the topic for themselves. A taxonomy of some of the barriers to perceiving climate change is presented in Table 1 (adapted from Gifford 2011). It includes the barriers mentioned above as well as a few others.

Table 1. Some barriers to accurate perceptions of climate change.

Limits on cognition	Ideology	Interpersonal relations	Perceived risks
Ignorance and uncertainty	Worldview	Social norms	Financial investment in status quo
Temporal discounting	System justification	Collective ignorance	Social costs of unpopular position
Difficulty with abstractions	Politicization	Mistrust of messenger	Unexpected costs from making changes, for example in adopting new technologies

Psychosocial impacts of climate change

Although early media coverage of climate change stressed impacts on other species, particularly polar bears, there is increasing awareness of the probable consequences for humans. In addition to threatening economic productivity and physical health, impacts on mental health are extremely likely. A number of mental disorders show a significant increase after extreme weather events, such as hurricanes, wildfires, or floods — events that will become more common because of climate change. Rates vary widely, but studies suggest that such extreme events result in a 7–40% increase in psychopathology, including acute traumatic stress, anxiety, depression, post-traumatic stress disorder, and substance abuse. These effects may persist for months or even years after the event. Those who are more directly impacted are naturally more likely to experience mental health problems.

Less well studied are the impacts of gradual climate changes, such as increased temperatures, rising sea levels, and changing patterns of precipitation. However, these are also anticipated to negatively affect mental health. In some cases, the impact may be direct; high temperatures, for example, are associated with increases in suicide. Other impacts are indirect. For example, climate change is creating a large number of environmental refugees, forced to emigrate from their traditional homeland as a result of rising sea levels or increased drought. Involuntary migration is well known to be a stressor that has the potential to harm both physical and mental health. The economic impact of environmental changes can also be a powerful stressor, and is suspected to be the primary reason for increased suicide rates among farmers experiencing drought.

These impacts on mental health mostly threaten people who are directly experiencing changes in their local climate. Global climate change can, however, affect even those who have not yet experienced the physical effects. The mere knowledge that the climate is changing can induce emotional responses including guilt, grief, anxiety, and depression. There are not yet clear and consistent metrics for studying these responses, but a number of studies in different countries show significant numbers of people reporting anxiety and stress associated with climate change (Figure 1). Those who are in generally good mental health may not be seriously affected by this stress. But for those who are already experiencing high stress levels, the additional stress burden could overwhelm their ability to cope.

Climate change will also have social impacts. Many of the events associated with climate change, such as major storms and migration, have the effect of disrupting communities. Because social networks provide access to information as well as practical and emotional support, they have a powerful impact on both physical and mental health, and a lack of social connections is strongly associated with morbidity and mortality. In fact, having a good network of social relationships is associated with about a 50% reduction in the risk of early death. Even when communities are not scattered by the direct impacts of climate change, social ties can be weakened due to the stressors associated with climate change, such as heat and resource scarcity. Natural disasters often lead to increases in interpersonal aggression, including domestic violence, and several powerful meta-analyses have shown that increases in heat are associated with increased conflict and aggression.

Any discussion of climate change must recognize that there is variability in human impacts. A number of different sources of variability combine to create differential consequences for different demographic groups. Most obviously, some groups are more geographically vulnerable: those living in low-lying or coastal areas, or areas prone to desertification or to wildfire. Economic differences also create vulnerability, as economic resources can help to avoid some impacts (shore up infrastructure, live in more desirable areas) and cope with others (access to reliable transportation, air conditioning; ability to afford food and water as they become more expensive). There are physiological vulnerabilities. Some people's bodies are less well able to cope with high

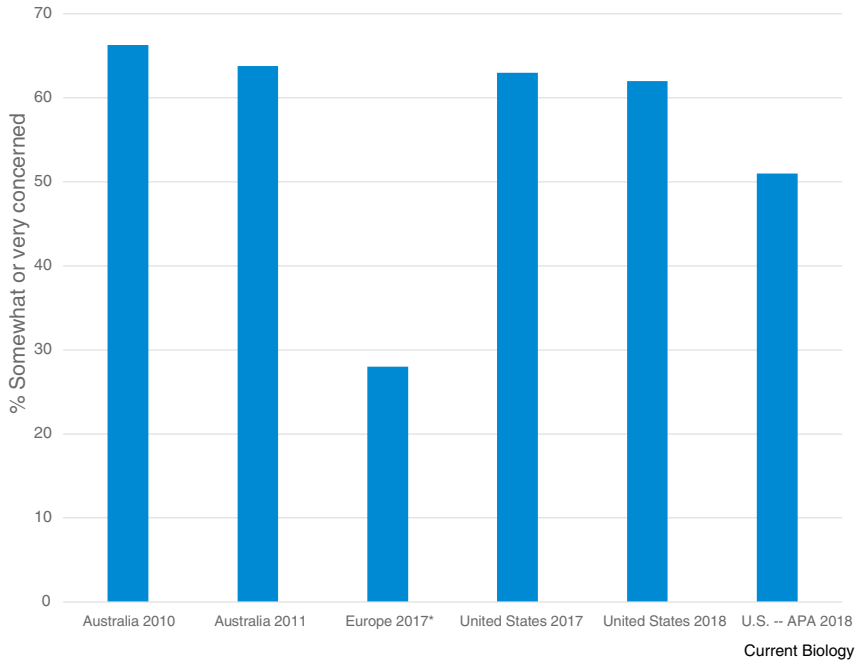

Figure 1. Worry about climate change in nationally representative surveys with similar question wording.
Note that for Europe the percentage shown represent those who indicated they were "very or extremely" concerned, in contrast to "very or somewhat" concerned in the other surveys; thus a lower percentage is to be expected. The APA survey specifically asked about sources of stress, whereas the others asked about attitudes toward climate change.

heat levels and/or defend themselves from disease; this includes the elderly, children, some people with pre-existing health problems, and people taking some kinds of medications, including psychotropic medications. Finally, there are social vulnerabilities. Those with less social and political power are often less able to inform themselves about the threats they are facing, to influence public policy, and to access the resources that will reduce their exposure to harm.

These different sources of vulnerability interact; for example, indigenous groups have less social power, typically fewer economic resources, and are often located in the most geographically vulnerable areas. Children are more physiologically vulnerable, but also more socially vulnerable because they have to rely on others for information and support. Geographic differences are significant within countries, but are further magnified across countries, where they are often linked to economic differences. The inequality of impact that results from these different vulnerabilities can itself be a source of stress and serve as a barrier that inhibits effective climate action.

The different categories of impact from climate change are interdependent. Figure 2 illustrates the different categories of impact and the ways in which they are mediated by vulnerabilities. The overlapping circles are a reminder that physical health affects mental health and community health, and vice versa.

Responding to climate change

In order to encourage effective responses to climate change, the problem first needs to be communicated in a way that overcomes the barriers identified above. Research on communication strategies has identified several key recommendations:

To overcome cognitive limitations, put information into a narrative form. Stories attract more attention and are easier to remember than lists of information. It is also useful to make the information locally relevant and to present it in multiple modalities, such as in lists, through images, and with statistics.

To overcome emotional limitations, balance fear with hope. Some element of fear is useful to attract attention, avoid complacency, and motivate action. But too much fear, in the absence of optimism, leads to learned helplessness, denial, and inaction. People may focus on managing their emotional response rather than on responding to the problem. They need to be told that there is a reason to act, but also believe that their actions are likely to bring about a positive outcome. Self-efficacy is a powerful predictor of behavior.

To overcome or at least address group-based polarization, seek trusted messengers to deliver the message. People are more likely to accept the recommendation of someone who seems similar to them, whereas the message of an outgroup member may be rejected as biased, illegitimate, or just irrelevant. There may be opportunities to deliver a message through the 'side door', in unexpected ways that avoid people's frustration and fatigue with the expected arguments.

For all of these suggestions, it is clear that successful communication must be geared to its audience. There is no universal message that will be accepted by all groups, because climate change means different things to different individuals, communities and organizations.

Beyond communicating the importance of responding to climate change, behavior that mitigates climate change, for example, by reducing the emission of greenhouse gasses, can be targeted directly. Psychologists have been working to identify and direct the factors that shape behavior at least since B.F. Skinner. Some of the important lessons are as follows:

Identify the reinforcement contingencies — the consequences of behavior that are perceived as rewarding or punishing. What consequences of behaviors make it more or less likely? Financial reinforcers are important — all else being equal, people are less likely to do things that cost more and more likely to do things that save money—but they are far from the only reinforcers, and often are not the most important. Social consequences, for example, are more consequential in many circumstances. People model themselves after the behavior of others, and are more likely

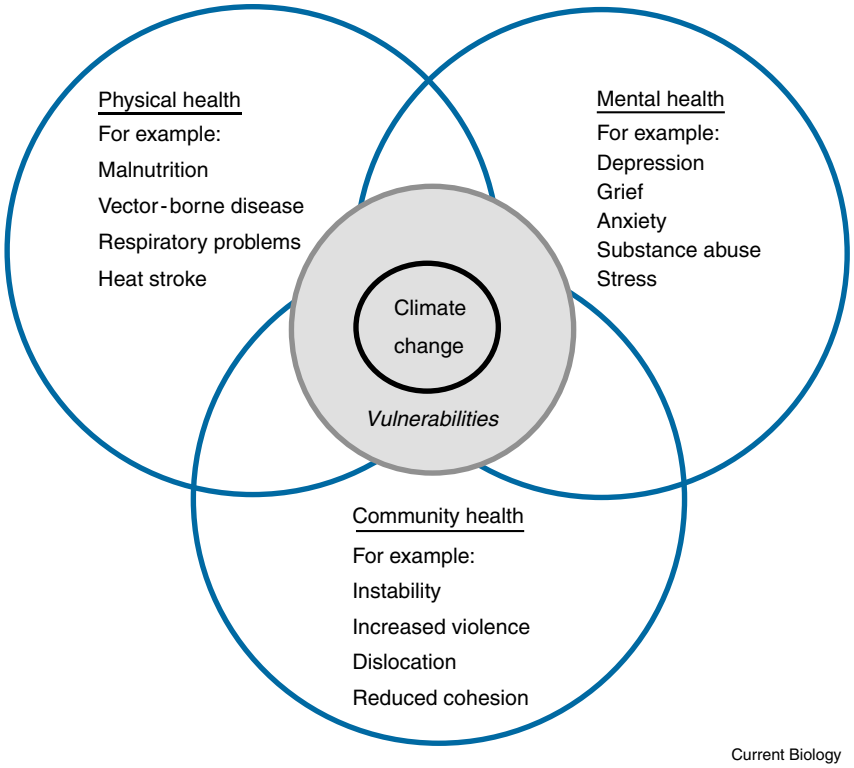

Figure 2. The interdependent impacts of climate change on psychosocial wellbeing.
Adapted with permission from Clayton, S., Manning, C. M., Krygsman, K., & Speiser, M. (2017). Mental Health and Our Changing Climate: Impacts, Implications, and Guidance. Washington, D.C.: American Psychological Association, and ecoAmerica.

to behave in ways that get social approval or social status.

Time and ease of behavior are also powerful. People can retain control and choice over their own behavior, but a more sustainable behavior is more likely if it is set as the default. Motion sensors that turn off lights when no one is in the room are an example; another important behavior would be offering more vegetarian dining options and fewer meat-based ones. When attempting to modify behavior, it is also important to attend both to the technical potential of the behavior change (what are the savings in CO_2 emissions?) and its plasticity: some behaviors are easier to change than others, and thus likely to result in greater savings despite lower technical potential.

With climate change clearly under way, it is important to consider not only mitigation but also adaptation. There are ways for individuals and communities to prepare for the kinds of changes that are inevitable in the coming decades. Of course there are structural and behavioral changes that can contribute to adaptation, such as constructing defenses against flooding or changes in agricultural practices. These sorts of behaviors can be targeted by the same types of interventions that focus on mitigation. But there are also ways of creating psychosocial resilience, defined as the ability to adapt in the face of adversity or significant stress. Resilience implies preparing psychologically for living under new conditions. Research has shown that maintaining social connections, becoming informed, flexibility, a feeling of self-efficacy, and a sense of optimism are associated with resilience. Resilience can also be fostered at the community level, when communities provide accurate information and opportunities for social connection, consider multiple perspectives and draw on local diversity, and encourage people to come together to take action.

Conclusion

Psychology is simultaneously a science and a service profession, devoted to research into human behavior as well as to promoting human wellbeing. Both these branches are necessary in order to understand and respond to the impacts of climate change. Research in risk perception, human wellbeing, and determinants of behavior are discussed separately above; 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. Interdisciplinary collaborations between psychologists and other researchers may help to build a more effective response to the threat of climate change.

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