SOCIETY'S GRAND CHALLENGES

Insights from Psychological Science

GLOBAL CLIMATE CHANGE

Society's Grand Challenges
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As a society, we face many challenges, and we depend on science to help. Whether we seek to halt global climate change, cure devastating diseases, reduce crime, end poverty, diminish health disparities, or achieve vitality in old age, advances in modern science are expected to help.

The science of psychology contributes to deeper understanding of these and many other societal challenges. The American Psychological Association is devoting significant resources and energy to bringing the best of psychological science to the forefront. In partnership with other fields of science, solutions will be found.

This booklet is one in a series, examining the insights of psychological science into challenges facing society. Each booklet focuses on a key challenge, provides a sampling of what we currently know, and suggests promising avenues for future research. The published work of scientists is cited, so that readers can learn more on their own.

We indeed face many challenges, and together we can solve them!

Alan E. Kazdin
2008 President
American Psychological Association

GLOBAL CLIMATE CHANGE

Most scientists recognize that human behavior is the main cause of today's climate crisis. Understanding that behavior, and learning how to change it, is one of our best hopes for a solution. Whether the goal is to reduce carbon emissions or to help vulnerable populations deal with rising sea levels and changing weather patterns, it is clear that values, beliefs, thoughts, and social relationships are key.

According to the 2007 report of the Intergovernmental Panel on Climate Change, however, human behavior is one of the least well understood components of the climate system. That is where the science of psychology can help.

By itself, psychology cannot stop global warming or deal entirely with its consequences. Other scientific disciplines provide the expertise to model climate change, build more efficient power plants, and predict the impact of carbon taxes on economic development. What psychology can provide is an explanation for why people choose to install energy-efficient appliances, reduce gasoline consumption or support government policies aimed at addressing climate change—and why, despite the best of intentions, they often do not.

The examples in this booklet show how psychological research complements the expertise of climate scientists, engineers, economists and policymakers and how it has already begun to suggest some new ways of addressing climate change. At the same time, this research is providing new answers to basic questions about the human mind, such as how our values and beliefs lead to actions, how we assess risks and what kinds of messages we find most persuasive.

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UNDERSTANDING ENVIRONMENTALISM

Environmental issues tap into fundamental values and they provoke powerful emotions. Is the natural world fragile or is it resilient? Are technological advancement and economic growth inherently good? What do the rich and powerful owe the poor and weak?

For the past several decades, Paul Stern, director of the U.S. National Research Council's Committee on the Human Dimensions of Global Change, and his colleagues have been studying how individuals' answers to these kinds of questions lead to behaviors that either help or harm the environment. Their research is revealing when psychological factors are crucial to solving climate change-related problems—and when they are not.

In a series of studies, Stern and his colleagues have shown that environmental behavior is the result of a long chain of causality. It all begins with values as basic as altruism—whether one sets a high priority on helping other people.

For someone who holds altruistic values, the next step toward pro-environmental behavior is belief—the belief that nature is inherently fragile, interconnected, and threatened by human activity.

The combination of altruistic values and an ecological worldview generates what Stern calls a personal norm—a sense of moral obligation to act.

The combination of a person's knowledge along with features of the social situation provide opportunities to act on those norms, resulting in behaviors ranging from turning off unneeded lights to buying energy-efficient cars and home appliances to signing petitions and voting for politicians who share one's concerns.

These fundamental values and beliefs also influence the way people perceive the risks associated with climate change. As Michael Slimak of the U.S. Environmental Protection Agency and Thomas Dietz of Michigan State University have argued, most research on risk perception focuses on the characteristics of the risk itself, such as whether it is unfamiliar, uncontrollable or potentially catastrophic.

But different people can assess the same risk in different ways. In one study, three groups of people were identified, each with a different level of engagement with environmental risks:

- the general public
- stakeholders in environmental conflicts (such as farmers and fishers)
- federal risk assessors and managers

Slimak and Dietz found that people who hold an ecological worldview combined with altruistic values rated environmental risks as highly important,

regardless of their experience or professional position.

But the groups also differed in some important ways. For example, experts were most concerned about global, long-term problems such as climate change. In contrast, the general public was most concerned about local, immediate threats such as hazardous waste.

As society becomes increasingly tuned in to climate change issues, the differences between professionals and the public are likely to change. Still, these differences are unlikely to go away entirely. The better

we understand them, the easier it will be to find solutions to environmental problems.

Studies like this can help explain why people are or are not concerned about climate change, but it will take more to solve the problem. As Stern points out, even the most powerful insights are of little use unless they help change behaviors that really matter.

What are the behaviors that really matter? Values and beliefs tend to have stronger effects on low-cost behaviors than on major household changes, for which financial and technological constraints are more pressing. The bigger payoff, such as reducing carbon emissions, will be achieved through changes in high-cost behaviors, such as choosing a car or home or insulating walls and ceilings. Here, psychologists' understanding of human behavior is part of the solution, but it is not enough. Better technologies and financial incentives may also be needed. That is why, Stern says, collaboration among psychologists, engineers, economists and other scientists is essential.

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ASSESSING RISKS

Risk analysts are experts in the science of risks. They tend to focus on the rational side of risk. For example, risk analysts calculate how much an individual should be worried about a given event based on its probability and severity. Often, they will show how the average person's risk perception deviates from the ideal.

Paul Slovic, who is president of the Oregon-based company Decision Research, and his colleagues have pointed out, however, that such calculations tell only half of the story. An individual's sense of risk also depends on values, emotions, images and personal experiences.

Although risk analysts might bemoan the irrational nature of these feelings, they are an essential part of the human response to risk. Psychologists are uniquely positioned to explore how these emotional reactions combine with rational deliberation to produce a sense of risk and the willingness to take actions that reduce it.

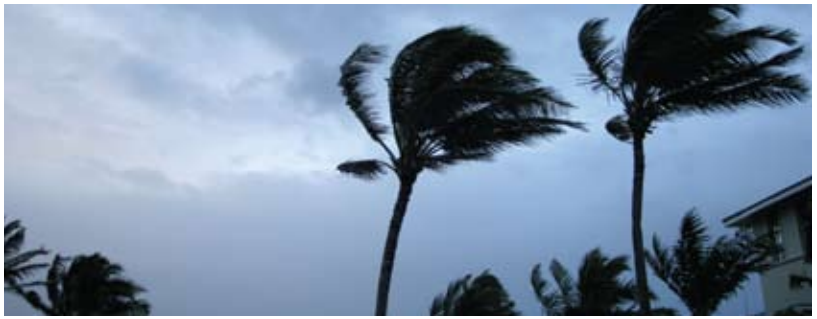
Anthony Leiserowitz, director of the Yale Project on Climate Change, has studied the emotional and image-driven aspects of Americans' climate change-related attitudes and behaviors. In a survey of nearly 700 Americans conducted in 2002 and 2003, Leiserowitz found that most people think of climate change as something that affects far-away people and places in the distant future. Only 13% of Americans were

mainly concerned about its impact on themselves, their families, or their communities.

Few respondents could call up vivid images to associate with climate change. Among those who could, the images tended to be distant, such as melting icebergs, or they were abstract, such as general global warming trends.

Leiserowitz was also able to distinguish between two subgroups, both of whom had powerful feelings and images related to climate changes. One group was the "naysayers" – the 7% of Americans who think that climate change is being over-hyped. The other group was the "alarmists" – the 11% of Americans who thought about climate change in terms of planetary catastrophe.

If the goal is to raise the general public's concern about climate change, then these findings suggest emphasizing powerful images and near-term, local consequences. To some extent, that is what many current efforts do. Fictionalized accounts, such as *The Day After Tomorrow*, documentary films such as *An Inconvenient Truth*, media coverage of extreme



weather events, and the campaign to list the polar bear under the Endangered Species Act all share one thing in common: they evoke powerful images and local consequences.

Yet, emphasizing visceral reactions rather than rational calculations also carries certain risks of its own. As Elke Weber of Columbia University argues, individuals may have only a "finite pool of worry" to allocate to all of the risks they face. Emphasizing the emotional aspects of climate change could lead to inaction on other, equally important issues—including long-term, ecosystem-wide effects of climate change that cannot easily be pictured in evocative images.

Nonetheless, whether their ultimate consequences are positive or negative, major disasters such as Hurricane Katrina will continue to shape public perceptions of the risks posed by climate change. Daniel Västfjäll of the University of Gothenburg in Sweden, along with colleagues Ellen Peters and Paul Slovic of Decision

Research in Oregon have examined the impact of natural disasters on general attitudes toward risk.

In one study, these researchers found that the 2004 tsunami in southeast Asia had a significant effect on the risk perceptions of Swedish undergraduates. Even though participants had not been directly affected by the tsunami, a reminder of the disaster made them more pessimistic about the future and less confident about their ability to avoid various personal risks, ranging from career failures to dental problems.

These effects were largely erased, however, when participants were reminded of the rarity of such large-scale disasters. The study suggests both that natural disasters—even distant ones—can influence risk perceptions and that the strength of their influence is affected by the way they are presented.

Psychological research on risk perception cannot create agreement where fundamental values differ, but it can help improve communication among experts, policymakers and the public. As Baruch Fischhoff of Carnegie Mellon University has argued, the factors that individuals weigh when making decisions about how to react to climate change are often far more complex than scientists usually recognize.

"A lot of scientists do a very poor job of communicating, and, like everybody else, they exaggerate how good they are at communicating. They hold their audience responsible for their own failures to communicate," says Fischhoff. Understanding why scientists fail to get their messages about risk across to the public—and why they are not always persuasive even when they do—is one of the areas where psychology can help address the challenge of climate change.

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ENCOURAGING CONSERVATION

Most people endorse basic environmental values—they favor recycling, conserving energy, minimizing pollution and protecting endangered species. But they do not always manage to translate those values into action, and public service campaigns aimed at helping them to do so often fail.

Drawing on a large body of research into social norms, Robert Cialdini of Arizona State University, Wesley Schultz of California State University San Marcos and their colleagues have been studying how different kinds of persuasive messages affect behavior. Their research has the potential to change the way governments, environmental groups and businesses communicate with the public.

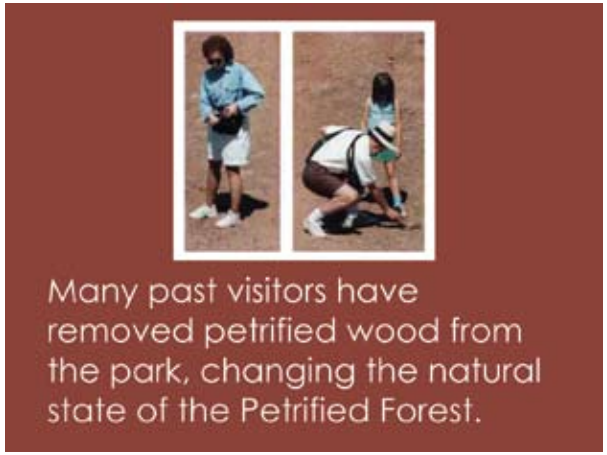
Environmental messages come in many forms: public service announcements, informational placards, and signs in hotel bathrooms. No matter what form they take, however, they share one thing in common – they all tend to stress the cumulative negative consequences of a large number of people behaving in the same way.

Framing messages this way might seem logical. After all, if a single person raises his or her carbon emissions, the consequences are insignificant. Environmental disasters tend to happen because large numbers of people act in the same way. It is important to understand this, but it might not create the best approach for developing effective messages.

Research on climate-change-related messaging is still rare. Fortunately, studies of other kinds of environmental messages provide clues to how such messages should be designed.

In a study at the Petrified Forest National Park in Arizona, for example, Cialdini found that messages that emphasized cumulative effects actually undermined the park's efforts to reduce the amount of petrified wood stolen from the park.

Prominently placed signs told park visitors that fourteen tons of petrified wood were stolen each year. The signs were meant to communicate to park visitors that theft of petrified wood was a problem, implying that they should not do it. But the signs may have been sending a very different message: everyone else is stealing the wood, so you can do it too!



This study helped to identify a far more effective message to reduce the theft of petrified wood. These were messages that focused on the social disapproval and stigma associated with stealing rather than the excessive amount of theft that was taking place.

Consider the message shown below on the left. This is the kind of message used traditionally to communicate that too many visitors are taking petrified wood, and possibly communicating the wrong message that it is ok to steal the wood.

Now consider the message shown below on the right. This message emphasizes the social stigma associated with stealing wood from the Park, implying that to do so will threaten preservation of the Petrified Forest. In Cialdini's work, this was found to be a more effective message in curbing the thefts.

Messages about the number of people who engage in a behavior can be effective too, but only when harmful behaviors are rarer than people think they are or when the helpful behaviors are more common. In a study on energy conservation, Jessica Nolan, a student of Schultz's, found that beliefs about how often one's neighbors tried to conserve energy were the most powerful predictor of one's own energy-conservation efforts.

Residents who were told that their neighbors often conserved energy used less electricity themselves in the following months than did residents who were told that conserving energy was good for the environment,

for society or for their own pocketbooks. People continued to deny that beliefs about their neighbors mattered, but in fact those beliefs were the most powerful influence.

In some cases, a combination of messages is the best strategy for effective persuasion. In a study of the reuse of towels in hotel rooms, Schultz and his colleagues found that messages that relied solely on what other people did or on social values had no effect. However, when guests were given both messages at the same time—they were told that most other guests reused their towels and that most guests approved of conserving energy—they were more likely to reuse their own towels. The study suggests that conservation messages designed with the help of psychologists can benefit both the environment and the bottom line.

Together, these studies suggest that research on social norms can help policymakers craft effective messages about environmental issues—whether those messages

are aimed at protecting natural resources, reducing household energy use or improving the efficiency of large businesses.

More research needs to be done on whether social norms can influence the behaviors that have the biggest impact on carbon emissions, such as decisions about the size of one's home, the efficiency of major household appliances, or the length of one's commute. But the initial findings of Cialdini and his colleagues suggest that persuasive communication can be a valuable complement to other approaches, such as tax incentives, regulations, and new technologies. They cannot address climate change alone, but they can help ensure that when new policies are put in place or new technologies are released into the market, people will take advantage of them.

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FUTURE DIRECTIONS

Over the past several decades, psychologists have been studying behaviors related to climate change. With increased public concern, and a growing sense of urgency to identify solutions, psychologists have begun to focus even more attention on the problem. According to leaders in the field, these are some of the most promising areas to be explored:

Effective Communication. Research on social norms suggests that carefully crafted messages can increase the likelihood of small-scale pro-environmental behaviors, such as reusing one's towel. But it is not clear whether the same techniques will affect major decisions, such as buying an energy-efficient house, car, or major appliance, says Paul Stern of the National Research Council. New research may determine whether such messages can also influence the big-ticket, life-changing behaviors that will have the biggest impact on climate change. And it will show how to avoid so-called "boomerang" effects, in which persuasive messages actually increase undesirable behaviors, says Wesley Schultz of California State University San Marcos.

Risk Assessment. Perceptions of risks, costs, and benefits have been a major subject of psychological research, but much remains to be understood about the way individuals experience environmental and global risks such as climate change. In collaboration with economists, psychologists can provide insight into the relationship between quantifiable aspects of climate change, such as changing weather patterns, and less tangible factors, such as justice or quality of life, says Baruch Fischhoff of Carnegie Mellon University. Such findings may help experts and policymakers communicate information to the public without sacrificing either accuracy or accessibility.

Policy Making. Although changes in individual consumer behavior have a role to play in addressing climate change, they will not work alone, says Jonathan Baron of the University of Pennsylvania. Large-scale structural changes in the economy will likely also be necessary. Psychologists can help by identifying the thought processes and biases that keep people from supporting the most efficient and effective policies. In addition, says Robert Gifford of the University of Victoria, they can develop models of decision-making that will help policy-makers understand how the public will respond once policies are put into place.

Self and Nature. Concern about harm to the natural world, from the endangerment of polar bears to the disappearance of glaciers, is one of the most powerful drivers of concern about climate change, says Susan Clayton of the College of Wooster. Future research will clarify why people care about nature, how they connect their everyday behaviors to distant impacts and what benefits they gain from access to natural environments. It could also clarify how people understand environmental justice, including their moral responsibility to people outside their own families, communities and nations, says Janet Swim of Pennsylvania State University.

Managing Stress. Even for individuals who are not immediately and directly affected by climate change, the problem can seem catastrophic, overwhelming and impossible to control. For people suffering the effects of rising sea levels, droughts or unpredictable weather, the consequences of climate change will undoubtedly cause significant stress. Psychological research can provide insights into climate-change-related stress and coping that will help individuals and communities deal with changing conditions in healthy, productive ways.

This booklet was written by Etienne Benson

Look for these other Grand Challenges booklets presented by the American Psychological Association Science Directorate.

Health Disparities

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