Understanding the Disconnect on Global Warming

March 08, 2011

How worried are you about global warming? Are you buying compact florescent light bulbs? Did you think more about gas mileage when buying your car? For the last several years, there has been increasing scientific consensus that global climate change is occurring, that this change could have serious consequences for human and animal life, and that human activity has caused it. (Arctic Climate Impact Assessment, 2004; Houghton et al., 2001). But even with scientific reports in the news and celebrity calls to conserve, it appears that people, at least in the United States are not yet getting the full message.

According to a March 2008 Gallup poll, 75 percent of Americans believe that global warming has already begun or will begin within their lifetime. But the same poll found that only 40 percent believe global warming will pose a "serious threat" to their own way of life. (Newport, 2008). The majority of Americans still do not believe global warming is something they need to personally worry about, even if they believe that global warming is occurring or will occur soon. This is where psychology comes in — psychology researchers are working to understand this disconnect and develop ways to counteract it.

Columbia University's Center for Research on Environmental Decisions (CRED) is at the forefront of this work (see below for more about CRED). One of CRED's most important contributions is its research on how human beings process information about risky situations and make decisions about how to act (or not act).

Imagine That

Work by Columbia's Elke Weber, an APS Fellow and Board Member, has shown there are two main information processing systems we use to perceive risk: *experience-based processing* and *analysis-based processing* (Weber, 2007). The experience-based processing system relates one's current situation to personally or vicariously experienced situations that have evoked strong emotional reactions. For example, you are walking alone at night when you suddenly notice someone following behind you. It occurs to you that this person might attack you; even though this particular outcome is highly uncertain, your immediate emotional reaction —fear— might motivate you to run or at least walk more quickly. That seemingly immediate fearful response is in fact preceded by something else: a vivid image of the consequences of not running or walking more quickly, losing your wallet or purse, getting injured, or worse. The current emotion and subsequent decision were motivated not by simply recalling an emotion you have felt before, but by recalling an *image* you have seen or imagined before. Perhaps you have been in a similar situation in the past or, more likely, you have heard or read stories about people being attacked at night or seen a similar situation on television or in a movie. Risk is perceived as a feeling, and we establish emotional concern about our present situation by comparing its possible consequences to the consequences of past situations. The emotional response proceeds from the image.

In contrast to this rapid experience-based processing system, the slower analysis-based processing system works abstractly and relates current situations to previously processed collections of concrete

experiences (Marx et. al., 2007). These experiences are processed consciously in a series of learned decision-making procedures, and unlike the experience-based processing system, this system does not respond automatically. To continue the example presented above: Imagine that before you leave your home you consider that walking alone at night is dangerous, and you deliberately avoid placing yourself in a dangerous situation by taking a taxi or making sure you are walking with other people. In this case, you have analyzed the situation before anything occurs that might evoke a strong emotion.

Even when using your analytical processing system to consider the possible consequences of your actions, you are still using imagery to guide your decisions. When making the decision to take a taxi or walk with others, you still process those same fearful images of being attacked, though they are markedly less vivid and thus elicit markedly weaker emotional responses. Though analytical processing is slower and more complex than experiential processing, analysis-based decisions based on uncertain perceived risks are always aided by the experience-based processing system.

Based on this understanding of the emotional motives behind decisions, researchers speculate that vivid imagery of global warming could prompt action. Anthony Leiserowitz, a principal researcher for CRED, conducted a study in which he categorized Americans' images of global warming. Americans reported 24 different categories of affect-producing images related to global warming. The three most dominant images were melting icecaps (21 percent), followed by general associations with heat (18 percent), followed by impacts on non-human nature (13 percent). Of these three, two of the images (melting icecaps and impacts on nature) refer to effects that are outside of most people's day-to-day experiences. Regarding the general associations with heat, Leiserowitz notes that "most of the references to 'heat' were relatively generic in nature and likely indicated associations with the word 'warming' in 'global warming'" (Leiserowitz, 2006). Interestingly, the next most cited image related to global warming, at 11 percent, was ozone depletion, even though the two are unrelated environmental issues.

This lack of imagery and understanding may be due to the highly complex and uncertain nature of the information on the causes and effects of climate change. Although, most agree that the atmosphere is warming and that human activity has played some role in its warming, we are uncertain of exactly how that change will affect our personal lives. The analytical system may perceive a risk when processing vague information about global warming, but, despite the efforts of Al Gore and his polar bear on the melting iceberg, the system remains uninformed by an image-generated affective response of any immediate danger. Why do we fail to perceive a risk that requires action? The answer appears to hinge at least in part on which information processing system is on duty.

Typically, when the two processing systems "disagree," the affective response usually overrides the analytical response. For example, though phobic people objectively know that a fearful stimulus will not harm them, they continue to avoid that stimulus out of the intense fearful response it generates. The images that produce the response are simply too "real" to be suppressed by reason. But the statistical information on the dangers of global warming does not evoke such vivid images, so the global warming crisis is only ever processed by the analysis-based system.

Taking a Dip in the Pool of Worry

At this point it might seem like a simple and effective way to increase concern about climate change would be to provide with the public with images that provoke strong emotional reactions. But Marx et

al. (2007) point out that even if we were to provide the American public with affective images of global warming, there is still the *finite pool of worry*. This term, coined by APS Fellow Patricia Linville and APS Member Gregory Fischer (1991), describes the phenomenon in which people's level of worry about one risk goes down as their level of worry about another risk goes up, as if they had the ability to only worry about so much at one time. Studying farmers in the Argentine Pampas, Hansen et al (2004) found that as perception of climate risk went up, perception of political risk (i.e. worry about the country's political situation) went down, and vice versa.

If people feel they do not have the time or energy to direct their attention to global warming among the myriad concerns of our nation — the economy, job security, dependence on foreign oil, war, social justice, and more pressing local environmental issues — then they will not be worried about the future consequences of failing to reverse the trend of climate change.

They Were Framed

One way to counteract this relative lack of priority and provide affective imagery is to associate environmental action with actions on other issues that people can relate to more easily. This is a form of psychological framing, as described by APS Fellow Daniel Kahneman and his colleague, the late Amos Tversky (1981), in which the same outcome of a situation is described in different ways. For example, advertisements in the Washington DC Metrorail stations are connecting concern for the environment with concern for the economy. One ad made the point that building and operating more windmills, which produce clean energy, would create more American jobs. Job creation and loss are very personal and emotional issues, especially in times like these when 82 percent of Americans say that now is a bad time to be looking for a job (Jacobe, 2008). The environmental ad, framed in terms of job creation, taps into sentiments that are probably already part of everyone's pool of worry to at least some degree. People may be much more willing to support actions that positively affect the environment if they know that by doing so they are not simply avoiding negative consequences but enacting a positive change through which their lives and their neighbors' lives will improve.

But, even if we provide compelling imagery and put climate change on the population's list of worries, we still face what Weber (1997) coined as the *single action bias* — people are likely to take only one action in order to reduce the worry they feel when perceiving a risk. For example, a family might replace the incandescent light bulbs in their home with compact fluorescent light (CFL) bulbs and, feeling that they are doing their part to reduce energy use, do little or nothing else, even with the numerous other ways to reduce energy use and carbon emissions: turning off lights when not in use, turning down the heat in the winter and the AC in the summer, carpooling to work, using public transportation, riding a bicycle instead of driving, etc. Single actions can be effective and are very important steps, but global warming is a complex issue that requires action from many different angles.

Humans seem hard-wired to stick to the status-quo until signs of danger are clearly in front of them. "There are different types of learning," says Weber, "but learning by getting hurt may still be the most effective and commonly found [type]." How then, do we encourage action to prevent global warming — a complex problem that we hope never to see the full effects of? Psychological scientists already have some suggestions: provide imagery, connect the problem with others that the populace is already worried about, and encourage multiple actions. With more research creating an ever-clearer picture of decision making, we may someday be able to convince everyone to not only replace that bulb with a

CFL, but invest in wind energy and join a carpool and…   ?

The Center for Research on Environmental Decisions

When APS Fellow and Board Member Elke Weber and Eric Johnson came to Columbia University in 1999, then-provost Jonathan Cole encouraged the two to gather researchers who were interested in the study of decision making in different disciplines such as psychology, economics, business, politics, and medicine. Together with APS Fellow and Charter Member David Krantz, Professor of Psychology and Statistics at Columbia, they founded the Center for the Decision Sciences (CDS), which sponsored a series of multidisciplinary talks that featured both local and internationally known decision researchers. These lectures became extremely popular among faculty members, postdocs, and graduate and undergraduate students.

In 2002 the National Science Foundation announced that it would fund a small number of university centers to study human responses to climate change and climate variability. Because of their involvement in CDS and Columbia's Earth Institute (which researches the link between the earth sciences and the policy sciences), Weber and Krantz responded to the call, and their proposal was one of four chosen out of many submissions to receive funding. The team that Weber and Krantz put together, which became the Center for Research on Environmental Decisions (CRED), included researchers from many disciplines and seven institutions other than Columbia. Weber explains that those chosen were "handpicked for their ability to contribute to an interdisciplinary understanding of adaptation and mitigation decisions in the face of climate uncertainty and for their demonstrated willingness to operate and cooperate in multidisciplinary environments."

CRED is now directed by a team of four co-directors: Elke Weber, David Krantz, Kenneth Broad, an anthropologist from the University of Miami, and Roberta Balstad, an historian and former director of the Center for International Earth Science Information Network at the Columbia Lamont campus. Researchers come from such various schools and organizations as the University of Miami's Rosenstiel School of Marine and Atmospheric Science, Columbia University's Department of Public Policy and Business Responsibility, Yale University's School of Forestry and Environmental Studies, the National Aeronautics and Space Administration, and The Weather Channel. Though primarily focusing on the role that psychological research has to play in our society's response to the threat of global warming, CRED incorporates the knowledge of these affiliates in the interest of disseminating that psychological research to the public and developing practical, pragmatic solutions to human-induced climate change.

CRED has ongoing research projects on five continents: North America, South America, Europe, Asia, and Africa/Middle East. CRED researchers have conducted studies among farmers of the Argentinean Pampas and rural Uganda, cattle herders of the Peruvian Andes and inhabitants of the Swiss Alps, just to name a few. "Production and pricing decisions made by groups like farmers in the face of economic, political, technological, and climatological uncertainty are very fertile testing grounds for psychological theories of judgment and choice," explains Weber.

Weber is delighted at how far CRED has come in addressing its research goals in just four years. "As a group," she says, "we have accomplished things none of us could have accomplished as individuals, and as a result the core group of researchers, graduate students, postdocs, and support staff has greatly enjoyed this experience." CRED's ongoing field studies show great promise; researchers are already

beginning to develop outreach programs for residents of rural communities around the world to help them make better environmental decisions.