

## GLOBAL WARMING: THE PSYCHOLOGY OF LONG TERM RISK

*Guest Editorial*

Beyond its objective basis in natural science, understanding, discussion, and resolution of the policy issue labeled “global warming” also depends on the way it is framed by various groups (Haas, 1992), and ultimately, viewed by members of the general public. Accordingly, there are several prisms, not entirely independent, through which to consider the global warming problem. In public discussion, natural scientists tend to frame the issue through the answers to questions like “what is the probability that global mean temperature will increase by 3 °C by 2100?” Based in part on the resulting scientific picture, economists pose additional questions like “what is the cost to the national economy of reducing carbon dioxide emissions by 10% by year 2010?” Policy makers are attentive to both these frames of reference (and others) but consider further issues like “how will climate change and emissions mitigation affect the major constituencies of my political party?”

It would be a mistake to assume that physical scientists and economists ask the basic questions while policy makers and others simply absorb the answers before developing additional questions. Over time, each group frames the issue with an eye toward responding to the questions raised by the other groups (Funtowicz and Ravetz, 1992). But experts in particular often seem to ask and answer such questions almost independent of the views of the general public. This disconnection must be of concern to anyone seriously interested in solving the global warming problem. At least with regard to democracies, it is unlikely that a stealth solution, developed and implemented without broad public engagement, could be imposed.

What does the general public make of the global warming problem? How does the public view the risks entailed by greenhouse gas emissions? What is the correspondence, if any, between the scientific picture and the public view, between the professional assessment of risk and the lay public’s perception? While considerations of the social, ethical, and cultural context for evaluating the long term risk of climate change are emerging, relatively little attention has been paid to psychological aspects (Dessai et al., 2004; Lorenzoni et al., 2005).

This special issue of *Climatic Change* follows from a workshop that was convened on 12 November 2004 at Princeton University<sup>1</sup> with a view toward addressing the psychological dimension. The workshop was motivated by the notion that environmental policies that target human behavior should incorporate insights about behavioral change and decision-making, topics central in behavioral sciences. The objective of the workshop was to inform climate scientists about the current state

of understanding of how people think about global warming and, hopefully, initiate a collaborative dialogue between climate and behavioral scientists. This is also the objective of this special issue of *Climatic Change*.<sup>2</sup>

The workshop proceeded in four segments that addressed public opinion and public values (based on methods like surveys and focus groups), individual perception of risk (how people view long term risk), judgment and decision-making with respect to long term risk, and means to improve communication of risk (e.g., by scientists and political leaders). Presentations came from experts spanning disciplines such as psychology, economics, and law, while physical scientists (and a philosopher) served as discussants.

All of the contributions to this issue are concerned with one basic question: how people think about global warming. Several of the papers, using survey methodology, address the determinants of public opinion on global warming and public support for environmental policies (Krosnick et al.; Leiserowitz; Lorenzoni and Pidgeon, this issue). This topic also emerges in other papers (Hersh and Viscusi; Jamieson; Sunstein, this issue). Another topic in the special issue is how well-established heuristics and biases in decision-making (Gilovich et al., 2002; Kahneman et al., 1982; Kahneman and Tversky, 2000) affect thinking about global warming (Baron; Bazerman; Leiserowitz; Sunstein; Viscusi and Zeckhauser; Weber, this issue).

Although the authors represent different disciplines and methodological approaches, several common themes emerge. At the surface level, both the European (Lorenzoni and Pidgeon, this issue) and the American public (Leiserowitz, this issue) seem to be concerned about global warming. However, individuals' willingness to support some policies that would directly affect them, particularly gasoline or fuel taxes, is relatively low (Hersh and Viscusi; Leiserowitz, this issue). In addition, in the US context, avowed concern about environmental issues does not always correspond with choices made in the voting booth, a pattern that Jamieson calls an "American paradox." The difference in the positions of the EU and the USA are discussed in three different papers (Lorenzoni and Pidgeon; Jamieson; Sunstein, this issue). These studies reveal that the "American paradox" may be unraveled by considering the broader political and decision-making context in which environmental issues are framed, including recent manifestations of climatic and non-climatic risks.

One of the problems US policy makers face in attempting to implement effective environmental policy is that environmental issues have become politically laden. In 1997, in an effort to increase public support for the Kyoto agreement, the Clinton administration sponsored an extensive if sporadic media campaign about the scientific evidence and consequences of global warming. National surveys conducted before and after the campaign showed little change overall in public opinion (Krosnick et al., 2000). In fact, both Republicans and Democrats *did* change their opinions but in *opposite* directions. Republicans become less concerned about global warming whereas Democrats become more concerned. Citizens used the

source of the informational campaign to draw inferences about the value of the information.

An analysis of data from a recent national survey in the USA, conducted in June 2005 (PIPA, 2005), also demonstrates the role of the political context. In this survey, 73% of respondents thought that the US should participate in the Kyoto agreement to reduce global warming. This is good news for supporters of the Kyoto agreement. Moreover, while the support was greater among Democrats (82%), the majority of Republicans (63%) also supported the US participation in the Kyoto agreement. However, a closer inspection of the data shows that the Republican support results from lack of knowledge about the position of the Bush administration. In the same survey, a stunning 43% of all respondents thought that President Bush favors the US participating in the Kyoto agreement to reduce global warming. As shown in Figure 1, this false belief made a big difference for Republicans' support for US participation. Among Republicans who were aware of the position of the current administration, only 45% supported the Kyoto agreement. What these findings show is that decisions about supporting particular policies may be partially based on political rather than scientific or economic considerations. Citizens are often informed not by the facts but by the positions of their own parties (Bartels, 2002). It is interesting to note in this context that Viscusi and Zeckhauser (this issue) found that respondents who predicted a Bush presidential victory in 2004 (perhaps implicitly revealing their voting preference to some extent) also predicted smaller temperature increases in the future.

Accordingly, the "American paradox," expressed in differences between the EU and the USA on the environment may reflect differences in political leadership as

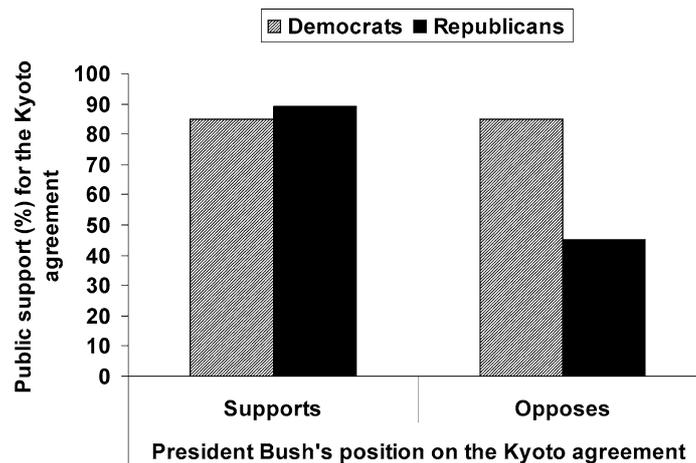


Figure 1. Public support for the US participation in the Kyoto Protocol as a function of respondents' political affiliation and their beliefs about the position on President Bush on the Kyoto agreement. Data from a national survey in the USA conducted in June 2005 by the Program on International Policy Attitudes ([www.pipa.org](http://www.pipa.org)).

much as any other factor, although this finding begs the deeper question of why leaders chose to spend political capital on particular issues. One implication for the US is that the likelihood of implementing policies on global warming is reduced as long as partisan divisions remain sharp.

As noted earlier, both Lorenzoni and Pidgeon and Leiserowitz report high level of public concern about global warming in Europe and the US. However, the personal relevance of the concern is not strong. As Leiserowitz shows (Table I, p. –), only 13% of Americans were concerned about the impact of global warming on themselves and their family or on their local community. These findings resonate with Weber's argument (see also Leiserowitz on the role of affect) that people are likely to act on decisions derived from affective feelings and personal experience but not on decisions from statistical descriptions of risks. Taken together, these studies point to additional difficulties on the policy front until the impacts of warming are broadly visible. Also relevant is the high public support for governmental interventions that do not directly affect citizens' individual behaviors and the low support for policies that do (Leiserowitz, this issue). Thus, the publics in both Europe and the US appear to be "concerned but unmoved."

It would be of great interest to revisit such studies now, after the devastating European heat wave of 2003, the Atlantic hurricane seasons of 2004 and 2005 (particularly given broad coverage of hurricane Katrina and its aftermath), and the media coverage of the consequences of Arctic warming. Does the public now view global warming in more personal terms? How pervasive is this view, has it affected attitudes toward particular policies, and how long may it last absent reinforcement?

The lack of knowledge of political and scientific facts can combine with decision biases (Baron; Bazerman, this issue) to further undermine successful policy actions. Wariness about global warming can reflect narrow concerns about local temperatures rather than reasoning about its large scale consequences. As pointed out by Lorenzoni and Pidgeon, the degree of concern in European countries seems to vary as a function of the local temperature. In fact, as shown in Figure 2, the degree of concern reported in their Figure 1 (p. –) for 15 European countries, is strongly correlated with the average temperature in July, the hottest month in Europe. On the other hand, temperature is only one factor in the mind of both people and governments. Other impacts, such as incidence of strong storms, also affect both policy makers and the general public. And, with Germany and Scandinavian countries having historically taken a leading role on this issue, the relation between temperature and national policy on global warming is at best obscure.

Another vexing challenge is that successful policy actions are often initiated after earlier regulatory failures (such as current voluntary approaches in the US), as pointed out by Sunstein (see also Vogel, 2003). The combined effects of concerns delayed until impacts are obvious and personal, and effective policy actions delayed by early failures lead to what Bazerman calls "predictable surprise." Undoubtedly, we shall be surprised by many of the consequences of global warming despite the

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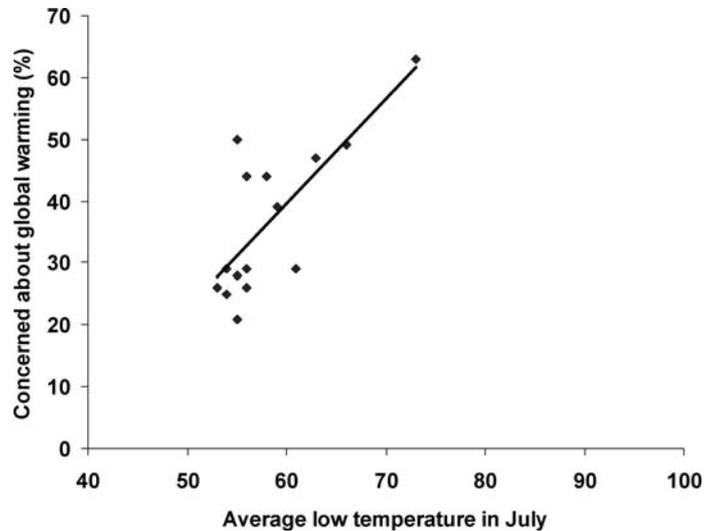


Figure 2. Scatter plot of the average daily minimum temperature (°F) in July and the percentage of respondents reporting that they are “very worried” about climate change for 15 European countries (see Figure 1 in Lorenzoni and Pidgeon, this issue).

fact that we had the information predicting the seriousness if not the details of these consequences.

The psychological perspective not only suggests why implementing policies to stem the warming has proven difficult, but also illuminates characteristics of a successful strategy. Among the clearest is the need for experts to interpret abstract global changes in the language of local consequences (as suggested, directly or indirectly by the Baron, Leiserowitz, Sunstein, Weber, and Zeckhauser and Viscusi articles, this issue). Translating general worries about global warming into local personally relevant concerns, the papers suggest, may increase the possibility of individual behavioral change. For example, citizens may become more likely to buy high-fuel-economy cars or compact fluorescent light bulbs, paving the way for comprehensive governmental policies.

Finally, there is the matter of political leadership, particularly in the US where a poisonous partisan divide (along with potent economic interests) inhibits progress across a spectrum of environmental and other socioeconomic issues. As Nobel Laureate Daniel Kahneman noted in a lunchtime address at the workshop, the public allots limited psychological space for political problems (what Weber in this volume refers to as “finite pool of worry”), perhaps focusing on no more than one big problem at a time. Leaders can’t always force resolution of an issue and as noted above, they can sometimes aggravate the partisan divide and make things worse. But strong leaders can at least create the conditions where attention is paid to a key issue like global warming. Without such a level of attention, timely solutions simply will not be implemented.

## Notes

<sup>1</sup>The workshop was sponsored by the Cooperative Institute for Climate Science (a NOAA Cooperative Institute sponsored by NOAA's Office of Oceanic and Atmospheric Research (OAR)) and the Program in Science, Technology, and Environmental Policy of Princeton University's Woodrow Wilson School of Public and International Affairs.

<sup>2</sup>We would also like to draw the readers' attention to *Risk Analysis* vol. 25 issue 6, which presents papers from a workshop also held in 2004 at the Tyndall Centre, University of East Anglia, covering related ground.

## References

- Bartels, L. M.: 2002, 'Beyond the running tally: Partisan bias in political perceptions', *Poli. Behavior* **24**, 117–150.
- Dessai, S., Adger, W. N., Hulme, M., Turnpenney, J., Köhler, J., and Warren, R.: 2004, 'Defining and experiencing dangerous climate change', *Clim. Change* **64**, 11–25.
- Funtowicz, S. O. and Ravetz, J. R.: 1992, 'The emergence of postnormal science', in R. von Schomberg (ed.), *Science, Politics, and Morality*, Kluwer Academic, Dordrecht, pp. 85–123.
- Gilovich, T., Griffin, D., and Kahneman, D., (eds.): 2002, *Heuristics and Biases: The Psychology of Intuitive Judgment*, Cambridge University Press.
- Haas, P. M.: 1992, 'Epistemic communities and international policy coordination: Introduction', *International Organization*, MIT Press, vol 46, no. 1, pp. 1–35.
- Kahneman, D., Slovic, P., and Tversky, A. (eds.): 1982, *Judgment Under Uncertainty: Heuristics and Biases*, Cambridge University Press.
- Kahneman, D. and Tversky, A. (eds.): 2000, *Choices, Values, and Frames*, Cambridge University Press.
- Krosnick, J. A., Holbrook, A. L., and Visser, P. S.: 2000, 'The impact of the fall 1997 debate about global warming on American public opinion', *Public Understanding of Science* **9**, 239–260.
- Lorenzoni, I., Pidgeon, N. F., and O'Connor, R. E.: 2005, 'Dangerous climate change: The role for risk research', *Risk Analysis* **25**, 1387–1398. DOI. 10.1111/j.1539-6924.2005.00686.x
- Program on International Policy Attitudes (PIPA): 2005, *Americans on Climate Change: 2005*. Questionnaire available online at [http://www.pipa.org/OnlineReports/ClimateChange/ClimateChange05\\_Jul05/ClimateChange05\\_Jul05\\_rpt.pdf](http://www.pipa.org/OnlineReports/ClimateChange/ClimateChange05_Jul05/ClimateChange05_Jul05_rpt.pdf). The analysis was performed by the authors on the raw survey data available on request from PIPA.
- Vogel, D.: 2003, 'The Hare and the Tortoise revisited: The new politics of consumer and environmental regulation in Europe', *British J. of Poli. Science* **33**, 557–580.

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