Symposium: Global Change and Cognition

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Abstract

We are living in a period of considerable global change. From climate change to peak oil we are facing multiple challenging problems that need to be managed carefully and wisely. Cognitive science has much to say about how people are likely to view those problems and how they will respond to them. This symposium will shed some light on those cognitive processes and how they can help—or indeed hinder—the problems we are facing.

Keywords: Global change; cognition of climate change; public acceptance of science; complex reasoning

Summary of Symposium

There can be little doubt that human societies are facing numerous serious problems, ranging from food insecurity to resource depletion and, perhaps most serious of all, climate change. Although technological solutions to those problems arguably exist, to date there has been little enthusiasm among politicians and the public to tackle those problems. At least in part, this inaction has resulted from political factors. However, the inaction may also reflect factors related to the limitations of human cognition: People's reasoning is known to be subject to numerous biases and limitations, and our cognitive apparatus may be ill-matched to the magnitude of current global problems.

Nowhere is this mismatch more apparent than with respect to climate change, which challenges numerous cognitive and psychological processes. At a basic cognitive level, people have difficulty understanding that emissions are cumulative and that greenhouse gases remain in the atmosphere even if emissions are reduced (Sterman & Sweeney, 2007). At a more abstract level, the public in some countries—in particular the U.S. but also in Australia—has become increasingly polarized in their attitudes towards science. Since the 1970's, Conservatives—unlike Liberals or Moderates—have become increasingly skeptical and distrustful of science (Gauchat, 2012), and people who embrace a laissez-faire vision of the free market are less likely to accept that anthropogenic greenhouse gas emissions are warming the planet than people with an egalitarian-communitarian outlook (Dunlap & McCright, 2008; Hamilton, 2011; Heath & Gifford, 2006; Kahan, Jenkins-Smith, & Braman, 2011; McCright & Dunlap, 2011).

In light of the fundamental importance of science to the solution of global problems, the rejection of well-established scientific facts by large segments of the population must be of concern. How can this rejection be overcome? Even putting aside ideological barriers, how can people's reasoning about the future become better calibrated with the actual risks from global change?

This symposium surveys a broad range of research that addresses these questions and related issues. **Tania Lombrozo** will highlight the fragile relationship between understanding particular scientific claims and accepting them as true; **John Cook** will analyze the multi-faceted role of perceived scientific consensus (i.e., what the public believes scientists are thinking) and how that impacts attitudes; **Gordon Brown** will be presenting an agent-based simulation that is built around consensus-detection and will show how that explains attitude polarization; **Ben Newell** will report on how people judge temporal distances when considering future gains and losses; and **Ullrich Ecker** will explain how best to deal with the dissemination of misinformation that characterizes much contemporary public debate.

Contributions

Understanding science vs. accepting it

Tania Lombrozo (University of California, Berkeley)

Addressing many contemporary challenges—such as climate change and increasing resistance to antibiotics—will require more than scientific and technological advances; it will also require changes in people's attitudes and behaviors. To what extent are people's attitudes towards science and particular scientific claims shaped by their understanding of the science? There is a relatively fragile relationship between understanding particular scientific claims and accepting them as true. Nonetheless, there does seem to be a relationship between people's understanding of the nature of science in general, on the one hand, and their acceptance of specific scientific claims, on the other. Tania Lombrozo will present data for the case of evolution and consider implications for education, science communication, and policy.

How does perceived consensus reduce the biasing influence of worldview on climate change attitudes?

John Cook (University of Queensland)

It is well established that political ideology has a strong influence on public opinion about climate change, and on how people update their beliefs in the light of new climate information. Specifically, people who endorse an extreme view of free-market economics tend to reject findings from climate science. Providing people with information about the scientific consensus has been shown to partially neutralise this ideological bias (Lewandowsky, Gignac, & Vaughan, 2012). Paradoxically, this is despite the fact that those most sceptical about climate change are also most distrustful of the scientific community. Data from several experiments are presented that explore the psychological mechanisms underlying the effectiveness of consensus information. The results are modeled within a Bayesian belief network.

Social norms and polarization of attitudes

Gordon D. A. Brown (University of Warwick)

Gordon Brown will describe an agent-based model of social norm effects and polarisation. The model will be applied to understanding attitudes towards climate change. The model assumes that agents located within a social network observe the behavior of neighbours and infer from that behavior the social distribution of particular attitudes (e.g. towards climate change). Agents are assumed to dislike behaviours that are extreme within their neighbourhood (social extremeness aversion), and hence have a tendency to conform. However, agents are also assumed to prefer choices that are consistent with their own true beliefs (authenticity preference). Behavioural choice—and expression of attitudes towards climate change—reflects a compromise between these opposing principles. The model sheds light on the role of perceived rather than actual scientific consensus, and "balanced" media coverage, on attitudes to climate change.

How to weigh your options with the passage of time: Subjective and objective time preferences

Ben R. Newell (University of New South Wales)

Many global challenges are difficult precisely because they involve trade-offs between immediate certain costs—e.g., increase in electricity prices to reduce carbon emissions—and uncertain future benefits—e.g., avoiding the worst and costliest effects of climate change. It has long been known that people discount the future very steeply; that is, they consider present monetary amounts to be more salient and valuable than when they are delayed into the future, even if those future amounts are objectively far greater. The functional form of people's discounting, however, is not well understood. This talk presents work on inter-temporal choice that sheds light on how people deal with trade-offs that involve a future cost. A particular focus is the difference between subjective and objective time estimates (cf. Malkoc & Zauberman, 2006; Zauberman, Kim, Makoc, & Bettman, 2009) and their implications for hyperbolic and exponential discount functions.

Misinformation, disinformation, and the need for debiasing

Ullrich K. H. Ecker (University of Western Australia)

The dissemination of misleading information presents an obstacle for the success of science communication, public education, and evidence-based policy. Of particular concern is the resilience of misinformation: Even in the presence of clear corrections, misinformation often continues to influence people's memory and reasoning. Misinformation is particularly difficult to correct when it supports existing attitudes and when corrections counter those attitudes. Refutations of incorrect beliefs hence need to be well-designed to be efficient. Ullrich Ecker will discuss the effects of attitudes on the processing of misinformation and retractions, and highlight the important factors in the design of refutations.

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