

# THINKING ABOUT GLOBAL WARMING

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**Abstract.** Attitudes toward global warming are influenced by various heuristics, which may distort policy away from what is optimal for the well-being of people. These possible distortions, or biases, include: a focus on harms that we cause, as opposed to those that we can remedy more easily; a feeling that those who cause a problem should fix it; a desire to undo a problem rather than compensate for its presence; parochial concern with one's own group (nation); and neglect of risks that are not available. Although most of these biases tend to make us attend relatively too much to global warming, other biases, such as wishful thinking, cause us to attend too little. I discuss these possible effects and illustrate some of them with an experiment conducted on the World Wide Web.

## 1. Introduction

It is just possible that we have it wrong about global warming. I don't mean the science of it, but, rather, the policy. What we have wrong is what I take to be the standard activist view—held by almost everyone except by some politicians who wish away the science and by a few economists.

According to the standard activist view<sup>1</sup> people have caused the accumulation of greenhouse gases largely because we have burned fossil fuel and cut forests. We did this inadvertently for a while (despite the fact that global warming was predicted before 1900), but we have been doing it even after most of us knew what we were doing. This warming will do some clearly predictable damage. It will cause oceans to rise, which will make life even more difficult for countries like Bangladesh. It will require changes in the use of land, and on the whole may make agriculture more difficult and reduce the food supply. It will disrupt many species of plants and animals, including some that are part of the human food supply. It will also cause unpredictable changes, and most such surprises turn out to be for the worse.

Because we have caused this problem, we need to fix it. "We" refers especially to the countries that are heavy users of fossil fuels, such as the U.S., the countries of Europe, and Russia. Fixing the problem means undoing what caused it, that is, cutting back on the use of fossil fuels, and possibly also planting forests. The negotiations leading to the Kyoto treaty have not challenged this view. They have focused largely on the problem of fairness in allocating the burden among nations, with major issues concerning the balance of prior causation and ability to pay, and the extent to which countries can fulfill their obligations by paying for emission

reductions in other countries. These fairness issues are interesting; I have discussed them elsewhere (Baron, 1998; Bazerman, et al., 2003).

An alternative view, stated clearly by Schelling (1992, 1996) and recently endorsed by the Copenhagen Consensus (2004) is that the attempt to undo what we have done, as envisioned in the Kyoto treaty, is too little, too late. Any effort that would have some hope of making a dent in the problem by undoing it is enormously expensive. If, however, we in the rich nations put global warming in a broader context by asking what we can do to help those most in need of help (in part because they are the least able to deal with the effects of warming), we will find a lot of low-hanging fruit. In particular, given that the harms of global warming will fall most heavily on the poor countries, we can do much right now to help these countries develop, so that they are in a better position to withstand the effects of warming, which is now essentially inevitable.

Moreover, although warming has unknown but imaginable risks, so does the situation of the poor countries now and in the foreseeable future. These include new epidemics and political upheaval. The risks could affect the rich countries as well as the poor ones.

Note that this alternative view accepts the scientific predictions of global warming and its effects. It merely asks the kinds of hard questions about cost and effectiveness that the dismal science is known for asking.

It also accepts that some efforts to reduce global warming are cost effective, because their costs are very low or negative (in the form of other benefits), even though their effectiveness at undoing warming is also low. Such no-regret options include reductions in the use of imported oil in the U.S., which would help with problems of trade, international relations, and air pollution, not to mention traffic jams and the sport-utility arms-race.

I cannot pass judgment on the correctness of this alternative view, which hinges on cost-effectiveness estimates, which, in turn, depend on assumptions about available technologies.<sup>2</sup> However, enough people take it seriously so that it seems worthwhile to ask about the impediments to its acceptance, if it were correct. In asking this, I take the view that I have taken elsewhere, namely, that people's intuitions about matters of public policy often lead them to favor policies that are sub-optimal in terms of the aggregate good of the very same people. Systematic biases in intuitive thinking, often caused by the use of heuristics, are held by everyone, including citizens, government officials, and journalists.

## 2. Biases

Several biases may affect people's thinking about global warming. I shall describe some of them in this section and then present additional experimental evidence about their existence in the next section. In the last section, I shall discuss some additional biases, not tested in the experiment.

## 2.1. NATURALISM

People seem to judge that harms caused by people are worse than those caused by nature: “I don’t mind natural extinctions, but I’m not too enthusiastic about extinctions that are directly caused by man. . . . If it’s going to happen, it should happen naturally, not through anything that man has an influence on” (from a respondent quoted by Kempton, Boster et al. (1995), p. 109).

Questionnaire studies show the same effects. People are more willing to pay to reduce risks when the source of harm is human than when the source is natural (Kahneman et al., 1993; Kahneman and Ritov, 1994). For example, subjects in one study were willing to contribute about \$19 to an international fund to save Mediterranean dolphins when the dolphins were “threatened by pollution” but only \$6 when the dolphins were “threatened by a new virus.” Similarly, in another study, subjects thought that compensation for injuries such as infertility should be greater when the injury is caused by a drug rather a natural disease, even if the penalty paid by the drug maker does not affect the amount of compensation paid to the victim (Baron and Ritov, 1993).

Analogously, many people seem to think that the relevant scientific question is whether people caused global warming. People think that, even if global warming is occurring, is dangerous, and could be prevented by reductions in emissions, we have less reason to cut emissions if we did not cause it.

One account of these results is that people use a heuristic principle: “Natural is good.” This is a reasonable heuristic. Natural selection has endowed biological systems with some stability, which could be disrupted by changes. But this principle is crude at best. It is of course reasonable to think that, in general, outcomes caused by people are easier to control than outcomes caused by nature. In the case of global warming, however, the question about cause is not going to help us much in answering questions about control. The latter questions should be the focus of discussion.

The next sub-section suggests an alternative account of the results in question.

## 2.2. THE POLLUTER PAYS

A powerful intuition is that people should clean up their own waste. If you cause a problem, you own it. When I play tennis, I will carefully deposit the lid of my tennis ball can in the trash, even when I could more easily pick up 5 lids that others have left on the court. Baron et al. (1993) found that subjects preferred to have companies clean up their own hazardous waste, even if the waste threatened no one, rather than spend the same amount of money cleaning up the much more dangerous waste of a defunct company. Ordinarily, it is easiest for people to undo their own harm, but this principle may be applied even when no such justification is available.

Another justification of the polluter-pays principle is that, when enforced, it deters people from causing harm. But the deterrent effect of this principle is absent when people do not know what they are causing, or when alternatives are too costly.

It might be argued that we should have known about global warming since 1896, when Svante Arrhenius first proposed the idea and then provided estimates that agree fairly well with modern computer models. Although Arrhenius was an important scientist, who won the Nobel Prize for other work, it could still be argued that too many scary findings and theories sit around in old journals for anyone to dig through them all and take them seriously, even when their authors are famous. A brief warming scare in the 1930s may have been the cry of “wolf” that led to neglect of later cries (Mahlman, 1997). Yet, in the 1980s, some observations suggested that warming had begun, and the world started to take it seriously. In hindsight, it may turn out that the scientific uncertainties were exaggerated, but at the time they seemed great enough to discourage precipitous action, especially in view of the excessive pessimism of earlier predictions of environmental disaster (Simon, 1980).

It therefore is not clear what lesson people would learn from a decision to hold the “polluters” responsible for the cost of reducing global warming. Heed every warning? No, there are too many. The desire to make the polluters pay seems like a good intuition because it usually creates good incentives for the future, but, in the case of global warming, that justification seems weak. The intuition remains strong.

The polluter-pays principle may explain the results in the last sub-section concerning naturalism. People may feel responsible for harms caused by other people, as if we were all responsible for each other. This feeling of responsibility may be greater when people imagine themselves as part of some particular group—such as the developed nations or residents of a single nation—that has caused the problem.

### 2.3. UNDOING

A related principle is that it is better to undo the harm one has caused than to do more good in some other way. This seems to be an extension of the basic idea that those who cause harm should make reparations that are as close as possible to undoing the harm itself. Beattie and Baron (1995) found that people prefer in-kind penalties over out-of-kind penalties. For example, if a company caused a fire that destroyed a forest (beach), subjects would rather have the company pay for the planting of a new forest (preservation of a beach) than for preservation of a beach (planting of a new forest). This was a matter of what the company paid for, not what was done; the forest was to be planted anyway.

In the case of global warming, it may turn out that the polluters could do more good for less money by helping victims with general economic development, rather than by undoing the causes or effects of global warming. This is Schelling’s main

claim. Yet, the bias to undo may prevent people from taking such alternatives seriously.

#### 2.4. PAROCHIALISM

Another source of resistance to Schelling's proposal is that it explicitly involves helping people in other countries. By contrast, the usual account of what to do about global warming does not state exactly who the victims are, hence who would benefit from reductions in global warming. People may resist the idea of helping outsiders, i.e., foreigners, even if they are poor foreigners. Perhaps the resistance is especially strong when the help is compulsory, e.g., higher taxes.

The tendency of people to favor a group that includes them, at the expense of outsiders and even at the expense of their own self-interest, has been called parochialism (Schwartz-Shea and Simmons, 1991). A prime example is nationalism, a value that goes almost unquestioned in many circles, just as racism and sexism went unquestioned in the past. Nationalists are concerned with their fellow citizens, regardless of the effect on outsiders. Nationalists are willing to harm outsiders, e.g., in war, for the benefit of co-nationals.

Several experiments demonstrate this sort of in-group bias, using artificial small groups rather than nations. Bornstein and Ben-Yossef (1994), for example, gave each subject an endowment of money, which could be "contributed" or not. In a condition with two competing groups, the contribution would increase the payoff for the subject's group and decrease the payoff for members of the other group, leading to a result in which the contribution is lost and no net good is done. Subjects were more willing to contribute in this condition than in a control condition, in which the other group was unaffected, so that net good resulted from the contribution because the subject's group benefited on the whole. Similar results have been found by others (Schwartz-Shea and Simmons, 1990, 1991).

Baron (2001) has argued that this parochialism effect is partly the result of an illusion, in which people think something like, "I am a member of my group. So anything that helps my group helps me. Thus, if I sacrifice for my group, I help myself." What this argument ignores is that the personal benefit from one's own sacrifice is small, especially when the sacrifice involves something like paying more for gasoline in order to reduce pollution. Baron asked subjects to calculate the effects of their contribution on themselves and others. This manipulation reduced the parochialism effect. Thus, parochialism is somewhat labile. As suggested by Singer (1982), it may be possible, through reason, to understand the arbitrariness of group boundaries. The more that people think of boundaries as arbitrary, the more they can direct their non-self-interested concern at the greater good rather than the parochial interests of their group. Yet, in the absence of such understanding, parochialism will cause people to resist any proposal that taxes them in order to help outsiders.

JONATHAN BARON

### 3. Experiment

In this section, I report an experiment testing for some of the biases I have listed: polluter-pays, undoing, naturalism, and parochialism. I presented subjects with scenarios in which rich nations could make a sacrifice in their current economic well-being—a payment—in order to counteract the future harms of global warming. Subjects indicated how large the payment should be.

I varied the cause of the warming: natural; rich nations including “your own” nation; rich nations not including own nation; or poor nations. A naturalism bias would imply less willingness to pay when the cause was natural. I also varied the nations affected, the “victims”: rich including own nation, other rich, or poor. Parochialism would imply a greater willingness to pay when the subject’s nation was a victim. Polluter-pays would imply higher payment when own nation is the cause.

Each scenario was followed by three questions about payment. One concerned mitigation or prevention. (The term “mitigation” probably should have been “adaptation.”) The next two contrasted mitigation or prevention with a proposal that would help the victims more efficiently. Undoing would imply that subjects should still favor mitigation or prevention over this more efficient option.

The experiment was conducted on the World Wide Web, using a panel of subjects who are typical of the U.S. adult population in age, income, and education, but untypical in sex, being mostly women. Some are not from the U.S., but the experiment did not assume that the subjects were U.S. residents. Subjects were paid, and covertly timed. The pay is sufficient to motivate most subjects to attend to the items, which are much more numerous than those typically used in studies in which subjects are asked to contribute a few minutes of their time without pay.

#### 3.1. METHOD

The 76 subjects ranged in age from 22 to 74 (median 42.5), and 26% were male. Five other subjects were eliminated on the basis of very fast times, including those on the very first case, which required careful reading.

The experiment began with general background about global warming<sup>3</sup>, a definition of economic effects<sup>4</sup>, and then a description of three types of actions:

The questions concern things that rich countries could do that might reduce global warming, mitigate its effects, or compensate for its economic effects. To do these things, the rich countries must spend money now, and the benefits will come in 50 years.

Mitigation attempts to undo the direct effects of warming. For example, dikes mitigate the effect of rising sea levels, and irrigation mitigates the effect of loss of rainfall on cropland.

#### THINKING ABOUT GLOBAL WARMING

Assume that you live in a rich country, such as the U.S. or Japan. Also assume that the rich countries that can help have the same population as the countries that are affected. The questions concern what kind of sacrifice, if any, the rich countries should make now, in order to reduce later economic harm.

The instructions concluded with technical instructions.<sup>5</sup>

A typical item was the following, with bold used to indicate parts that changed from item to item (which were also color coded for condition):

Suppose that warming is caused by human activity in **some rich countries including your own**. And the effect is felt by **other rich countries not including your own**, where it would cause a 10% decline in the economy in 50 years.

Suppose further that your country and the other rich countries could largely **prevent this decline by taking steps to reduce global warming (such as reducing emissions)**, but such actions would require paying a price now in terms of their own economies. This is the only way to help those affected.

What is the most that the rich countries should be willing to pay now, as a reduction in their economies, in order to reduce in 50 years the 10% economic decline caused by global warming to a 2% decline in other rich countries not including your own. (Suppose that you were voting, and if a majority gave an answer at the actual cost or higher, then the actual cost would be paid.)

None; should not pay at all. 1% 2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% or more [same scale used after each question] (*Mean answer [not shown to subjects]: 5.05%.*)

Now suppose that the rich countries had another option. They could provide general economic assistance now in a way that does not reduce global warming and does not mitigate its direct effects. This assistance would reduce the 50-year 10% economic decline to only 1% for the same cost as the first option. The rich countries must choose one option only. If they vote for both, then the one with the highest average value to the voters will take effect.

What is the most that the rich countries should be willing to pay now in order to **prevent this decline by taking steps to reduce global warming (such as reducing emissions)** (the original option, which would reduce the 10% economic decline to 2%)? (*Mean answer: 4.88%.*)

What is the most that the rich countries should be willing to pay now in order to provide general economic assistance (reducing the 10% economic decline to 1%)? (*Mean answer: 4.55%.*)

Twenty-eight items were presented in a random order chosen for each subject. Fourteen items concerned prevention, as in the example, and the other 14 concerned mitigation, with the second and third phrases in bold replaced with “**mitigate the**

**effects of global warming through projects designed to counter its effects (such as dikes).”**

The items with each group of 14 varied in the cause of the warming and in its victim, the group that would benefit if some action were taken, as follows (with each of the causes after the first three cases beginning with “human activity in some”). The numbers the last column are the mean responses, to be explained later.

Cause	Victim	Mean
Nature	Some poor countries	4.51
Nature	Some rich countries including your own	5.74
Nature	Some rich countries not including your own	4.21
Poor countries	Some rich countries including your own	5.12
Poor countries	Some rich countries not including your own	4.32
Poor countries	Other poor countries	4.14
Poor countries	The same poor countries	4.02
Rich countries including your own	Other rich countries not including your own	5.29
Rich countries including your own	Some poor countries	5.61
Rich countries including your own	The same rich countries	6.26
Rich countries not including your own	Other rich countries including your own	5.11
Rich countries not including your own	Other rich countries not including your own	4.16
Rich countries not including your own	Some poor countries	4.53
Rich countries not including your own	The same rich countries	4.57

In sum, half of the cases involved mitigation and half involved prevention, for the first two questions on each screen. The third question was always about alternative, and more efficient, ways of helping. The contrast between the first question and the third thus tested the strength of the desire to undo, rather than help in some other way.

Within each group of 14 questions, the experiment varied the cause of the warming (rich, poor, or nature), the victim (rich or poor), the role of “your” country as a cause and as a victim (necessarily nested within “rich”), and whether the causes and victims were the same.

Some combinations of variables made no sense, so the data were analyzed using multiple regression, within each subject, to take partial confounds into account. When interactions could be defined, none was significant, so I report main effects only.

## 3.2. RESULTS

The mean contributions for the three questions, respectively (also shown in above), were 5.05% (prevent or mitigate/adapt, s.d. 3.50% across subjects), 4.88% second (prevent or mitigate/adapt with the alternative option to provide general economic assistance, s.d. 3.40%), and 4.55% (for the assistance option, s.d. 3.48%). The first question was significantly higher than the third ( $t_{75} = 2.12$ ,  $p = 0.0373$ , two tailed), but the other differences were not significant.<sup>6</sup> This result implies that subjects generally preferred to do something directly about the problem rather than help in other ways, even when the latter is slightly more efficient. This result provides evidence for an undoing bias.

Recall that the pages differed in whether the solution involved mitigation or prevention. Mitigation was slightly, but not significantly, more strongly preferred than prevention, with a mean difference of 0.49% ( $t_{75} = 1.28$ ,  $p = 0.2028$ , collapsing across the three questions). This non-result is not relevant to any of the biases at issue. All subsequent results collapse across this variable.

The raw means for the 14 categories are shown above. The raw means for causes were 5.1 for rich countries, 4.0 for poor countries, and 4.8 for nature. However, these classifications are confounded with other effects.

The remaining analyses are based on within-subject regressions with all variables standardized within each subject (setting the dependent variable to 0 when it had no variation). I fit a model to each subjects responses with the following predictor variables:

RichCause The problem is caused by rich nations.

PoorCause The problem is caused by poor nations.

OwnCause The victims are the cause of the problem.

RichVictim Rich nations are the victims.

YouCause Your nation was in the group that caused the problem.

YouVictim Your nation is in the group of victims.

Note that natural cause is coded as 0 (absent) for both RichCause and PoorCause, and poor nations being victims is just the absence of RichVictim. Mean regression coefficients were tested by two-tailed  $t$  tests across subjects.

RichVictim had a nearly significant negative effect ( $-.06$  standardized coefficient,  $t_{75} = -1.75$ ,  $p = 0.0847$ ), suggesting that subjects were slightly more willing to pay to help poor nations, other things being equal.

OwnCause had no significant effect (relative to nature). Nor did RichCause (relative to nature), PoorCause evoked a lower willingness to pay (again, compared to nature). The experiment thus failed to find a naturalness effect. In a separate analysis with a contrast that compared rich and poor, the difference between the two was significant, with greater willingness to pay when rich nations were the cause ( $t_{75} = 2.48$ ,  $p = 0.0153$ ). This result support the polluter-pays principles,

JONATHAN BARON

although it is also consistent with an interpretation in terms of group responsibility (since the subject is from a rich nation).

Moreover, YouCause had a significant effect (.21,  $t_{75} = 5.62$ ,  $p = 0.0000$ ). The results for YouCause and RichCause support the view that willingness to pay is a function of perceived responsibility, but naturalness as such has no effect here. People feel most responsible when their own nation caused the problem, somewhat responsible when other rich nations caused it, but not particularly responsible when poor nations caused the problem as opposed to nature.

YouVictim also had a clear effect (.29,  $t_{75} = 7.44$ ,  $p = 0.0000$ ), supporting an account in terms of parochialism. Note that the benefits of contributing are 50 years hence, when much of the population will be new. (The correlation of this coefficient with age of the subjects was 0.04, which is inconsistent with an answer in terms of pure self-interest.)

#### 4. Discussion

The results suggest that people favor undoing the effects of global warming, rather than providing other, more efficient, economic assistance. People also tend to be parochial, more concerned with their own co-nationals than with others. Moreover, they are also willing to pay to reduce harm that “they,” in some general sense, have inflicted. The “they” extends to residents of other rich nations but not, in this study, to humans on the whole. Other evidence for naturalness bias might also be interpreted in terms of “own cause” bias. This is an avenue for future research.

Evidence for the polluter-pays principle is less clear. When poor nations caused the problem, they were not required to pay for it, although rich nations were required to do so. Conceivably, the polluter-pays principle for poor countries is masked by a desire to avoid harming those who are already worse off.

##### 4.1. OTHER BIASES FAVORING OVERSPENDING ON CLIMATE CHANGE

The experiment reported results relevant to four possible biases, finding clear evidence for two of them: undoing and parochialism. The undoing bias leads us to want to spend more to undo the effects of human-induced climate change, even if other expenditures are more efficient in promoting the general good. Other possible biases might work in this direction, less consistently.

One such bias results from fluctuations in public attention to long-term risk (Kuran and Sunstein, 1999). People become concerned about risks in part through a process of social contagion. Discussion of risks in the media promotes concern, which promotes more media stories, and so on, until some other risk takes over the stage. Fluctuations in concern do not seem to reflect the seriousness of the

#### THINKING ABOUT GLOBAL WARMING

risk itself (Loewenstein and Mather, 1990). More generally, attitudes toward risk are subject to “social amplification” (Kasperson et al., 1988). Global warming has occupied public attention for some time, perhaps because we keep being reminded of it by changes in the weather. Recent hurricane seasons (2004 and 2005) are an example, although probably these had nothing to do with warming. Of course, terrorist attacks are the risk of the moment, but they are on a different stage—human as opposed to environmental—hence possibly incapable of reducing concern with global warming.

Global warming may be contrasted with other environmental risks that may be receiving too little attention right now. These include overfishing (Baron, 1998; Bazerman et al., 2001) and the loss of all sorts of species throughout the world. Of course, global warming will exacerbate species loss, but most of the decline is caused by other kinds of human activity. Loss of species might be much like global warming, in that there isn’t much we can do about it at a reasonable cost. However, it is different from global warming in that solutions are largely within nations, and some relatively inexpensive (and ineffective) solutions have already been put in place, such as the Endangered Species Act in the U.S. (Bazerman et al., 2001).

The solutions to overfishing are mostly inexpensive. Indeed, in the long run they are almost cost free, since regulation of fishing will help both consumers and fishers. Failure to solve the problem can have the same kind of unpleasant—and possibly disastrous—consequences that global warming can have. Some poor countries depend on ocean fish as their main source of protein. For resident of rich countries, fish are part of a healthy diet, and their absence will make such a diet more costly and less palatable, although some technologies (such as farming) may help. Yet, the world is having an even more difficult problem regulating fishing than it is having with greenhouse gas emissions.

The Copenhagen Consensus (2004) lists a number of other problems of this sort, most of which are not receiving their due of public attention, such as malnutrition (which has long-run effects on productivity as well as immediate effects). The main concern is with helping the world’s poor, but that is arguably where the greatest need is. And the status of the poor can affect the rich indirectly in many ways.

Unfortunately, none of these problems is an easy sell politically. Opposition to solving them arises from other biases, which I have discussed elsewhere (Baron, 1998; Baron et al., in press), including parochialism and wishful thinking. In another context, I have suggested two general solutions to the political problems (McCaffery and Baron, in press). One is education in economics. Many of the biases are undermined by the general perspective of economics, which compares all costs and benefits, with all options on the table. The other is increased reliance on national and international agencies for decision making, within the larger context of democratic government. For example, the U.S. Federal Reserve has largely removed the issue of interest rates from politics; people have come to trust it. The same thing could happen with agencies that allocate funds for risk reduction or

JONATHAN BARON

poverty reduction. Clearly education will facilitate the development of trust. And the agencies must do their job well.

#### 4.2. BIASES FAVORING UNDERSPENDING ON CLIMATE CHANGE

I have focused on biases that cause people to worry too much about global warming and too little about other problems. Surely other biases have the opposite effect. One is wishful thinking. People who oppose government regulation tend to distort facts so as to convince themselves that no regulation is needed. They also convince themselves that uncertainty will be resolved in their favor (Baron et al., 1990). They may even endorse or accept unsupported scientific positions, such as the belief that climate change is not occurring.

Parochialism can also favor underspending when people focus on the fact that prevention of climate change will benefit mostly other nations than their own. Parochialism can also distort judgments of fairness. For example, those from nations that have contributed very little to climate change will think it is fair for the big “polluters” to pay more, while the latter group will favor equal reductions for all. As argued by Baron (1998, chapter 2), these arguments can be made quite sincerely.

Interestingly, opponents of spending on climate change have some of the other biases. They spend a lot of time trying to argue that people did not cause global warming. As should be apparent from what I have said, many other arguments against regulation are available. When President Bush withdrew from the Kyoto negotiations, he based his position on highly questionable claims about the inadequacy of our current scientific understanding and the possibility that people were not really causing problems after all. Perhaps the greater uncertainty is in the economics, not the atmospheric science. A more defensible argument might have been that the Kyoto treaty would cost a fair bit and do very little to stop global warming. By contrast, cost-effective solutions might focus instead on helping less-developed countries in ways that are more cost-effective. It may be possible to present cost-effective ways to help the world’s poor as viable alternatives to spending the same amount of money on a futile war against global warming. People may be more willing to support help for the world’s poor when it is presented in this way.

Or, it may turn out that new technology will make the war against climate change winnable after all.

#### Notes

1. An example of this view is that of the Union of Concerned Scientists: <http://www.ucsusa.org/globalwarming/science/global-warming-faq.html>.
2. See Weyant (2004) and associated articles (in the same special issue) for discussions. Most of the scenarios described are consistent with the view that costs of prevention are quite high relative to anything that has so far been politically feasible.

## THINKING ABOUT GLOBAL WARMING

3. “Global warming is expected to hurt the economies of some countries. The harms will come from rising sea levels, reduction of rainfall in some areas, and reductions in wildlife. Some countries may also benefit from longer growing seasons, expansion of crop land, and reduction in heating costs. These benefits could, for some nations, cancel out the economic effect of the harms. Thus, it is possible that the harms of global warming will be limited to some nations.

Global warming also has different causes. Some of it is natural, some (most) is caused by burning fossil fuels, and some is caused by deforestation. But, in the questions here, suppose that most global warming is caused by just some nations, such as those that have cut down forests.”

4. “The net harms are stated in terms of effects on ‘the economy.’ Concretely, this is about what people consume (buy). A cut of 10% in consumption for you, for example, is what you would buy if you spent 10% less money than you do now.”
5. “There are 28 items, with 3 questions each. Choose the response that is closest to what you think. Anything that changes from item to item is in bold or in color. Thus, you will need to read everything else carefully only once or twice.”
6. Although the second and third questions—which pitted prevention/mitigation against general assistance—did not show an overall difference, some subjects consistently favored one or the other. I used the step-down resampling procedure of Westfall and Young (1993) as implemented by Dudoit and Ge (2003), to test individual subjects in a way that corrects for multiple tests. By this test, 15 of the 76 subjects significantly favored mitigation/prevention at  $p < .05$ , while 13 favored general assistance (which was more cost-effective).

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JONATHAN BARON

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