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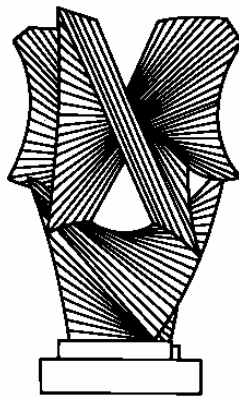
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On the Divergent American Reactions to Terrorism and Climate Change

Cass R. Sunstein *

Abstract

Two of the most important sources of catastrophic risk are terrorism and climate change. The United States has responded aggressively to the risk of terrorism while doing very little about the risk of climate change. For the United States alone, the cost of the Iraq war is now in excess of the anticipated cost of the Kyoto Protocol. The divergence presents a puzzle; it also raises more general questions about both risk perception and the public demand for legislation. The best explanation for the divergence emphasizes bounded rationality. Americans believe that aggressive steps to reduce the risk of terrorism promise to deliver significant benefits in the near future at acceptable cost. By contrast, they believe that aggressive steps to reduce the risk of climate change will not greatly benefit American citizens in the near future—and they are not willing to pay a great deal to reduce that risk. This intuitive form of cost-benefit analysis is much influenced by behavioral factors, including the availability heuristic, probability neglect, outrage, and myopia. All of these contribute, after 9/11, to a willingness to support significant steps to respond to terrorism and to relative indifference to climate change. It follows that Americans are likely to support such steps in response to climate change only if one of two conditions is met: the costs of those steps can be shown to be acceptably low or new information, perhaps including a salient incident, indicates that Americans have much to gain from risk reduction in the relatively near future.

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“Climate change is the most severe problem that we are facing today—more serious even than the threat of terrorism.”

Sir David King¹

“I see little evidence, at least in the United States, that people want to make significant additional sacrifices to raise living standards among the people who live now in the developing world. It would surprise me if they could get excited about raising living standards in those same parts of the world at a future time”

Thomas Schelling²

“The greater the apparent threat from visible forms of pollution and the more vividly this can be dramatized, the more public support environmental improvement will receive and the longer it will sustain public interest. Ironically, the cause of ecologists would therefore benefit from an environmental disaster like a ‘killer smog’ that would choke thousands to death in a few days.”

Anthony Downs³

I. Introduction

It is an understatement to say that in the last decade, a great deal of attention has been paid to terrorism and climate change. What unifies the two sets of risks is their potentially catastrophic quality.⁴ The attacks of 9/11 killed about three thousand people, an unquestionably large number; but other forms of terrorism, perhaps involving biological or nuclear weapons, could kill many more, conceivably a million people or more.⁵ Some of the worst-case scenarios associated with climate change involve many millions of deaths as a direct and indirect result of warmer temperatures.⁶ Human beings face a number of catastrophic risks, but terrorism and climate change rank among the most serious.

The two risks share an additional feature. It is difficult to assign probabilities to the worst-case outcomes. Officials cannot reasonably say that the risk of a catastrophic terrorist attack, in the next ten years, is somewhere between (say) 5% and 30%. The same might well be true of climate change. On one estimate, the risk of catastrophe, by the year 2100, is somewhere between 2% and 6%.⁷ But many people believe that we lack

¹ David A. King, *Climate Change Science: Adapt, Mitigate, or Ignore*, 303 *Science* 176 (2004).

² Thomas Schelling, *Intergenerational Discounting*, in *Discounting and Intergenerational Equity* 101 (Paul Portney and John Weyant eds. 1999).

³ Anthony Downs, *Up and Down with Ecology—The “Issue Attention Cycle,”* 28 *The Public Interest* 38, 46 (1972).

⁴ See, e.g., Richard Posner, *Catastrophe* 43-58, 75-86 (2005); Martin Rees, *Our Final Hour* (2003); Mark Maslin, *Global Warming* 83-101 (2004); William Nordhaus and Joseph Boyer, *Warming the World* 87-89, 93-94 (2003).

⁵ See Posner, *supra* note, at 75-86; Robert Goodin, *What’s Wrong With Terrorism?* 119 (noting risk of a million deaths from efficient biological attack) (2006).

⁶ See *id.*; Nordhaus and Boyer, *supra* note, at 78-83.

⁷ See *id.* at 88 (suggesting a 1.2% probability of a catastrophic impact with 2.5 degree Celsius warming and a 6.8% probability with 6 degree Celsius warming). This estimate was obtained by starting with a survey of relevant experts, using the median answer, and adjusting that answer upwards in

sufficient information to assign a probability to that risk; there are simply too many imponderables.⁸ In these domains, nations are plausibly thought to be operating in the domain of uncertainty rather than risk, in the sense that they are able to identify the worst outcomes without being able to specify the likelihood that they will occur.⁹ Both terrorism and global warming, then, are potentially catastrophic risks whose probability cannot easily be specified; they are also risks that are likely, if they come to fruition, to affect many people at the same time.

My principal concern in this Article is the stark difference between American reactions to terrorism-related risks and American reactions to the risks associated with climate change.¹⁰ An explanation of this difference should cast light on the demand for risk-related law in general; it should also provide a useful test of competing accounts of how human beings think about social hazards. Hence I shall explore four different approaches to risk perception: psychometric accounts, including more recent versions that rely on the affect heuristic; “cultural cognition,” emphasized by those who believe that risk perception is best understood in terms of identifiable cultural dispositions; standard accounts of rational choice, which emphasize costs and benefits; and behavioral economics, stressing heuristics and biases. We shall see that psychometric accounts offer at best limited help. Those who stress culture do illuminate internal divisions on the underlying questions, but they cannot fully account for the current situation. For these reasons, accounts based on the psychometric paradigm and on culture offer inadequate explanations.

The best account is behavioral in character; it emphasizes the extent to which the public demand for regulation is based on intuitive cost-benefit analysis, affected by bounded rationality. In that analysis, both costs and benefits very much matter, but their assessment is influenced by heuristics and biases, including the availability heuristic and an undue emphasis on short-term effects. As we shall see, American judgments about climate change are greatly affected by both “unavailability bias” and myopia. In part because of the absence of vivid illustrations of harm, Americans believe that they have relatively little to gain from serious efforts to reduce the risks of climate change; hence they are unwilling to spend a great deal to reduce those risks. To this extent, an intuitive form of cost-benefit analysis explains American practice; it also helps to account for

accordance with more recent information. See *id.* Under the circumstances, with so much uncertainty and rapidly changing data, there is no reason for great confidence in the resulting figures.

⁸ See Posner, *supra* note, at 49; Maslin, *supra* note, at 97 (noting projection of potential increase in malaria, by 2080s, of 260-320 million people).

⁹ For a lucid treatment, see Jon Elster, *Explaining Technical Change* 185-207 (1983). I am bracketing many complexities here. It is possible that the uncertainty is bounded, in the sense that experts can say, with some confidence, that the risk of catastrophic climate change is over 1% but below 40%; perhaps the same is true for terrorism. For present purposes, it is not necessary to explore these questions.

¹⁰ Other risks share many of the characteristics of terrorism and global warming, see Posner, *supra* note, and Rees, *supra* note. It would undoubtedly be illuminating to investigate American reactions to those risks as well. But the divergence explored here is especially striking, and a great deal of information is available with which to untangle the puzzle.

European receptivity to risk-reduction efforts, because the analysis is much more favorable to risk reduction in Europe.¹¹

By contrast, Americans typically believe that certain efforts to combat terrorism are likely to do more good than harm. Their judgments to this effect are influenced by highly salient incidents that affect both thought and behavior. Because of the attacks of 9/11, the threat of terrorism is highly salient to most Americans; there is no 9/11 for climate change. At the same time, Americans almost certainly have much to lose with aggressive regulation of greenhouse gases,¹² and an appreciation of the relevant costs affects their judgments about appropriate regulation.

My goals here are positive, not normative. I do not mean to suggest any particular approach to the problems of terrorism and climate change, or to endorse any view about how to rank or compare the two problems. Those who believe that climate change is the more serious problem might be tempted to explain the divergent reactions by reference to the power of well-organized interests in the United States, or some combination of selfishness, ignorance, and obtuseness on the part of those responsible for American law and policy. Those who believe that terrorism is self-evidently the more serious problem, and that climate change poses speculative risks for which it is appropriate to “wait and learn,”¹³ may find no puzzle at all. But whatever one’s view about the normative issues, the question of risk perception should have independent interest. As we shall see, it would be most surprising if judgments about risks of this kind were unerring or if they closely tracked expert opinion. The demand for risk regulation raises important puzzles of its own¹⁴; and the supply is affected by the demand.

Although I do not explore the normative issues, there is a clear prescriptive implication: The United States is unlikely to take significant steps to reduce greenhouse gases unless the costs of risk reduction are much decreased, an available incident or political leaders trigger fear of relatively imminent harm, or both. Altruistic or self-interested actors, in the private or public sphere, might well be able to enlist these points in any effort to increase the likelihood that the public will respond.

The remainder of this Article comes in five parts. Part II briefly outlines Americans beliefs and practices. Parts III, IV, V, and VI explore the four accounts, beginning with those that are least helpful in explaining the basis puzzle and culminating in an approach based on bounded rationality. Part III explores the psychometric paradigm. Part IV turns to the idea of cultural cognition. Part V investigates the

¹¹ See Nordhaus and Boyer, *supra* note, at 162-63, and in particular the suggestion that the “major beneficiary of the environmental effects of reducing emissions is Europe. The net economic impact on OECD Europe is positive in all experiments . . . with the environmental benefits ranging from \$35 to \$127 billion.” *Id.* at 162.

¹² See *id.* at 161, 168, with the suggestion that “the United States is a net loser while the rest of the world on balance benefits from the Kyoto Protocol.”

¹³ See Robert Mendelsohn, Perspective Paper No. 1., in *Global Crises, Global Solutions* 44-47 (Bjorn Lomborg ed. 2005)

¹⁴ See George Loewenstein and Jane Mather, *Dynamic Processes in Risk Perception*, 3 *J. Risk and Uncertainty* 155 (1990).

relationships among costs, benefits, and attitudes toward climate change and terrorism. Part VI explores bounded rationality, with special attention to intuitive cost-benefit balancing and the role of the availability heuristic, probability neglect, outrage, and myopia.

II. Beliefs and Practices

With respect to climate change and terrorism, American beliefs and practices are complex and variable. Of course there is a degree of heterogeneity. The basic story, however, is relatively straightforward, and it reveals a sharp asymmetry in reactions to the two sets of risks.

A. Climate Change

In terms of legal mandates, the United States has done essentially nothing to reduce the emission of greenhouse gases, relying largely on collecting information about emissions levels and encouraging further research.¹⁵ One of the nation's principal goals is an 18% improvement in greenhouse gas intensity between 2002 and 2012,¹⁶ with intensity measured as emissions per unit of gross domestic product (GDP). But this goal is an aspiration, not a requirement,¹⁷ and in any case significant reductions in greenhouse gas intensity can be accompanied by extremely large increases in greenhouse gas emissions.¹⁸

To be sure, substantial resources are being devoted to research.¹⁹ In 2005, over \$5 billion was appropriated for climate change programs and energy tax incentives; a 4.8% increase is planned for 2006.²⁰ More than \$2 billion has specifically been appropriated for the Climate Change Science Program and the Climate Change Research Program, both designed to analyze existing trends and to explore possible solutions.²¹ Since 1992, the

¹⁵ For overviews, see <http://www.state.gov/g/oes/rls/fs/46741.htm> and <http://www.epa.gov/globalwarming/>, in particular the reports mentioned at http://yosemite.epa.gov/oar/globalwarming.nsf/content_/actions.html; <http://www.whitehouse.gov/news/releases/2001/06/20010611-2.html>; Daniel R. Abbasi, Americans and Climate Change 20-23 (2006). On June 22, 2005, a 53-44 majority of the United States Senate approved a "sense of the Senate" resolution to the effect that "Congress should enact a comprehensive and effective national program of mandatory market-based limits and incentives on greenhouse gases that slow, stop and reverse the growth of such emissions" *Id.* at 20. The most aggressive legislative proposal, from Senators John McCain and Joseph Lieberman in 2003, would have capped greenhouse gas emissions at 2000 levels. The proposal was defeated by a vote of 55-43. For an overview, see <http://commerce.senate.gov/newsroom/printable.cfm?id=214305>; for an analysis, see Sergey Paltsev et al., Emissions Trading to Reduce Greenhouse Gases in the United States: The McCain-Lieberman Proposal, available at <http://web.mit.edu/globalchange/www/reports.html>.

¹⁶ For a helpful outline, see http://www.pewclimate.org/policy_center/analyses/response_bushpolicy.cfm

¹⁷ See *id.*

¹⁸ This in fact has been the experience of the United States between 1990 to 2004, with significant reductions in greenhouse gas intensity (by 21%) accompanied by significant growth in carbon dioxide emissions (by 19%). See Energy Information Administration, Emissions of Greenhouse Gases in the United States 2004 at xii (2005).

¹⁹ See <http://www.usgcrp.gov/>

²⁰ <http://www.whitehouse.gov/news/releases/2005/05/20050518-4.html>

²¹ *Id.*

Department of Energy has been required to estimate aggregate greenhouse gas emissions in the United States, and annual reports are available.²² These estimates are mandated by the United Nations Framework Convention on Climate Change, signed by the United States

One of the most ambitious current programs involves company-by-company reporting of actions taken to reduce greenhouse gas emissions, but this program itself remains voluntary,²³ in sharp contrast to the reporting requirements in other federal statutes.²⁴ Hence the United States lacks a company-by-company Greenhouse Gas Inventory, comparable to the Toxic Release Inventory that has played such a large role in reducing toxic emissions.²⁵ At the international level, the most aggressive program in which the United States now participates is the “methane to markets” agreement,²⁶ but this agreement is only a modest contribution to greenhouse gas abatement.²⁷ No regulatory limits are imposed on greenhouse gases from fossil fuels, motor vehicles, or any other source, notwithstanding efforts to require the government to impose such limits.²⁸

State and local governments have undertaken some action on their own. In December 2005, the governors of seven states signed a Memorandum of Understanding, designed to create a regional “cap-and-trade” plan to reduce power plant emissions.²⁹ The mayors of over 200 cities, including over 43 million Americans, have pledged to meet city-level goals corresponding with the requirements of the Kyoto Protocol.³⁰ In June 2005, Governor Arnold Schwarzenegger pledged to reduce California’s greenhouse gas emissions to 1990 levels by 2020, a pledge that helped lead to the West Coast Governor’s Global Warming Initiative, which includes California, Washington, and Oregon.³¹ California has enacted legislation to reduce emissions of greenhouse gases from automobiles, with a 22% reduction target by 2012 and a 30% reduction target by 2016.³² These various initiatives go well beyond the actions of the national government, but even

²²Energy Information Administration, *supra* note, at ES-1; <http://www.eia.doe.gov/oiaf/1605/1605a.html>; <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2006.html>

²³ <http://www.eia.doe.gov/oiaf/1605/frntvrgg.html>. For an example of a voluntary report from General Motors Corporation, see http://www.gm.com/company/gmability/environment/news_issues/news/ghgreport_2003.pdf

²⁴ See *id.*; 42 USC 13385 (requiring inventory of national aggregate emissions of each greenhouse gas for each calendar year for baseline period of 1987 through 1990, updated annually); 42 USC 7651k (requiring monitoring and computing of aggregate annual total carbon dioxide emissions, to be made available to the public).

²⁵ See James T. Hamilton, *Regulation through Revelation: The Origin, Politics, and Impacts of the Toxic Release Inventory Program* (2005).

²⁶ See <http://www.methanetomarkets.org/>; <http://www.epa.gov/methanetomarkets/basicinfo.htm>

²⁷ See Energy Information Administration, *supra* note, at iii-xx, showing that methane is a relatively small component of aggregate American contributions to climate change.

²⁸ *Massachusetts v. EPA*, 415 F.3d 50 (DC Cir 2005).

²⁹ See www.rggi.org

³⁰ See www.ci.seattle.was.us/mayor.climate. For information on the Kyoto Protocol in general, see Nordhaus and Boyer, *supra* note; <http://unfccc.int/2860.php>

³¹ See www.ef.org/westcoastclimate

³² See Abassi, *supra* note, at 21.

as a whole, they are not projected to produce significant emissions reductions in the United States.

The behavior of the government is not inconsistent with the views of the American public, though those views are admittedly unstable and complex.³³ On the one hand, large majorities of Americans were found as early as 2000 to favor the Kyoto Protocol³⁴ (88%), believe that the United States should reduce its greenhouse gas emissions (90%), support an increase in fuel economy standards (79%), and favor government regulation of carbon dioxide as a pollutant (77%).³⁵ In the same year, a slim majority also supported a tax on “gas guzzlers” (54%).³⁶ Restrictions on power plants, designed to limit greenhouse gas emissions, were strongly supported (61%).³⁷

On the other hand, strong majorities were opposed to a gasoline tax (78%) and to a business energy tax (60%) designed to reduce greenhouse gas emissions.³⁸ In 2000, the environment ranked only 16th among the most important problems in the nation, and of these climate change was ranked 12th of thirteen environmental issues (below urban sprawl).³⁹ Notwithstanding the vast publicity given to climate change in recent years, polls reached broadly similar conclusions in 2006, with Americans ranking the environment twelfth on a list of the most important problems, below immigration, health care, and gas and heating oil prices; among environmental problems, climate change was ranked ninth, well below damage to the ozone layer (a problem that has long been handled through regulatory controls).⁴⁰ Another 2006 poll found that strong majorities of Americans *oppose* an increase in taxes on electricity and gasoline as an attempt to reduce climate change.⁴¹ In the same year, a different poll did find that 59% of Americans would support an increase in the gasoline tax to reduce the threat of climate change, but the magnitude of the increase was not specified.⁴² In late 2005, Americans were asked, “Where should the US concentrate its resources if it could only guard against one potential attack.” Nuclear power attracted the highest percentage of answers (39%); environmental disasters were lowest on the list, at 10%.⁴³

³³ See Anthony Leiserowitz, *Communicating the Risks of Global Warming: American Risk Perceptions, Affective Images and Interpretive Communities*, forthcoming in *Communication and Social Change: Strategies for Dealing with The Climate Crisis* (S. Moser and L. Dilling eds., forthcoming); Anthony Leiserowitz, *Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values*, *Climate Change* (forthcoming).

³⁴ The United States has refused to ratify the Kyoto Protocol. See Robert Percival et al., *Environmental Regulation 1070-71* (5th ed. 2003). For a list of the 163 nations that have ratified the protocol, see http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf

³⁵ *Id.*

³⁶ *Id.*

³⁷ <http://www.pollingreport.com/enviro.htm>

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ See the summary and overview in *The New York Times*, April 23, 2006, at 14.

⁴¹ <http://www.pollingreport.com/enviro.htm>

⁴² See <http://environment.about.com/od/environmentallawpolicy/a/gasolinetax.htm>.

⁴³ See <http://www.angus-reid.com/polls/index.cfm/fuseaction/viewitem/itemID/8371>.

It seems clear that while Americans show some and perhaps increasing concern about climate change, they are not willing to sacrifice a great deal to reduce the associated risks. As we shall see in more detail below, most Americans do not believe that climate change poses a serious threat in the near future, and hence they do not think that they, or their friends and family members, face a real risk in the short-term.⁴⁴ Notably, citizens of many nations show more concern about global warming than Americans do; higher levels of concern are found in Germany, Switzerland, Japan, Ireland, Great Britain, Mexico, Brazil, Portugal, Canada, Denmark, Norway, Chile, and Poland.⁴⁵ In 2001, citizens in Europe in general and Britain in particular ranked the environment as the largest global threat, above poverty, natural disasters, famine, AIDS/HIV, and even war.⁴⁶ Indeed, a majority of Britons (63%), polled in 2004, ranked climate change as the most important environmental issue in the world.⁴⁷ In the same year, terrorism was ranked as the “most serious threat to the future wellbeing of the world” by 48% of those polled, by global warming came in second, at 25%, about double the number for population growth and AIDS/HIV.⁴⁸ It is an understatement to say that the issue of climate change has far less salience in the United States.

To be sure, Americans are relatively supportive of programs that, as they perceive it, do not impose costs on the public but instead on “companies” or “power plants.” But when the costs are not indirect, and are seen as requiring out-of-pocket expenditures, their enthusiasm for legal controls on greenhouse gases diminishes dramatically.

What are the consequences of legal practices and social beliefs for greenhouse gas emissions? Perhaps unsurprisingly, such emissions, in the United States, have been increasing in the very period in which climate change has received attention both domestically and abroad. Greenhouse gas emissions increased by no less than 15.8 percent between 1990 and 2004.⁴⁹ In 1990, carbon dioxide emissions were 5,002.3 million metric tons; in 2004, they were 5.973.0 million metric tons, a jump of 19 percent.⁵⁰ To be sure, greenhouse gas intensity has indeed been decreasing in the same period, with a significant decline of 21%.⁵¹ But because of increased energy usage, per capita emissions have actually increased over this period by 1.2%—an increase that, alongside population growth, produced the increase in aggregate emissions.⁵²

Fossil fuel combustion is by far the largest contributor to greenhouse gas emissions in the United States, accounting for 98% of carbon dioxide emissions.

⁴⁴ See notes *infra*.

⁴⁵ See Steven Brechin, *Comparative Public Opinion and Knowledge on Global Climatic Change and the Kyoto Protocol: The U.S. Versus the World?* 23 *International J Sociology and Social Policy* 106, 110 (2003).

⁴⁶ See Andrew Norton and John Leaman, *The Day After Tomorrow: Public Opinion on Climate Change* 4 (2004).

⁴⁷ *Id.* at 5.

⁴⁸ *Id.* at 6.

⁴⁹ See Energy Information Administration, *supra* note, at ix; *Record Increase in U.S. Greenhouse Gas Emissions Sparks Global Controversy* (2006), available at <http://environment.about.com/b/a/256722.htm>.

⁵⁰ Energy Information Administration, *supra* note, at x, xii.

⁵¹ *Id.*

⁵² *Id.* at xii.

Greenhouse gas emissions from this source has been growing in most sectors, with a 1.7% increase between 2003 and 2004.⁵³ While methane emissions were reduced by 10% in 2004, total greenhouse gas emissions increased by 1.7% in the same year, the largest increase on record from any nation.⁵⁴ All the principal sectors—which include residential, commercial, industrial, and transportation-related uses—remain free from national regulation. By contrast, substantial reductions in greenhouse gas emissions, between 1990 and 2003, can be found in Bulgaria, Estonia, Latvia, the Czech Republic, Lithuania, Hungary, Poland, Russia, Ukraine, Iceland, Luxembourg, the United Kingdom, Sweden, and Germany.⁵⁵

B. Terrorism

With terrorism, the picture is very different. After the 9/11 attacks, the risk of terrorism has been consistently ranked among the most pressing problems facing the United States.⁵⁶ It is an understatement to say that the American government has taken massive steps to reduce terrorism-related risks. The most expensive are almost certainly the wars in Afghanistan and Iraq, undertaken in large part to reduce those risks. The war in Iraq has been extremely costly. As of September 2005, \$212 billion had been allocated from the United States Treasury, and aggregate costs were estimated at \$255 billion to the United States, \$40 billion to coalition partners, and \$134 billion to Iraq, for a total global cost of \$428 billion.⁵⁷ As of May 1, 2006, the appropriations were nearing \$280 billion⁵⁸—ensuring that the cost of the Iraq War, to the United States, will soon surpass the total expected cost of the Kyoto Protocol, which on plausible assumption would have been \$325 billion.⁵⁹ There is a great deal more in the way of costly activity, including new legislation⁶⁰ and numerous regulations.⁶¹

⁵³ Id.

⁵⁴ See Energy Information Administration, Emissions of Greenhouse Gases in the United States 2004 (2005); Record Increase in United States Greenhouse Gases Reported (2006), <http://www.ens-newswire.com/ens/apr2006/2006-04-18-02.asp>

⁵⁵ See UNFCCC, Key GHG Data: Greenhouse Gas (GHG) Emissions Data for 1990–2003, submitted to the UNFCCC, at 16-17 (November 2, 2005). Notably, several countries show emissions increase comparable to or higher than those of the United States; these include Canada (24.2%), New Zealand (22.5%), Australia (23.3%), Austria (16.5%), Greece (24.8%), Ireland (25.6%), Portugal (36.7%), Spain (41.7%), and Italy (11.5%).

⁵⁶ In 2006, for example, 45% of Americans said that they worried “a great deal” about the possibility of future terrorist attacks, the same percentage that worried about “crime and violence,” and a higher percentage than worried about the economy, hunger and homelessness, and the environment. See note supra.

⁵⁷ See Scott Wallsten and Katrina Kosec, Economic Cost of the War in Iraq, available at <http://aei-brookings.org/publications/abstract.php?pid=988>

⁵⁸ http://nationalpriorities.org/index.php?option=com_wrapper&Itemid=182

⁵⁹ The figure is \$325 billion, see Nordhaus and Boyer, supra note, at 161, a figure that might turn out to be inflated if replacements for carbon dioxide have a diminishing cost as a result of technological innovation.

⁶⁰ See <http://www.ncsl.org/programs/press/2002/pdcongress.htm> for an overview; the most prominent enactments include the USA Patriot Act, the Federal Aviation Security Act, and the Air Transportation Safety and System Stabilization Act.

⁶¹ For an early catalogue, see Office of Management and Budget, Draft Report to Congress on the Costs and Benefits of Federal Regulations, 67 Federal Register 5014 - 15045. (March 28).

With respect to the war on terror, Americans disagree on a great deal. But they agree that the risk of terrorism is both serious and real, and they favor expensive precautions to reduce that risk. In 2006, the Pew Research Center found that defending the nation from terrorism was a “top priority” for 80% of Americans—a higher percentage than for any other problem.⁶² In the period shortly after the 9/11 attacks, 88% of Americans believed that it was either very likely or somewhat likely that there would be “another terrorist attack within the next few months”—with about half of Americans worrying about the possibility that a family member might “become a victim of a terrorist attack,” and over 40% worrying that “terrorist attacks might take place where [they] live or work.”⁶³

Later studies have continued to show a high level of concern, with many people believing that an imminent attack is likely.⁶⁴ In July 2005, nearly half of respondents described themselves as “somewhat” or “very” worried that they, or someone in their family, would be a victim of terrorism.⁶⁵ Nearly half also said that it was somewhat or very likely that there would be a terrorist attack in the United States “in the next several weeks.”⁶⁶ There can be little doubt that the level of concern is lower now than it was in the immediate aftermath of the 9/11 attacks, and that public fear will leap after any future attack. But whatever emerges from any particular slice in time, it is clear that Americans believe that they face a serious threat of a terrorist attack in the not-distant future and that they and their loved ones are at risk. Americans are willing to support substantial measures to reduce the threat.

C. Beliefs and Regulation

The divergent judgments about climate change and terrorism help to account for governmental behavior. Of course there are many possible relationships between public attitudes and government responses. For a general orientation, consider the following table:

	Officials Want Risk Reduction	Officials Do Not Want Risk Reduction
Public Demands Risk Reduction	War on terror after 9/11	Superfund legislation; Alar
Public Does Not Demand Risk Reduction	Controls on ozone-depleting chemicals; acid deposition regulation	Controls on greenhouse gases; airline security before 9/11

⁶² <http://www.pollingreport.com/prioriti.htm>.

⁶³ See http://www.americans-world.org/digest/global_issues/terrorism/terrorism_perception.cfm.

⁶⁴ A 2002 study, involving students at Harvard University, found a “best estimate” mean of 294 deaths from terrorism in the next year, with an “upper bound” best estimate of 25,199. Interestingly, the upper bound estimates of “total fatalities due to all terrorism” were lower than the upper bound estimates of “total fatalities due to airplane terrorism”—a finding to which I will return. See W. Kip Viscusi and Richard Zeckhauser, *Sacrificing Civil Liberties to Reduce Terrorism Risks*, 26 *J Risk and Uncertainty* 99 (2003).

⁶⁵ <http://www.usatoday.com/news/polls/2005-07-25-july-poll.htm>

⁶⁶ *Id.*

We can easily imagine cases in which both the public and its representatives favor risk reduction. After the attacks of 9/11, this was certainly the case with respect to the war on terror. The same can plausibly be said about certain steps to reduce air pollution.⁶⁷ In other contexts, the public does not demand risk reduction, but officials favor it; they are permitted to take certain steps because the public does not oppose them, and electoral retribution is unlikely. This was the case with respect to controls on acid deposition.⁶⁸

Very different issues arise when the public demands some kind of regulatory response, even though officials would not favor it on their own. For many officials, this was the case with respect to the Superfund statute, designed to regulate abandoned hazardous waste sites; the publicity given to the supposed disaster at Love Canal made a statutory response almost inevitable, even though many officials did not favor it either publicly or privately.⁶⁹ The same category covers the public demand for some kind of response to the health hazards allegedly associated with the pesticide Alar.⁷⁰ The final category consists of cases in which the public does not demand risk reduction at the same time that officials do not want it. That category includes security measures in airports before the attacks of 9/11.⁷¹ It is also a plausible account of the current situation with respect to climate change.⁷²

Of course these stylized categories ignore important variations. We can identify cases in which the public does not merely fail to demand risk reduction, but would affirmatively punish risk reduction efforts. Aggressive security measures at airports before 9/11 would probably have fallen in this category, simply because such measures would have been deemed a significant and unnecessary inconvenience. Where citizens would face a large burden from risk reduction, there is a built-in obstacle to risk reduction.⁷³ Citizens would almost certainly resist a large increase in the gasoline tax, even if the increase was defended by reference to environmental concerns, the interest in energy self-sufficiency, or some combination of the two.⁷⁴ We might be able to imagine cases in which officials would be willing to block regulation even if the public demands it. At the very least, officials might insist on a more tepid, less costly, and more symbolic

⁶⁷ See James T. Hamilton, *Regulation through Revelation* 177-91 (2005); Bruce Ackerman, John Millian, and Donald Elliott, *Toward a Theory of Statutory Evolution: The Federalization of Environmental Law*, 1 *J. L. Econ. &*

Organization 313 (1985).

⁶⁸ See Kevin Esterling, *The Political Economy of Expertise* (2004). For a parallel story with respect to ozone-depleting chemicals, see Richard Benedict, *Ozone Diplomacy* (1997); the evidence here is more complicated because a substantial segment of the public supported controls on such chemicals.

⁶⁹ See Timur Kuran and Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 *Stan L. Rev.* 683 (1998); Matthew Kahn, *Environmental Disasters As Regulation Catalysts? Exxon-Valdez, Love Canal, and Three Mile Island in Shaping U.S. Environmental Law* (unpublished manuscript 2006).

⁷⁰ See Robert Percival et al., *Environmental Regulation* 387-393 (2003); Aaron Wildavsky, *But Is It True?* (1999). The ultimate response was a voluntary removal of Alar from the market, after EPA issued a preliminary determination to cancel all food uses of the substance. See Percival et al., *supra*, at 391.

⁷¹ See Max H. Bazerman and Michael D. Watkins, *Predictable Surprises* 15-42 (2004).

⁷² See *id.* at 236-40.

⁷³ See the discussion of “fungibility” in Howard Margolis, *Dealing With Risk* (1999).

⁷⁴ See the evidence of public opposition to an increased gasoline tax in notes *supra*.

response than the public would like.⁷⁵ In the aftermath of public concern about toxic releases from chemical plants, for example, the legislative response involved disclosure requirements, not regulatory controls.⁷⁶

Importantly, the category of “officials” contains a great deal of diversity. In the table above, the term is meant to refer to those with some kind of formal position, and thus includes mayors, governors, presidents, national and state legislators, and bureaucrats in various levels of government. As we have seen, there may well be disagreements or even conflicts among state and national governments; and career bureaucrats may well differ from elected officials. In addition, the public is hardly monolithic. Internal divisions within the citizenry can greatly complicate the political economy of risk reduction, not least when well-organized private groups ensure that government responses take their preferred form.⁷⁷ In the context of terrorism, the airline industry played a significant role in preventing more extensive security procedures before 9/11.⁷⁸ By contrast, well-organized groups actually spurred American efforts to respond to depletion of the ozone layer, because they had developed cheap substitutes for ozone-depleting chemicals, and sought to obtain a competitive advantage by increasing the demand for those substitutes.⁷⁹ DuPont, the world’s largest producer of CFCs, pledged to phase out production by an early date, but warned “that international cooperation was essential, and that participation in an agreement to phase out CFCs needed to be as broad as possible, to avoid production by other manufacturers relocating to non-signatory states.”⁸⁰ On this count, the depletion of the ozone layer is altogether different from climate change, for there can be no doubt that powerful organizations have played a role in discouraging aggressive measures to control greenhouse gas emissions.⁸¹

There is an additional consideration. The public demand for regulatory controls is not simply a brute fact. It shifts over time, often in response to the statements and actions of influential people in the private and public sectors. Public opinion is endogenous to the acts of both officials and well-organized groups. The level of concern with terrorism would inevitably have been high in the aftermath of the attacks of 9/11; but it would have

⁷⁵ See Hamilton, *supra* note, at 18-40 (discussing possible content of Toxic Release Inventory, a response to public demand for legislative controls on toxic releases); Kahn, *supra* note.

⁷⁶ See Hamilton, *supra* note.

⁷⁷ See Hamilton, *supra* note, at 18-40 (exploring role of interest groups in Toxic Release Inventory); Bruce Ackerman and William Hassler, *Clean Coal/Dirty Air* (1983), for a classic study.

⁷⁸ See Bazerman and Watkins, *supra* note, at 26-31, 128-29, and the suggestion that “the U.S. airline industry successfully resisted security improvements for decades, through its lobbying and campaign funding,” *id.* at 128.

⁷⁹ See Robert Percival et al., *Environmental Regulation 1050–51* (4th edition 2003), and in particular this claim: “Throughout the negotiations there was considerable jockeying among countries seeking to acquire an economic advantage over their international competition. Each side advocated primarily what it had already done—an aerosol ban in the United States and a production capacity cap in Europe.” *Id.* at 1050.

⁸⁰ Scott Barrett, *Environment & Statecraft* 234 (2005).

⁸¹ With respect to research, see Posner, *supra* note, at 53-57, including the suggestion that the research of many “global warming skeptics” has been “financed by the energy industries,” and it “may not be very good research,” *id.* at 53. With respect to regulation, see Robert Repetto, Introduction, in *Punctuated Equilibrium and the Dynamics of Environmental Policy* 1, 17 (2006); Lee Lane, *The Political Economy of U.S. Greenhouse Gas Controls*, in *id.* at 162, 165-66.

been possible for leaders to diminish that concern by (for example) giving assurances that the risk was low and attempting to assimilate terrorism-related risks to those encountered in ordinary life.⁸² To say the least, American leaders did not take this course, emphasizing instead that we are “still not safe” and that ours is “a Nation in danger.”⁸³

With respect to the war on terror, prominent officials have played a large role in activating public concern, increasing the salience of the 9/11 attacks and invoking those attacks to stress the need for protective measures.⁸⁴ Such measures can themselves have a role in forming both beliefs and desires. Aggressive security measures at airports, for examples, are likely to intensify public fear, in a way that can heighten the demand for further precautions. With respect to climate change, the most influential national leaders have taken a quite different course. Far from activating concern, they have attempted to dampen it.⁸⁵ There are limits to the malleability of public opinion, but it is possible to imagine a situation in which the objective facts are the same, but in which American leaders increased concern about climate change but decreased concern about terrorism, to the point where the divergent attitudes were not so divergent, at least after the lapse of several years post-9/11. Hence the divergence is a product in part of simple facts, above all the 9/11 attacks, but also of political responses to both sets of risks.

A full account of the political economy of risk regulation would have to give careful attention to the effects of interest groups and officials in the process of belief formation. But when public opinion is at least relatively stable and firm, it can make a great deal of difference. If the public demands regulation, well-organized groups may well be unable to prevent it⁸⁶; and if the public resists regulation, well-organized groups may well be unable to bring it about. Let us turn, then, to competing accounts of risk perception.

III. The Psychometric Paradigm and Affect

A. Qualitative Factors and Risk

The psychometric paradigm may well have become the most influential account of risk perception in the social sciences,⁸⁷ including law.⁸⁸ The goal of the psychometric account is to explain the divergence between the risk-related judgments of experts and those of ordinary people. A major conclusion is that ordinary people show a “richer” rationality than that of experts, who focus on quantities alone.⁸⁹ On this view, most

⁸² This course of action is suggested in Goodin, *supra* note.

⁸³ *Id.* at 166 (quoting a speech by President Bush).

⁸⁴ See below.

⁸⁵ See, e.g., <http://www.whitehouse.gov/news/releases/2001/03/20010314.html>.

⁸⁶ See Hamilton, *supra* note, for a case study; on theory, see Roger Noll and James Krier, *Some Implications of Cognitive Psychology for Risk Regulation*, 19 *J Legal Stud* 747 (1990).

⁸⁷ See Paul Slovic, *The Perception of Risk* (2000); *Cross-Cultural Risk Perception* (Ortwin Renn and Bernd Rohrman eds. 2000).

⁸⁸ Clayton P. Gillette & James E. Krier, *Risk, Courts, and Agencies*, 138 *U. Pa. L. Rev.* 1027, 1061-1085 (1990) (defending the idea of competing rationalities).

⁸⁹ See Slovic, *supra* note, at 231.

people are attuned to far more than the number of lives at stake. They pay attention as well to a range of qualitatively distinctive factors, not reducible to mere numbers. For example, people are influenced by whether a risk is potentially catastrophic; faced by future generations; involuntarily incurred; uncontrollable; delayed rather than immediate; and particularly dread.⁹⁰ The psychometric paradigm purports to explain why people are so fearful of the risks associated with pesticides, herbicides, and nuclear power—risks that do not greatly concern experts.⁹¹ The psychometric paradigm also claims to explain why people are not much concerned about the risks associated with automobiles and x-rays—risks that many experts believe to be quite substantial.⁹² When ordinary people show a greater concern with nuclear power than with x-rays, it is because the former poses risks that are delayed, involuntarily incurred, potentially catastrophic, unfamiliar, and faced by future generations.⁹³

The psychometric approach can certainly claim to account for heightened social concern with terrorism, which is likely to trigger the standard grounds for “richer rationality.” The risks associated with terrorism are particularly dreaded, and such risks have the uncontrollable, unfamiliar, and potentially catastrophic qualities that are said to produce intense reactions.⁹⁴ But can the psychometric paradigm explain the asymmetrical reactions to terrorism and climate change? At first glance, it cannot. Indeed, it would be reasonable to say that if the psychometric paradigm is right, then climate change should have a high priority, perhaps even higher one than terrorism. The risks associated with climate change are certainly delayed rather than immediate, and they are imposed directly on subsequent generations, which might face catastrophe. At least as much as terrorism, the risks associated with climate change are involuntarily incurred and uncontrollable.⁹⁵ Such risks also raise serious equitable concerns, since they will be faced by especially vulnerable people in poor nations.⁹⁶ Along the dimensions identified by the psychometric paradigm, climate change and terrorism might be expected to trigger roughly equivalent public concern.

From the standpoint of the psychometric approach, it could not easily be predicted that terrorism would trigger a greater reaction than terrorism. Indeed, the fact that the risks associated with climate change are delayed, and likely to face future generations, seems to reduce rather than to heighten public concern—a real problem for the psychometric paradigm.

B. The Affect Heuristic

More recently, those interested in the psychometric paradigm have explored the “affect heuristic”—a heuristic that is said to determine risk-related thoughts and

⁹⁰ See *id.* at 99; for a discussion and critique, see Howard Margolis, *Dealing With Risk* (1997).

⁹¹ Slovic, *supra* note, at 143-44.

⁹² *Id.*

⁹³ See *id.* at 143-52.

⁹⁴ On public reactions to terrorist threats, with reference to the psychological literature, see Robert Goodin, *What’s Wrong With Terrorism?* 123-36 (2005).

⁹⁵ On some of the difficulties here, see Cass R. Sunstein, *Risk and Reason* 58-72 (2002).

⁹⁶ See Thomas Schelling, *Strategies of Commitment* (2006).

behavior.⁹⁷ On this view, people have rapid, immediate reactions to persons, activities, and processes, and the immediate reaction operates as a mental short-cut for a more deliberative or analytic assessment of the underlying issues.⁹⁸ Much of this work emphasizes the existence of two families of cognitive operations, sometimes described as System I and System II, with which risky activities and processes are evaluated.⁹⁹ System I is rapid, intuitive, and error-prone; System II is more deliberative, calculative, slower, and more likely to be error-free. Heuristic-based thinking is rooted in System I; it is subject to override, under certain conditions, by System II.¹⁰⁰ System I may, for example, lead people to be fearful of flying, or of large dogs, but System II might create a deliberative check, ensuring an eventual conclusion that the risks are trivial. So too, System I might reflect little reason for concern about (say) sunbathing, but System II might lead people to avoid undue exposure to the sun for fear of skin cancer.

Considerable evidence suggests that immediate affective reactions help to explain people's judgments about risks. When asked to assess the risks and benefits associated with certain items, people tend to say that risky activities contain low benefits, and that beneficial activities contain low risks.¹⁰¹ Hence it may well be that "affect" comes first, and helps to direct judgments of both risk and benefit. In support of this hypothesis, note that when subjects are asked to make their assessment under time pressure, the inverse correlation between risks and benefits is increased—a finding that strongly suggests that an affect heuristic, and System I, are at work.¹⁰² Consider also the fact that when people learn about the low risks of an item, they are moved to think that the benefits are high—and when they learn about the high benefits of an item, they are moved to think that the risks are low.¹⁰³ In these ways, judgments about risks can be connected with "the halo effect," which predicts that "the favorability of an overall impression an attitude object is a good predictor of how strongly positive or negative qualities are ascribed to the object."¹⁰⁴

Perhaps the affect heuristic explains the asymmetry between terrorism and climate change. For many Americans, the idea of terrorism conjures up intense images of

⁹⁷ See, e.g., Paul Slovic, *The Affect Heuristic in Judgments of Risks and Benefits*, in Paul Slovic, *The Perception of Risk* 413 (2000).

⁹⁸ *Id.* at 414-15.

⁹⁹ *Id.* at 414.

¹⁰⁰ See Daniel Kahneman & Shane Frederick, *Representativeness Revisited*, in *Heuristics and Biases: The Psychology of Intuitive Judgment* 49, 51-52 (Thomas Gilovich et al. eds. 2001). The two systems need not be seen as occupying different physical spaces; they might even be understood as heuristics (!), see *id.* There is, however, some evidence that different sectors of the brain can be associated with Systems I and II. See the discussion of fear in Joseph LeDoux, *The Emotional Brain* 106-132 (1996), and the more general treatment in Matthew Lieberman, *Reflexive and Reflective Judgment Processes: A Social Cognitive Neuroscience Approach*, in *Social Judgments*, Joseph P. Forgas et al., eds. (2003).

¹⁰¹ Slovic, *supra* note, at 415-16.

¹⁰² *Id.*

¹⁰³ *Id.*

¹⁰⁴ Compare student course evaluations. Among teachers, it is informal lore that when a particular class likes the instructor, the evaluation of all enumerated items will improve, including such items as course materials, even when they stay constant from year to year.

disaster, as the idea of climate change does not.¹⁰⁵ In general, “many of the climate change risks may not be as viscerally unsettling to people as one might think.”¹⁰⁶ Even if people were convinced that terrorism-related risks are not greater, as a statistical matter, than those associated with climate change, their affective reactions to the former would likely be far more intense than their affective reactions to the latter. The claim seems right; the idea of terrorism typically does produce more intense emotions than the idea of climate change. The problem is that this difference itself remains to be explained. Affect is not simply given; it has sources. In this context, use of the affect heuristic appears to be as much as redescription of different public reactions as an explanation of those differences.

We could easily imagine a society, not unrecognizably different from our own, in which the affect heuristic leads to much greater concern with climate change than with terrorism, or at least equivalent concern. If events potentially related to climate change were familiar and salient, and if events related to terrorism were not, the divergence in reactions would run in a different direction. Indeed, there is no need to use our imagination. Among some groups, climate change does produce extremely intense concern, almost certainly equal to or greater than that associated with terrorism.¹⁰⁷ Let us now turn to this point, which offers a distinctive account of risk perception.

IV. Cultural Cognition

In a number of papers, Dan Kahan and his coauthors have drawn attention to “cultural cognition”—to risk-related judgments that are a product of cultural orientations, which serve as a kind of heuristic for more fine-grained judgments.¹⁰⁸ On this approach,¹⁰⁹ people can be sorted into four groups: individualists, hierarchists, egalitarians, and solidarists. Those who fall into the individualist camp tend to distrust government regulation and to believe in free markets; hence they are unlikely to be greatly concerned about climate change. The same is true of hierarchists, who favor the established social order, and who reject efforts to disrupt it; controls on climate change might well be seen as disruptive. By contrast, egalitarians are skeptical of businesses and other institutions that are thought to produce large-scale inequalities in society; egalitarians are sympathetic to environmental causes in general, and they are greatly concerned about climate change.¹¹⁰ The same is true of solidarists, who believe that human beings owe strong duties to one another, duties that environmental degradation violates.

¹⁰⁵ See Leiserowitz, *supra* note.

¹⁰⁶ Abassi, *Americans and Climate Change*, *supra* note, at 26.

¹⁰⁷ See *id.*

¹⁰⁸ See Dan Kahan and Donald Braman, *Cultural Cognition and Public Policy*, 24 *Yale Law and Policy Review* 149 (2006); Dan Kahan et al., *Fear of Democracy*, 119 *Harv L Rev* 1075 (2006).

¹⁰⁹ The foundations of the approach can be found in Mary Douglas and Aaron Wildavsky, *Risk and Culture* (1993).

¹¹⁰ See Kahan et al., *Fear of Democracy*, *supra* note.

Kahan and his coauthors claim to show that cultural cognition helps to explain public reactions to numerous risks, including those associated with climate change.¹¹¹ Egalitarians and solidarists are significantly more concerned about climate change than are hierarchists and individualists. On this view, cultural dispositions operate as a kind of heuristic for risk-related judgments.¹¹² Indeed, Kahan and his coauthors contend that cultural dispositions are a more accurate predictor of such judgments than party identification and demographic characteristics such as race, religion, gender, and wealth. In the context of climate change, they find, on the basis of survey evidence, that this is in fact true.¹¹³ Certainly it can be demonstrated that political commitments are “clustered”; those who believe that society has “become too soft and feminine,” or that government “interferes too much in our daily lives,” are more likely to resist strong measures to combat climate change.¹¹⁴ To this extent, there is a link between cultural dispositions and views about climate change. In addition, cultural differences might well be associated with different judgments about particular risk-reduction measures connected with terrorism; the war in Iraq, for example, likely splits people along lines that are cultural in the sense used by Kahan and his authors.

It is possible to go further. Some groups do consider climate change to be a more serious threat than terrorism, and those groups appear to be identifiable along cultural lines.¹¹⁵ My own small-scale survey at the University of Chicago Law School found that most respondents did in fact consider climate change the more serious problem, by a margin of 73% to 27%.¹¹⁶ As noted, most Americans do not agree.¹¹⁷ The University of Chicago study did not test for cultural dispositions, but we can say, with a high degree of confidence, that as compared with individualists and hierarchists, egalitarians and solidarists are likely to rank the risks of climate change as equivalent to or higher than those associated with terrorism.

But there are two problems with use of the idea of cultural cognition to explain American reactions to climate change and terrorism. The first is that cultural divergences have not been shown with respect to the latter risk, and those interested in cultural cognition have not claimed to find cultural differences in the evaluation of terrorism. Perhaps some such differences will be found in the future. But it would be most surprising if one or another group showed little concern about terrorism-related risks, or even if different groups showed significant variations in their level of concern. By definition, the idea of cultural cognition is able to illuminate risk perceptions only for those risks that are culturally contested, in the sense that relevant judgments diverge across people who can be sorted into the relevant categories.¹¹⁸ For some risks, such as those associated with lawnmowers, lightning, skiing, driving, flying, and hurricanes, cultural dispositions ought not to be expected to play a significant role. Terrorism may

¹¹¹ Id.

¹¹² See Kahan and Braman, *supra* note.

¹¹³ See Kahan et al., *Fear of Democracy*, *supra* note.

¹¹⁴ Id.

¹¹⁵ See Leiserowitz, *supra* note.

¹¹⁶ Data on file with the author.

¹¹⁷ See notes *supra*.

¹¹⁸ See Cass R. Sunstein, *Misfearing: A Reply*, 19 *Harv. L. Rev.* 1110 (2006).

well fall in the same category, simply because the magnitude of public concern does not diverge along identifiably cultural lines.¹¹⁹

The second problem has to do with the roots of cultural dispositions. As with the affect heuristic, so too with cultural cognition, which involves a heuristic as well: A reference to “culture” is an imperfect explanation, because culture too needs explanation. Why, exactly, are individualists less concerned about climate change than are egalitarians? What connects “culture” to risk perceptions? To make progress, it is necessary to specify the mechanisms by which culture contributes to judgments about risks. There are two principal possibilities.

1. *Normative bias.* Normative commitments often influence people’s judgments about factual questions, as part of the general phenomenon of “biased assimilation.”¹²⁰ Suppose that certain people believe that the depletion of the ozone layer is unlikely to be a problem, and that the relevant fears are based on a form of hysteria and weak science. If so, such people might be unlikely to credit new information suggesting that the fears are legitimate. The general phenomenon—normative bias—is well-supported by evidence of both biased assimilation and confirmation bias, by which people tend to seek out, and to believe, evidence that supports their own antecedent views.¹²¹

As I am understanding it here, normative bias is an effort to reduce the cognitive dissonance¹²² produced when preexisting normative commitments are in evident tension with apparently relevant factual findings.¹²³ If people with certain predispositions think that climate change is not a serious problem, it may well be because of normative bias. And if Americans are more severely split with respect to climate change than with respect to terrorism, it is because normative commitments play a large role in assessing the former than in assessing the latter. For terrorism, such commitments become relevant, not for assessing the risk in general, but for contests over particular risk-reduction strategies, such as the controversial surveillance by the National Security Agency, which can trigger them.

2. *Social influences.* Suppose that people do not know whether climate change causes serious risks. They are likely to form a judgment on the basis of what they learn

¹¹⁹ It is true, however, that particular anti-terrorist measures would produce diverse reactions along cultural lines. It is to be expected, for example, that some groups would show heightened concern about the USA Patriot Act or the NSA surveillance program.

¹²⁰ See Jeffrey Rachlinski, *The Psychology of Global Climate Change*, 2000 U Ill L Rev 299.

¹²¹ See Craig MacKenzie, *Hypothesis Testing and Evaluation*, in BLACKWELL HANDBOOK OF JUDGMENT & DECISION MAKING 200, 203-09 (Derek Koehler & Nigel Harvey eds. 2004). Note that people may well be simple Bayesians here. For example, people may have reason to believe that gun ownership is not dangerous, because their own experience, and that of their acquaintances, supports that belief; for such people, it will take a great deal of evidence to justify the conclusion that guns are not safe.

¹²² See LEON FESTINGER, *A THEORY OF COGNITIVE DISSONANCE* (1957); GEORGE AKERLOF, *AN ECONOMIC THEORY OF COGNITIVE DISSONANCE*, IN *EXPLORATIONS IN PRAGMATIC ECONOMICS* 177 (2005).

¹²³ See Kahan et al., *supra* note: “Individuals selectively credit and dismiss factual claims in a manner that supports their preferred vision of a good society.”

from those they know and trust.¹²⁴ If people sort themselves into different groups, with different fears, then risk perceptions will diverge accordingly. People with incomplete information are rationally interested in the views of those whom they trust. Those who believe that climate change is a serious problem might so believe because they are following the views of others.¹²⁵ Note that the resulting differences may or may not operate along geographical lines. If environmentalists are influenced by other environmentalists, then their fears about climate change might have little to do with physical location.

This understanding of cultural cognition emphasizes the role of social influences on individual beliefs and actions. Such influences come in two forms: informational and reputational.¹²⁶ Suppose that trusted people believe that climate change is a serious problem; if so, there is reason to believe that climate change imposes significant risks, because that belief supplies valuable information. And if trusted or at least powerful people so believe, there is reason to go along with them, simply in order to avoid incurring their wrath; here is a reputational basis for following them. When people are divided along certain lines, and when certain beliefs tend to “cluster,”¹²⁷ it is typically because of social influences. To the extent that beliefs about climate change are a product of cultural cognition, social influences are the explanation.

Normative bias and social influences undoubtedly play a large role in judgments about the relative priority of climate change and terrorism. It is easy to imagine social groups that would regard climate change as having equal or higher priority; it is also easy to imagine groups that would regard terrorism as self-evidently a far more serious problem. But social influences and normative bias cannot be the whole story, and here is a final problem for cultural accounts of risk perception. The problem of terrorism occasioned far less concern on September 10, 2001 than it did on September 12 of the same year; of course the explanation lies in the external shock of the 9/11 attacks. Indeed, almost 50% of Americans described terrorism as the “most important problem facing the country” immediately after the 9/11 attacks—an increase from *zero* the year before.¹²⁸

When there is such an external shock, risk perceptions change dramatically across cultural lines, and social influences and normative bias cannot provide an inadequate account of those changes.¹²⁹ In the environmental context, consider the legislation calling for the Toxic Release Inventory, which was a clear product of a highly publicized chemical accident at the Union Carbide plant in Bhopal, India in December 1984; the accident “left more than 2,000 people dead and ignited a debate in the United States over

¹²⁴ On the relevance of this point to environmental policy, see William Brock, Tipping Points, Abrupt Opinion Changes, and Punctuated Policy Change, in Punctuated Equilibrium and the Dynamics of American Environmental Policy 47 (Richard Repetto ed. 2006).

¹²⁵ On cascade effects in general, see David Hirshleifer, The Blind Leading the Blind, in The New Economics of Human Behavior 199 (Mariano Tommasi and Kathryn Ierulli eds. 1995); the implications for risk regulation, see Brock, *supra* note.

¹²⁶ See Cass R. Sunstein, Laws of Fear 94-102 (2005).

¹²⁷ See the emphasis on clustering on Kahan et al., *supra* note.

¹²⁸ See Robert Goodin, What’s Wrong With Terrorism? 135 (2006).

¹²⁹ See Loewenstein and Mather, *supra* note.

the public's right to know about chemicals at industrial plants."¹³⁰ Perhaps divergences in concern can be explained partly by reference to cultural divisions, but the general heightening of concern cannot possibly be explained in that fashion.

Or return to a change involving no external shock: Having shown some ambivalence about efforts to control ozone-depleting chemicals, the United States government firmly committed itself to the Montreal Protocol in 1987, and a reference to social influences and normative bias cannot explain the shift.¹³¹ The commitment was instead influenced by evidence that regulatory restrictions would be far less costly than anticipated, and more beneficial as well.¹³² Of course political dynamics played a role, with a weakened Reagan Administration showing some uneasiness about appearing indifferent to an apparently serious environmental issue.¹³³ But "culture cognition" does not explain the national commitment. Cultural differences also fail to explain the enactment of the acid deposition program as a key part of the Clean Air Act Amendments of 1990; a crucial development was the rise of emissions trading mechanisms for controlling acid deposition, because those mechanisms dramatically decreased the costs of compliance.¹³⁴ With respect to the government, at least, "cultural cognition," and the underlying mechanisms, cannot adequately account for American behavior, or the divergence reactions to terrorism and climate change.

V. Benefits, Costs, and Rational Choice

If citizens are assumed to be rational, we might be able to make progress simply by assuming that risk-related beliefs and conduct are a product of some kind of rational weighing of benefits and costs. If citizens believe that they have much to gain and little to lose from risk regulation, they will favor risk regulation; leaders respond to what citizens believe, and their own judgments are influenced by cost-benefit analysis as well. Perhaps the cost-benefit ratio is simply better for certain reductions of terrorist threats than for aggressive efforts to reduce the risks associated with climate change. Note in this regard that the United States ultimately supported the Montreal Protocol, and aggressive controls on ozone-depleting chemicals, after a careful cost-benefit analysis suggested that the costs of controls would be far lower than anticipated, and the benefits far higher.¹³⁵ In the words of a high-level participant in the proceedings: "A major break . . . came in the form of a cost-benefit study from the President's Council of Economic Advisers. The analysis concluded that, despite the scientific and economic uncertainties, the monetary benefits of preventing future deaths from skin cancer far outweighed the costs of CFC controls as estimated either by industry or by EPA."¹³⁶

¹³⁰ See Hamilton, *supra* note, at 178.

¹³¹ See Richard Benedict, *Ozone Diplomacy* (1991); Edward Parson, *Protecting the Ozone Layer* (2003).

¹³² *Id.*

¹³³ *Id.*

¹³⁴ See Kevin Esterling, *The Politics of Expertise* (2004).

¹³⁵ See Barrett, *supra* note, at 227-30.

¹³⁶ See Benedict, *supra* note, at 63.

If this example generalizes, an explanation of the divergence between terrorism and climate change need not speak of psychometrics, affect, or culture. Rational self-interest is enough. Of course many people believe that the United States has moral obligations to poorer nations, which are distinctly threatened by climate change.¹³⁷ Perhaps climate change is properly regarded as a kind of tort, committed by wealthy agencies, above all the United States, against poor nations, who are in the weakest position to adapt. But perhaps moral obligations are insufficient to motivate expensive regulatory requirements. If so, those interested in imposing those requirements must speak in other terms.¹³⁸

A. Benefits

Americans might well believe that they have far more to gain from efforts to reduce the risks of terrorism than from efforts to reduce the risks of climate change. To be sure, much depends on the specific measures that are proposed. But the simplest claim here would be that climate change is not yet occurring—or that if it is occurring, its effects will not be significant in the United States. If we doubt the risk of serious harm, we might well resist regulatory responses. Perhaps the best response to existing concerns involves continued research, especially if little is to be gained by acting now rather than a few years from now.¹³⁹ With respect to terrorism, by contrast, it is difficult to say that the risk is not real or that it is too speculative to warrant immediate action. To be sure, particular risk-reduction strategies might be questioned—on the ground, for example, that certain surveillance programs will not have significant effects, or that some steps increase risks on balance. But it is hard to argue that with respect to terrorism, the best approach is one of “learn, then act.”

Current evidence strongly suggests that Americans believe that they have relatively little to gain from efforts to control climate change. In 2006, a large majority of Americans suggested both that climate change is “already happening” and that climate change does not pose a “serious threat” to them or their way of life in their lifetime.¹⁴⁰ In 2006, another poll found that two-thirds of Americans believe that climate change will not create a serious danger in their lifetime.¹⁴¹ In 2000, a sample of people was asked, “Which of the following are you most concerned about? The impacts of climate change on . . . 1) you and your family; 2) your local community; 3) the U.S. as a whole; 4)

¹³⁷ See, e.g., Nordhaus and Boyer, *supra* note, at 74–98, and in particular the conclusion that “low-income regions—particularly India and Africa—and Europe appear to be quite vulnerable to climate change. The impact on India comes from its extreme vulnerability to climatic shifts because of the importance of monsoons on agriculture, the disamenity of increasing temperatures on nonmarket time use, and the potential for adverse health impacts. For Africa, much of the vulnerability comes from potential health impacts of global warming.”

¹³⁸ Cf. Jack Goldsmith, *Democracy, Prudence, Intervention* (unpublished manuscript 2006) (contending that moral obligations are not enough to motivate humanitarian intervention).

¹³⁹ See Robert Mendelsohn, *Perspective Paper No. 1*, in *Global Crises, Global Solutions* 44-47 (Bjorn Lomborg ed. 2005); Nordhaus and Boyer, *supra* note, at 98.

¹⁴⁰ <http://www.pollingreport.com/enviro.htm>

¹⁴¹ See *Americans Still Not Highly Concerned About Global Warming* (2006), available at <http://poll.gallup.com/content/?ci=22291>

people are over the world; 5) non-human nature; or, 6) not at all concerned.”¹⁴² Nearly 70% of respondents answered 4) or 5), and only 13% answered 1) or 2). It is thus apparent that Americans generally think that they are not themselves at risk as a result of climate change.¹⁴³ In their view, the principal risks are faced by those in other nations, or by the environment in general.¹⁴⁴ Thus the “health impacts of climate change have not been portrayed effectively in the United States, leaving a motivational gap.”¹⁴⁵

Compare in this regard a cross-national study of perceptions of risk associated with terrorism.¹⁴⁶ Americans estimated their *personal* chance of serious harm from terrorism as 8.27%—to say the least, a significant risk.¹⁴⁷ For obvious reasons, the objective risks from terrorism are difficult to calculate, but the figure seems wildly inflated. It is obvious that if each American does face a risk of 8.27%, aggressive protective measures are certainly justified. Recall here the evidence that substantial numbers of Americans are worried about the risk that a terrorist attack will affect themselves, or their loved ones, in the near future.¹⁴⁸

There is thus reason to believe that Americans think that they have far more to gain from controls on terrorism than from controls on climate change, and that the personal risk, to those now living, is much higher from terrorism than from climate change. Some specialists offer supportive findings. For example, Nordhaus and Boyer find that extremely little is lost by a ten-year delay in emissions reductions.¹⁴⁹ Perhaps this judgment is not correct. But even if it is wrong, doubts about the personal benefits of climate change policies help to explain divergent public reactions. As I have emphasized, legal initiatives are more likely if the citizenry is fearful; and Americans are far more fearful of terrorism than they are of climate change. The pattern of regulation is a natural product of this fact.

B. Costs

Perhaps those who show greater concern with terrorism are aware, at least intuitively, that the costs of reducing climate change are likely to be very high—plausibly higher than the costs of reducing the risk of terrorism. To be sure, such comparisons are difficult in the abstract. Here as elsewhere, everything depends on the particular steps at issue. The war in Iraq, motivated in large part by the risk of terrorism, has been extremely

¹⁴² Leiserowitz, *supra* note.

¹⁴³ See Abassi, *supra* note, at 144: “A greater focus on how the consequences of climate change brush up against the lives and values of those who have so far been indifferent or opposed to action is critical to creating a larger base of concern.”

¹⁴⁴ For a contrary view, see Climate Change Impacts on the United States, available at <http://www.usgcrp.gov/usgcrp/nacc/default.htm>.

¹⁴⁵ See Abassi, *supra* note, at 190.

¹⁴⁶ See Neal Feigensohn et al., Perceptions of Terrorism and Disease Risks: A Cross-National Comparison, 69 M. O. L. Rev. 991 (2004).

¹⁴⁷ *Id.* at 995-1001.

¹⁴⁸ See note *supra*.

¹⁴⁹ See WILLIAM D. NORDHAUS & JOSEPH BOYER, WARMING THE WORLD: ECONOMIC MODELS OF GLOBAL WARMING 127 (2000) (describing the net loss as “trivially small”).

costly, easily exceeding \$300 billion for the United States alone.¹⁵⁰ As I have noted, the cost of the Iraq War, to the United States, now exceeds the total expected cost of the Kyoto Protocol, and before long the cost of Iraq War will dwarf that expected cost.¹⁵¹ At the same time, it is possible to imagine steps to control greenhouse gases that would not be terribly expensive.¹⁵² But perhaps significant reductions in the risk of terrorism can be undertaken at reasonable cost, and perhaps the same is not true of climate change. On this view, the divergent public reactions reflect a kind of informal cost-benefit analysis, in accordance with which an awareness of the magnitude of the costs is doing a great deal of work.

There is almost undoubtedly something to this explanation. If the risk of climate change could be significantly reduced for \$10 million, or with an annual tax increase of \$1 on every American, it is highly likely that much more would be done to combat climate change. American enthusiasm for the Montreal Protocol is strong evidence on this count.¹⁵³ A demonstration that climate change could be reduced at low cost would undoubtedly increase American enthusiasm for risk reduction efforts.¹⁵⁴ To the extent that the costs of risk reduction are “on screen,” less aggressive efforts will be made to reduce risks.¹⁵⁵ Note in this regard that in the abstract, Americans broadly support the Kyoto Protocol and strong efforts to combat climate change—but their enthusiasm sharply diminishes as they are asked to incur costs to reduce greenhouse gas emissions.¹⁵⁶ In the context of terrorism, people may well believe that they are themselves unlikely to incur significant costs, except, perhaps, in the form of increased waiting lines at airports.

Consider the recorded views of Americans about environmental protection and climate change in the late 1990s. About 63 percent of Americans agreed with the following statement: “Protecting the environment is so important that requirements and standards cannot be too high and continuing environmental improvements must be made regardless of cost.”¹⁵⁷ In the same general vein, 59 percent supported the Kyoto Treaty on climate change, with only 21 percent opposed.¹⁵⁸ But in the same period, 52 percent of Americans said that they would refuse to support the Kyoto Treaty if “it would cost an extra \$50 per month for an average American household.”¹⁵⁹ In fact only 11 percent of Americans would support the Kyoto Treaty if the monthly expense were \$100 or more.¹⁶⁰

¹⁵⁰ See Walsten, *supra* note.

¹⁵¹ The figure is \$325 billion, see Nordhaus and Boyer, *supra* note, at 161, a figure that might turn out to be inflated if replacements for carbon dioxide have a diminishing cost as a result of technological innovation.

¹⁵² The methane program is an example. See note *supra*.

¹⁵³ See Benedict, *supra* note.

¹⁵⁴ Note that proponents of the McCain-Lieberman proposal, which would have capped greenhouse gas emissions in the United States at 2000 levels, emphasized a study purporting to show relatively low costs from full implementation. See note *supra*,

¹⁵⁵ See Howard Margolis, *Dealing with Risk* (1997).

¹⁵⁶ See Laserowitz, *supra* note.

¹⁵⁷ See The Program on International Policy Attitudes, *Americans on the Global Warming Treaty*, available at http://www.pipa.org/OnlineReports/GlobalWarming/glob_warm_treaty.html at Box 15.

¹⁵⁸ *Id.*

¹⁵⁹ *Id.* at Box 16.

¹⁶⁰ *Id.*

As I have noted, polls find that Americans are skeptical of increased energy and gasoline taxes as efforts to reduce climate change—though they also favor regulatory mandates on power companies.¹⁶¹ How can we explain strong majority support for “environmental improvements . . . regardless of cost” and strong majority rejection of environmental improvements when the cost is high?

The answer lies in the fact that people are not, in fact, willing to spend an infinite amount for environmental improvements. When the costs are squarely placed “on screen,” people begin to weigh both costs and benefits, and their enthusiasm for regulatory expenditures diminishes.¹⁶² Hence Americans believe that car companies should be required to take steps to reduce greenhouse gas emissions, without also being willing to spend a great deal, if anything, in increased gasoline prices.¹⁶³ Surveys in Europe suggests that significant numbers of citizens are willing to pay a considerable amount to reduce the risks of climate change; but even there, the amount is not extremely high.¹⁶⁴ Among all people between the age of 15 and 64, only about 20% are willing to pay more for gasoline to reduce environmental harm, and among that group, the average willingness to pay is an increase of 2.4%, or 11.5 cents per liter.¹⁶⁵ For citizens as well as leaders, an intuitive assessment of costs and benefits plays a large role in determining the level of precautions actually sought.

Consider in this regard a study done at the Wharton School, which projected extremely high costs for the United States from the Kyoto Protocol¹⁶⁶—including a loss of 2.4 million jobs and \$300 billion in the nation’s GDP, with an average annual cost of \$2700 per household, including a 65 cent per gallon increase in the price of gasoline and a near-doubling of the price of energy and electricity. These numbers are almost certainly inflated, especially in light of the technological innovations that would undoubtedly drive expenses down.¹⁶⁷ But if significant costs are to be expected, significant regulation is less likely. Return here to the government’s decision, in the 1990 Clean Air Act, to take extremely aggressive steps to control acid deposition.¹⁶⁸ Those steps became possible only after the creation of an ambitious emissions trading program reduced the anticipated costs of emissions controls; hence those who would otherwise be inclined to oppose the program found it acceptable.¹⁶⁹ We saw a similar pattern with American enthusiasm for steps to decrease depletion of the ozone layer.¹⁷⁰

¹⁶¹ <http://www.pollingreport.com/enviro.htm>

¹⁶² See Margolis, *supra* note, for a detailed discussion of this point in connection with risk perception.

¹⁶³ See Laserowitz, *supra* note.

¹⁶⁴ W. Kip Viscusi and Joni Hirsch, *The Generational Divide in Support for Climate Change Policies: European Evidence* (unpublished draft 2005).

¹⁶⁵ *Id.*

¹⁶⁶ <http://www.api.org/globalclimate/wefastateimpacts.htm>

¹⁶⁷ Consider the remarkable decline in the anticipated cost of substitutes for CFCs. After the signing of the Montreal Protocol, “substitutes for CFCs were announced at an astonishing rate, and their projected costs declined steadily. By mid-1989, industry accepted the feasibility of a complete phaseout of CFCs, and EPA estimated that a total phaseout would cost less than it had projected for a 50 percent reduction only two years later.” Robert Percival et al., *Environmental Regulation* 1051 (2003).

¹⁶⁸ For an overview, see A. Denny Ellerman et al., *Markets for Clean Air* (2000)

¹⁶⁹ See *id.*; Kevin Esterling, *The Political Economy of Expertise* (2005).

¹⁷⁰ See note *supra*.

C. American Costs, Foreign Benefits

The most serious damage from climate change is not expected to be felt in the United States.¹⁷¹ On some estimates, American agriculture will actually be a net winner as a result of climate change.¹⁷² On other estimates, Americans as a whole will be net losers, but not nearly to the same extent as other nations.¹⁷³ The estimates fit public perceptions, for Americans believe that other nations have more to lose from climate change than the United States does.¹⁷⁴ Here there is a significant difference between the problem of climate change and the problem of ozone depletion, where the United States had a great deal to gain, in terms of health benefits, from both immediate and long-term action.¹⁷⁵ American behavior is likely to be much affected by any finding that citizens in other nations have much more to gain from regulatory protection than Americans do. Consider the fact that a “revealed preference” study of American laws suggests that a non-American life is valued at 1/2000 an American life.¹⁷⁶ If Americans believe that people in India and South Africa, rather than Florida and New York, are at serious risk, they will be far less likely to act.

The most systematic analyses suggest that the United States stands to lose much more, and to gain much less, from aggressive regulation than European nations do. For the United States, the likely costs of the Kyoto Protocol, for example, seem to exceed its likely benefits, with a total cost of \$325 billion.¹⁷⁷ The picture for the world as a whole is far more mixed, with Europe anticipated to be a net gainer, and with Russia likely to gain an especially large amount.¹⁷⁸ Hence those nations that favor aggressive controls on greenhouse gases, and that have shown enthusiasm for the Kyoto Protocol, are responding in large part to the fact that they are anticipated to gain a great deal and to spend relatively little. Indeed, almost all Eastern European nations have easily met their obligations under the Kyoto Protocol, in large part because their emissions allowances greatly exceeded their likely emissions in any case.¹⁷⁹ When the costs are so low, regulation will seem attractive if the risks of climate change are even mildly available to

¹⁷¹ See Nordhaus and Boyer, *supra* note, at 96-97.

¹⁷² See Olivier Deschenes and Michael Greenstone, *The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations of Weather* (2006), available at <http://www.aei-brookings.org/publications/abstract.php?pid=1031>; compare the suggestion in Nordhaus and Boyer, *supra* note, at 97, that “the economic impact of gradual climate change (that is, omitting catastrophic outcomes) is close to zero for a moderate (2.5 degree C) global warming.” Note that this conclusion does not come to terms with the economic effects on the United States that would result from the very fact of serious economic harms in other nations; such harms might well adversely affect the United States as well, among other things because of a reduction in the demand for goods and services produced here.

¹⁷³ See note *supra*.

¹⁷⁴ <http://www.pollingreport.com/enviro.htm>

¹⁷⁵ See Barrett, *supra* note, at 227-230.

¹⁷⁶ See Wojciech Kopszok et al., *The Limitations of Decentralized World Redistribution: An Optimal Taxation Approach*, 30 *European Economic Review* 1051 (2005).

¹⁷⁷ Nordhaus and Boyer, *supra* note, at 161.

¹⁷⁸ *Id.* at 161-63.

¹⁷⁹ See UNFCCC, *Key GHG Data: Greenhouse Gas (GHG) Emissions Data for 1990-2003* 16-17 (2005).

leaders and citizens. Recall here the clear finding that Americans do not believe that they personally have much if anything to lose from climate change.¹⁸⁰

At the present time, many people believe that the United States will be able to handle the costs of climate change,¹⁸¹ and hence that expensive precautions are hard to justify simply from the standpoint of national self-interest. If this is so, then intuitive cost-benefit balancing is the source of the official position of the United States; it also helps to explain Europe's greater willingness to engage in precautionary measures. For the United States, the key point is that aggressive regulation seems to be a kind of foreign aid program, one that is not self-evidently in national self-interest.¹⁸² As we have seen, controls on ozone depletion were very different on that count, because the domestic cost-benefit ratio easily favored such controls.¹⁸³ Of course the problem of terrorism is not comparable to climate change on this count. While efforts to control terrorism are likely to benefit other nations, the principal goal is to protect the United States itself.

D. Present Costs, Future Benefits

Perhaps the real difference lies in the *temporal* incidence of costs and benefits.¹⁸⁴ Consider the following question: "Do you think climate change is an urgent problem that requires immediate government action, or a longer-term problem that requires more study before government action is taken?" Many more Americans believe that the problem is "longer-term" than "urgent."¹⁸⁵

For climate change, it is reasonable to believe that the largest costs of risk reduction will be felt immediately, whereas the benefits will be received mostly by those in the future.¹⁸⁶ Whatever their stated moral commitments, and whatever the psychometric paradigm may say, current citizens are usually unwilling to pay a great deal to help those who will follow them. Perhaps current citizens are rationally discounting the future, believing that harms in fifty years do not deserve the same attention as harms today.¹⁸⁷ Perhaps citizens are assuming that if risks will not be incurred for many decades, they might not be incurred at all, simply because technological advances will provide a solution. Perhaps they are using an implausibly high discount rate to assess future benefits.¹⁸⁸ Perhaps they are being unrealistically optimistic, or reducing cognitive

¹⁸⁰ See Leiserowitz, *supra* note.

¹⁸¹ See Olivier Deschenes and Michael Greenstone, *The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations of Weather* (2006), available at <http://www.aei-brookings.org/publications/abstract.php?pid=1031>.

¹⁸² See Thomas Schelling, *Intergenerational Discounting*, in *DISCOUNTING AND INTERGENERATIONAL EQUITY*, at 99, 100.

¹⁸³ See note *supra*.

¹⁸⁴ See Bazerman and Watkins, *Predictable Surprises*, *supra* note, at 84-87, 238-39.

¹⁸⁵ <http://www.pollingreport.com/enviro.htm>

¹⁸⁶ See Bazerman and Watkins, *supra* note, at 238-39.

¹⁸⁷ On discounting generally, see *Discounting and Intergenerational Equity* (Paul Portney and John Weyant eds. 1999); Symposium, *U Chi L Rev* (forthcoming 2007).

¹⁸⁸ See W. Kip Viscusi, *Rational Discounting for Regulatory Analysis*, *U Chi L Rev* (forthcoming 2007).

dissonance,¹⁸⁹ believing that a probabilistic harm in the future will not come to fruition at all, or will not be particularly bad if it does. Or they might be simply self-interested, treating future generations as a kind of foreign country. Thomas Schelling argues that “[g]reenhouse gas abatement is a foreign aid program, not a saving-investment problem of the familiar kind.”¹⁹⁰ And if political actors are responsive to their citizens, it is most unlikely that they will impose high current costs for long-term gains. By the time the largest benefits of risk-reduction are generally felt by the public, those politicians will be out of office and indeed long dead.

Here, then, is a substantial difference between the risk of terrorism and the risk of climate change. Every politician has a strong incentive to take steps to prevent terrorist attacks. If such an attack occurs “on his watch,” the likelihood of political reprisal is high. The risk of such an attack is immediate. By contrast, it is far less likely that there will be a climate change “incident” on the watch of, or easily attributable to, any current politician.¹⁹¹ To justify public concern, or the imposition of immediate costs, such a politician must trigger moral commitments, which may not be so easy to do.¹⁹² If moral commitments do not operate as an impetus for costly controls, a politician who attempts to regulate greenhouse gases might be imposing costs on current voters for the benefit of future people who will never be able to reward that particular politician with their electoral support. Such politicians might well be heroic; but it might well be surprising to see heroes of that particular sort.

E. Rational Choice? A Summary and Some Doubts

If the various parts of the analysis are taken as a whole, we seem to have the ingredients of a plausible explanation of the divergent American reactions to terrorism and climate change. With respect to climate change, the benefits of aggressive regulation are disputed and the costs are plausibly high, certainly for the United States. The benefits are likely to be enjoyed disproportionately by other nations and in the fairly distant future. The analysis is very different for terrorism, where Americans perceive themselves as peculiarly at risk, and hence the benefits of risk reduction will be felt in the United States and by current generations. For many efforts to reduce the risk of terrorism, it is possible to question whether the benefits justify the costs; but the judgment, intuitive or more reflective, is that many expensive measures are worthwhile.

To this extent, an account based on rational choice stands on firm ground. Those who emphasize bounded rationality do not urge that people are irrational, or that they refuse to attend to consequences. But recall that on September 10, 2001, terrorism was far from a high-priority item for Americans—and that the year before the attacks, literally

¹⁸⁹ See Akerlof, *supra* note.

¹⁹⁰ Thomas Schelling, *Intergenerational Discounting*, in *DISCOUNTING AND INTERGENERATIONAL EQUITY*, at 99, 100.

¹⁹¹ Hurricane Katrina is a possible exception, in light of efforts to connect its magnitude with global warming. But those efforts failed, and the failures are instructive: It is bound to be difficult to connect particular weather-related events with global warming in general.

¹⁹² Cf. Jack Goldsmith, *supra* note (exploring reluctance of Americans to intervene for purposes of humanitarian intervention, when national security interest is not at stake).

zero percent of the public counted terrorism as the nation's leading problem.¹⁹³ By contrast, many specialists believed, for a period preceding the attack, that the risk of terrorism was foolishly neglected in light of a rational assessment of costs and benefits—and hence that the attacks were a kind of “predictable surprise.”¹⁹⁴ On this view, the neglect was a product of “unavailability bias,” in which the absence of cognitively available incidents of harm made people unreasonably indifferent to the risk.¹⁹⁵ Note in this regard that in the eighteen months following the 9/11 attacks, terrorism continued to be named the nation's most important problem by between 15 and 20 percent of those polled—and that the “fluctuations closely track[ed] the frequency of television news stories concerning terrorism.”¹⁹⁶ Here, too, is a tribute to the power of the availability heuristic.

Perhaps the post-9/11 reaction is simply a form of rational updating on the part of Americans; committed believers in rational choice would so consist, believing that the aggressive regulatory steps, after 9/11, generally reflected the (massive) new information provided by the attacks themselves. With respect to ordinary citizens, this account is not implausible. But as an explanation of the behavior of the United States, much more was almost certainly involved, because officials had the information to justify more aggressive security measures well before 9/11.¹⁹⁷ To understand the missing ingredients, it is necessary to venture well beyond an account based solely on rational choice.

VI. Behavioral Economics

It would certainly be optimistic to suppose that risk perception, and American risk regulation, is generally a product of rational (whether or not selfish) balancing of costs and benefits.¹⁹⁸ With respect to terrorism, vivid and concrete images play a large role in people's judgments. Climate change is entirely different. According to a recent study, “most Americans lacked vivid, concrete, and personally-relevant affective images of climate change, which helps explain why climate change remains a low priority national or environmental issue.”¹⁹⁹ This finding provides an important clue to risk perception in general; it also casts a distinctive light on the divergent American reactions to terrorism and climate change.

A. The Availability Heuristic

1. Availability in general. It is well-established that in thinking about risks, people rely on certain heuristics, or rules of thumb, which serve to simplify their inquiry.²⁰⁰ Heuristics typically work through a process of “attribute substitution,” in which people

¹⁹³ See Goodin, *supra* note, at 135.

¹⁹⁴ See Bazerman and Watkins, *supra* note, at 15-41.

¹⁹⁵ See below.

¹⁹⁶ Goodin, *supra* note, at 135.

¹⁹⁷ See *id.*

¹⁹⁸ For evidence against that optimistic view, see W. Kip Viscusi, *Fatal Tradeoffs* (1994).

¹⁹⁹ Leiserowitz, *supra* note.

²⁰⁰ See Daniel Kahneman, Paul Slovic, & Amos Tversky, *Judgment Under Uncertainty: Heuristics and Biases* (1982).

answer a hard question by substituting an easier one.²⁰¹ Should Americans be fearful of hurricanes, nuclear power, mad cow disease, alligator attacks, or avian flu? When people use the availability heuristic, they assess the magnitude of risks by asking whether examples can readily come to mind.²⁰² For example, “a class whose instances are easily retrieved will appear more numerous than a class of equal frequency whose instances are less retrievable.”²⁰³ If people can easily think of relevant examples, they are far more likely to be frightened and concerned than if they cannot. Consider a simple study showing people a list of well-known people of both sexes, and asking them whether the list contains more names of women or more names of men. In lists in which the men were especially famous, people thought that there were more names of men, whereas in lists in which the women were the more famous, people thought that there were more names of women.²⁰⁴

This is a point about how familiarity can affect the availability of instances. A risk that is familiar, like that associated with terrorism in the aftermath of 9/11, will be seen as more serious than a risk that is less familiar, like that associated with sunbathing or hotter summers. But salience is important as well. “For example, the impact of seeing a house burning on the subjective probability of such accidents is probably greater than the impact of reading about a fire in the local paper.”²⁰⁵ Thus vivid and easily imagined causes of death (e.g., tornadoes) receive likelihood estimates that are similar to those of less-vivid causes (e.g., asthma attacks) that occur with a far greater frequency (here a factor of 20).²⁰⁶ So too, recent events will have a greater impact than earlier ones. The point helps explain differences across time and space in much risk-related behavior, including both public and private decisions to take precautions. If floods have not occurred in the immediate past, people who live on flood plains are far less likely to purchase insurance.²⁰⁷ Whether people will buy insurance for natural disasters is greatly affected by recent experiences.²⁰⁸ In the aftermath of an earthquake, insurance for earthquakes rises sharply—but it declines steadily from that point, as vivid memories recede.²⁰⁹

The importance of the availability heuristic emerges from a cross-national study of perceptions of risk associated with terrorism and SARS.²¹⁰ Americans perceived terrorism to be a far greater threat, to themselves and to others, than SARS; Canadians

²⁰¹ See Daniel Kahneman & Shane Frederick, Representativeness Revisited: Attribute Substitution in Intuitive Judgment, in *Heuristics and Biases: The Psychology of Intuitive Judgment* 49-53 (Thomas Gilovich, Dale Griffin, & Daniel Kahneman, eds. 2002).

²⁰² See Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases, *supra* note, at 3, 11-14.

²⁰³ *Id.* at 11.

²⁰⁴ *Id.*

²⁰⁵ *Id.*

²⁰⁶ See W. Kip Viscusi, *Judging Risk and Recklessness*, in CASS R. SUNSTEIN, *PUNITIVE DAMAGES: HOW JURIES DECIDE* 181-82 (2002).

²⁰⁷ *Id.*

²⁰⁸ PAUL SLOVIC, *THE PERCEPTION OF RISK* 40 (2000).

²⁰⁹ *Id.*

²¹⁰ See Neal Feigenson et al., *Perceptions of Terrorism and Disease Risks: A Cross-National Comparison*, 69 *MO. L. REV.* 991 (2005).

perceived SARS to be a greater threat, to themselves and to others, than terrorism.²¹¹ These findings are understandable in light of the fact that Canadians have experienced no incidents of terrorism but a significant number of cases of SARS—whereas Americans have experienced a serious terrorist attack but no cases of SARS. Note that the use of the availability heuristic, in these contexts, is hardly irrational.²¹² What has happened before seems, much of the time, to be the best available guide to what will happen again. The problem is that the availability heuristic can lead to significant errors, in terms of both excessive fear and neglect; the problem of neglect is especially serious when citizens face a potentially catastrophic low probability risk that has not come to fruition in the recent past.²¹³

What, in particular, produces availability? An illuminating essay, with important implications for divergent reactions to terrorism and climate change, attempts to test the effects of ease of imagery on perceived judgments of risk.²¹⁴ The study asked subjects to read about an illness (Hyposcencia-B) that “was becoming increasingly prevalent” on the local campus. In one condition, the symptoms were vague and hard to imagine, involving an inflamed liver, a malfunctioning nervous system, and a general sense of disorientation. In another condition, the symptoms were concrete and easy to imagine—involving muscle aches, low energy, and frequent severe headaches. Subjects in both conditions were asked to imagine a three-week period in which they had the disease and to write a detailed description of what they imagined. After doing so, subjects were asked to assess, on a ten-point scale, their likelihood of contracting the disease. The basic finding was that likelihood judgments were very different in the two conditions, with easily-imagined symptoms making people far more inclined to believe that they were likely to get the disease.

2. Availability, terrorism, and climate change. If the availability heuristic plays a large role in people’s risk-related judgments, then we might have a simple explanation for the asymmetry in American reactions: Because of the attacks of 9/11, an available incident drives people’s probability judgments with respect to terrorism, whereas there is no such incident with respect to climate change. The vividness and salience of the incident helps to ensure continuing concern about terrorism-related risks. To see the point, consider what would happen if in 2000, a candidate for public office had made the risk of terrorism a central issue in a political campaign. Such a candidate would likely

²¹¹ Id.

²¹² Kahneman and Tversky emphasize that the heuristics they identify “are highly economical and usually effective,” but also that they “lead to systematic and predictable errors.” See Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases, in Judgment and Decision Making: An Interdisciplinary Reader 38, 55, Hal R. Arkes & Kenneth R. Hammond, eds. (1986). Gerd Gigerenzer, among others, has emphasized that some heuristics can work extremely well, see Gerd Gigerenzer et al., Simple Heuristics That Make Us Smart (1999); Gerd Gigerenzer, Adaptive Thinking: Rationality in the Real World (2000), and used this point as a rejoinder to those who stress the errors introduced by heuristics and biases. For present purposes, it is not necessary to take a stand on the resulting debates. Even if many heuristics mostly work well in daily life, a sensible government can do much better than to rely on them.

²¹³ See Bazerman and Watkins, *supra* note, at 91-93 (discussing effects of vividness).

²¹⁴ In Steven J. Sherman et al., Imagining Can Heighten or Lower the Perceived Likelihood of Contracting a Disease: The Mediating Effect of Ease of Imagery, in Heuristics and Biases: The Psychology of Intuitive Judgment 82, Thomas Gilovich et al., eds. (2002).

have seemed to have an odd sense of priorities—focusing on a distant and apparently unrealistic threat, one that could not possibly have resonated in the minds of voters. Or suppose that in 2000, a member of Congress had aggressively argued for much of the same legislation that followed the attacks of 9/11, including increased security measures at airports and new presidential authority to ferret out suspected terrorists. There is no question that Congress would have rejected any such effort; indeed, a legislator who argued for it would probably have seemed to be an alarmist and a threat to civil liberties. In 2000, the public was no more focused on terrorism-related risks than on the risks associated with climate change. The attacks of 9/11 made all the difference.

The point is quite general. Risk-reduction legislation is often fueled by identifiable crises. Legislation calling for disclosure of toxic releases was spurred by a chemical accident at Bhopal, India, which focused “media attention on chemical safety” and led members of Congress to “introduce right-to-know legislation.”²¹⁵ The relevant legislation could not possibly have been enacted without the highly publicized Bhopal disaster.²¹⁶ Corporate Fuel Economy Standards, requiring fuel economy for motor vehicles, were a product of the Arab oil embargo and the nationally publicized “energy crisis”; without the crisis, the fuel economy legislation would have been unimaginable.²¹⁷ Often the available incidents are a product of presentations by influential actors. *Silent Spring*, by Rachel Carson,²¹⁸ almost certainly helped to spur national controls on pesticides and indeed the environmental movement and other legislation as well. Indeed, Carson’s book, with its vivid narratives of harm-producing activities, may well have played a role in the creation of the Environmental Protection Agency.²¹⁹ The point is that Carson did not offer a dry analysis of the costs and benefits of pesticides; it made certain events highly salient to its readers.

Availability affects public perceptions as well. Within the United States, public concern about risks usually tracks changes in the actual fluctuations in those risks. But public concern outruns actual fluctuations in the important case of “panics,” bred by vivid illustrations that do not reflect changes in levels of danger.²²⁰ At certain points in the 1970s and 1980s, there were extreme leaps in concern about teenage suicides, herpes, illegitimacy, and AIDS—leaps that did not correspond to changes in the size of the problem. Availability, produced by “a particularly vivid case or new finding that receives considerable media attention,” played a major role in those leaps in public concern.²²¹ In 2006, three incidents of alligator attacks led citizens of Florida to be “suddenly hypervigilant to a danger that seemed to be lurking in every body of freshwater bigger

²¹⁵ Hamilton, *supra* note, at 184.

²¹⁶ See *id.* at 178-91.

²¹⁷ See James Dunn, Automobile Fuel Efficiency Policy: Beyond the CAFÉ Controversy, in *Punctuated Equilibrium and the Dynamics of U.S. Environmental Policy 197, 198* (Robert Repetto ed. 2006).

²¹⁸ See Rachel Carson, *Silent Spring* (1962). For an overview of the influence of the book, see Thomas Hawkins, Re-Reading *Silent Spring* (1994), available at <http://www.ehponline.org/docs/1994/102-6-7/spheres.html>.

²¹⁹ See Al Gore, Introduction, available at <http://clinton2.nara.gov/WH/EOP/OVP/24hours/carson.html>.

²²⁰ See George Loewenstein and Jane Mather, Dynamic Processes in Risk Perception, 3 *J. Risk and Uncertainty* 155 (1990).

²²¹ *Id.* at 172.

than a bathtub. Calls to hotlines skyrocketed, and all over the state people were asking themselves what could possibly be going on.”²²² With terrorism, it is difficult to know whether the response to the 9/11 attacks has been excessive, insufficient, or optimal. But there is no doubt that it was a function of a highly salient event.

With respect to the operation of the availability heuristic, leaders in the private and public spheres can have a significant impact. By its very nature, the voice of an influential politician comes with amplifiers. When public officials bring an incident before the public, a seemingly illustrative example is likely to spread far and wide. Because of the magnitude of the harm, the terrorist attacks of September 11, 2001 would inevitably loom large no matter what President George W. Bush chose to emphasize.²²³ But the President, and his White House generally, referred to the attacks on countless occasions, frequently as a way of emphasizing the reality of seemingly distant threats and the need to incur significant costs to counteract them (including the 2003 Iraq war, itself fueled by presidential speeches including vivid narratives of catastrophic harm). President Bush was certainly able to invoke salience on behalf of the Iraq war, offering a vivid picture of the risks of inaction in his 2003 State of the Union Address: “Imagine those 19 hijackers [involved in the 9/11 attacks] with other weapons and plans, this time armed by Saddam Hussein. It would take one vial, one canister, one crate slipped into this country to bring a day of horror like none we have ever known.”²²⁴ And indeed, President Bush had a general incentive to invoke the 9/11 attacks: A reminder of those attacks lead people to show stronger support for him—and the increase in support occurred among those inclined against him as well as those inclined in his favor.²²⁵

With climate change, by contrast, no salient incident triggers public concern. Notwithstanding efforts to link Hurricane Katrina with climate change,²²⁶ the evidence is contested and disputable, and Americans did not conclude that the hurricane was in any sense “caused” by climate change. If a salient incident does occur, the likelihood of an American response would dramatically increase. As we have seen in connection with the acid deposition program and controls on ozone-depleting chemicals, no such incident is necessary. But unless it occurs, a clear demonstration, or at least perception, of a favorable cost-benefit ratio will likely be necessary to spur regulation.

B. Probability Neglect

As a result of the availability heuristic, people can offer an inaccurate assessment of probability. But sometimes people will attempt little assessment of probability at all, especially when strong emotions are involved. In such cases, large-scale variations in probabilities will matter little—even when those variations unquestionably should matter a great deal. What matters is the outcome, not the likelihood that it will occur. The point

²²² See Michael Lemonick, Death by Alligator, Time 48 (May 29, 2006).

²²³ The same is true of the accident that led to the Toxic Release Inventory. See Hamilton, *supra* note, at 178-82.

²²⁴ Quoted in <http://dir.salon.com/story/tech/feature/2004/10/28/bioshield/index.html>

²²⁵ See John Jost, System Justification Theory, Calif L Rev (forthcoming 2006).

²²⁶ See note *supra*.

applies to hope as well as fear; vivid images of good outcomes will crowd out consideration of probability too. Lotteries are successful partly for this reason. Consider also these findings:

- When people discuss a low-probability risk, their concern rises even if the discussion consists mostly of apparently trustworthy assurances that the likelihood of harm really is infinitesimal.²²⁷
- If people are asked how much they will pay for flight insurance for losses resulting from “terrorism,” they will pay more than if they are asked how much they will pay for flight insurance from all causes.²²⁸
- People show “alarmist bias.” When presented with competing accounts of danger, they tend to move toward the more alarming account.²²⁹
- Visualization or imagery matters a great deal to people’s reactions to risks. When an image of a bad outcome is easily accessible, people will become greatly concerned about a risk, holding probability constant.²³⁰
- If the potential outcome of a gamble has a great deal of associated affect (a kiss with a favorite movie star, an electric shock), its attractiveness or unattractiveness is remarkably insensitive to changes in probability, even changes as large as from .99 to .01.²³¹

Probability neglect provides a great deal of help in understanding the divergent American reactions to terrorism and climate change. With respect to terrorism, there is an intense, often highly visual reaction to bad outcomes—a reaction that can easily crowd out judgments about probability. The same is not true of climate change. To be sure, there is nothing intrinsic to the relevant risk that justifies this state of affairs. As I have noted, some people urged that the devastation of Hurricane Katrina had a great deal to do with climate change,²³² and it is easy to imagine a successful effort to suggest that catastrophic events were caused, or increased in intensity, by virtue of climate change. If so, probability neglect might spur increased regulatory controls on greenhouse gas emissions. At the present time, however, the American public does not connect climate change with particular bad outcomes, and the absence of aggressive regulation is best understood in light of that fact.

²²⁷ See A.S. Alkhami and Paul Slovic, A Psychological Study of the Inverse Relationship Between Perceived Risk and Perceived Benefit, 14 *Risk Analysis* 1086, 1094-94 (1994).

²²⁸ See George Loewenstein et al., Risk As Feelings, 127 *Psych. Bull.* 267 (2001).

²²⁹ W.Kip Viscusi, Alarmist Decisions With Divergent Risk Information, 107 *Ec. Journal* 1657, 1657-59 (1997)

²³⁰ See Paul Slovic et al., Violence Risk Assessment and Risk Communication, 24 *Law and Human Behavior* 271 (2000).

²³¹ See Yuval Rottenstreich & Christopher K. Hsee, *Money, Kisses, and Electric Shocks: On the Affective Psychology of Risk*, 12 *PSYCHOL. SCI.* 185, 188 (2001) (finding that when emotions are triggered, variations in probability matter relatively little).

²³² For a brief outline of expert views, see <http://www.cnn.com/2006/TECH/science/04/25/global.warming.hurricanes.reut/index.html>; for a popular account, see <http://www.time.com/time/nation/article/0,8599,1099102,00.html>.

C. An Identifiable Perpetrator: The Goldstein Effect and Outrage

In George Orwell's *1984*, political leaders focus public attention on Emmanuel Goldstein, a former member of the Party who became its despised enemy.²³³ In Orwell's narrative, the Party made Goldstein the outlet and the occasion for public fear and outrage, even when the ultimate source of that fear, and that outrage, were more plausibly a product of failures of the regime. Osama Bin Laden was never a friend to the United States or a member of any of its parties, and to say the least, he is a genuine enemy. But there can be little doubt that the war on terror has been spurred by what we might call *the Goldstein Effect*: the ability to intensify public concern by giving a definite face to the adversary, identifying a human source of the underlying threat and a person to be blamed for it.²³⁴

Of course the risk of terrorism triggers intense outrage, whatever the magnitude of the risk; and when outrage is triggered, the public is likely to respond far more than it otherwise would.²³⁵ But if terrorism can be associated with a particular person or group, the response will be increased. This approach has generally succeeded with Osama Bin Laden. It was also successful with the attack on Iraq in 2003, as Saddam Hussein became a casualty of the Goldstein Effect. (To make these claims, it is of course unnecessary to question the demonization of Osama Bin Laden and Saddam Hussein; those who are demonized may actually be demons.)

There is no analogue in the context of climate change. Warmer temperatures are a product not of an identifiable perpetrator or any human face, but of the interaction between nature and countless decisions by countless actors in the private and public domains. To the extent that nature is responsible, or perceived as responsible, public concern is dampened. It has been found that “[h]uman intervention seems to be an amplifier in judgments on food riskiness and contamination,” even though “more lives are lost to natural than to man-made disasters in the world.”²³⁶ Studies show that people overestimate the carcinogenic risk from pesticides and underestimate the risks of natural carcinogens. People also believe that nature implies safety, so much that they will prefer natural water to processed water even if the two are chemically identical.²³⁷ If nature or put to one side, contributors to climate change include not merely numerous companies in the United States and around the world, but each of us, through our daily activities and consumption. There are no obvious devils or demons here—no human beings who

²³³ See George Orwell, 1984 (1948).

²³⁴ See Mary Douglas, Risk and Blame (1992), for a general account of how particular sources of risk are blamed, and in particular pp. 9-14, for an emphasis on practices of blaming that have cultural sources, and that cannot be captured by exploring individual judgments about risk perception.

²³⁵ See Peter Sandman et al., Communications To Reduce Risk Underestimation and Overestimation, 3 Risk Decision & Policy 93 (1998).

²³⁶ Paul Rozin & Carol Nemeroff, Sympathetic Magical Thinking: The Contagion and Similarity “Heuristics,” in Heuristics and Biases: The Psychology of Intuitive Judgment (first page), Thomas Gilovich, Dale Griffin, & Daniel Kahneman, eds. (Cambridge; New York: Cambridge Univ. Press, 2002).

²³⁷ Id.

actually intend to produce the harms associated with climate change.²³⁸ In the context of terrorism, a “we-they” narrative fits the facts; in the context of climate change, those who are the solution might well also be, or seem to be, the problem. In these circumstances, public outrage is much harder to fuel, and those concerned with climate change cannot easily take advantage of the Goldstein Effect.

Those who are so concerned might try, and indeed have tried, to use the Goldstein Effect against American leaders, most obviously President George W. Bush, perhaps charging him with negligence or even recklessness.²³⁹ And in fact, President Bush’s decision to reject the Kyoto Protocol in 2001 “produced a very strong negative reaction internationally, especially in Europe,” and “the citizens of Europe and their leaders were outraged.”²⁴⁰ But no one can claim that President Bush has actually *sought* to bring about climate change, and hence it is difficult to produce the level of outrage associated with Osama Bin Laden. In the next decades, it might be possible to enlist the Goldstein Effect against India and China, which are likely to be large contributors to climate change.²⁴¹ But nations lack faces.

More generally, a great deal of evidence suggests the pervasive importance of outrage to people’s reactions to risk. Several studies test this question with the hypothesis that certain low-probability risks, such as those associated with nuclear waste radiation, produce outrage, whereas other low-probability risks, such as those associated with radon exposure, do not. The most striking finding is that even when the risk was *identical* in the nuclear waste (high outrage) and radon (low outrage) cases, people in the nuclear waste case reported a much greater perceived threat and a much higher intention to act to reduce that threat.²⁴² Indeed, “the effect of outrage was practically as large as the effect of a 4000-fold difference in risk between the high-risk and low-risk conditions.”²⁴³ Efforts to communicate the meaning of differences in risk levels, by showing comparisons to normal risk levels, reduced the effect of outrage, but even after those efforts, outrage had nearly the same effect as a 2000-fold increase in risk.²⁴⁴ Outrage almost certainly contributed to “right-to-know” legislation involving chemical releases.²⁴⁵ Terrorism is a high-outrage threat, indeed it may be the highest-outrage threat, and hence the public response is likely to be far more intense than the corresponding response to climate change, which does not produce anything like the same level of outrage.

²³⁸ See Abassi, *supra* note, at 122: “The climate change story is rarely told with a villain; in fact, to the extent that the public correctly perceives that climate change is connected to energy use, they may recognize their broad complicity, which limits the conflict narrative further.”

²³⁹ See, e.g., Tim Flannery, *The Weather Makers* (2006).

²⁴⁰ See Steven Brechin, *Comparative Public Opinion and Knowledge on Global Climatic Change and the Kyoto Protocol: The U.S. Versus the World?* 23 *International J Sociology and Social Policy* 106, 123 (2003).

²⁴¹ See Nordhaus and Boyer, *supra* note.

²⁴² Abassi, *supra* note, at 106.

²⁴³ *Id.*

²⁴⁴ *Id.*

²⁴⁵ See Hamilton, *supra* note, at 178-92.

The behavioral conclusions, then, are that outrage plays a large role in people's judgments about risks; that outrage increases the intention to respond to risk; and that the Goldstein Effect contribute to outrage. These points help to explain the divergent American reactions to terrorism and climate change. Of course outrage is a social and cultural product, and not a brute fact. It would be possible for officials to heighten or to reduce outrage in either domain. In particular, those concerned about the risks associated with climate change might well be able to increase outrage by identifying the leading contributors to climate change and suggesting that with certain steps, they can significantly reduce the relevant risks.

D. Myopia, Optimism, and Fairness

Many people believe that climate change has already imposed significant costs, including significant numbers of deaths, perhaps as many as 150,000 each year²⁴⁶; but the most serious risks are long-term.²⁴⁷ This is so for the United States as for other nations. Americans appear to understand this point; as we have seen, they believe that the risks will be felt by future generations rather than those now living. It is also clear that this point affects people's willingness to support expensive precautions. From the standard point of view, there is no problem here. People rationally discount the future, and costs in one hundred years should not be treated the same as the same costs today.²⁴⁸ Apart from discounting, it is possible that because of technological advances, those costs will not be incurred at all. On the basis of the data alone, we might be willing to conclude that insofar as time matters, the divergent reactions to the risks of terrorism and climate change are a product of standard accounts of rationality.

But something is missing from this optimistic account. Behavioral economists have emphasized that people often engage in "hyperbolic discounting"; they discount the future at an implausibly high rate, demonstrating a form of myopia that reflects bounded rationality.²⁴⁹ At the level of individual behavior, the result can be self-control problems that greatly undermine people's well-being.²⁵⁰ Analogous problems emerge in the political domain. A recent survey demonstrates that with respect to water quality improvements, people show extreme time preferences, greatly favoring current improvements over significantly more beneficial improvement merely two years later.²⁵¹ The conclusion is that "there is evidence of a substantial under-evaluation of deferred

²⁴⁶ The World Health Organization estimates that climate change produces 150,000 annual deaths and 5 million annual illnesses. See *Nature* (November 2005); <http://www.washingtonpost.com/wp-dyn/content/article/2005/11/16/AR2005111602197.html>

²⁴⁷ *Id.*

²⁴⁸ See, e.g., David Weisbach and Dexter Samida, *Pareian Intergenerational Discounting*, *U Chi L Rev* (forthcoming 2007).

²⁴⁹ See David Laibson, *Golden Eggs and Hyperbolic Discounting*, 112 *Q J Econ* 443 (1997); Shane Frederick et al., *Time Discounting and Time Preference: A Critical Review*, 60 *J Econ Lit* 351 (2002).

²⁵⁰ See the discussion of bounded willpower in Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 *Stan L Rev* 1471 (1998).

²⁵¹ See W. Kip Viscusi and Joel Huber, *Hyperbolic Discounting of Public Goods*, NBER Working Paper 11935 (2006).

benefits, which in effect receive a weight of about 50-60 percent of their correct discounted value.”²⁵²

It is reasonable to think that a similar form of under-evaluation affects people’s beliefs and behavior with respect to climate change. The problem is likely to be compounded by the presence of optimistic bias, by which people tend to show an unrealistic belief in their own immunity from certain risks.²⁵³ At least when a risk will not be faced for the distant future, and when no available incident heightens concern, optimistic bias can result in little concern about long-term risks.

Myopia and optimism to one side, the evidence thus far suggests that American belief and behavior reflects American self-interest. With respect to depletion of the ozone layer, the assessment of costs and benefits suggested that Americans had more to gain than to lose, a point that was supplemented by the convenient fact that American companies were in the forefront of innovation with respect to the development of ozone-depleting chemicals.²⁵⁴ It is unnecessary to speak in behavioral terms to say that self-interest helps to account for the greater focus on terrorism than on climate change. On the contrary, behavioralists emphasize that people care about fairness, and are sometimes willing to sacrifice their material self-interest in order to be fair or (especially) in order to punish unfairness.²⁵⁵

Nonetheless, there are two behavioral points here, both of which bear directly on American reactions to climate change. The first is that while people care about fairness, their judgments about fairness are systematically biased in their own direction—a finding that helps to explain litigation behavior, including failures to settle.²⁵⁶ In the context of climate change, the prediction is that fairness-related judgments, on the part of both rich and poor countries, will be self-serving, in a way that will affect international negotiations.²⁵⁷ The United States is therefore unlikely to believe that fairness require substantial sacrifices on its part, purely for the sake of other nations. The second point is that when people are willing to sacrifice material self-interest for the sake of fairness, it is often because they anticipate that their own unfairness will be punished.²⁵⁸ In the context of climate change, Americans have little reason to believe that other nations, and in particular poor nations, will be willing or able to punish the United States for refusing to enter into international agreements, or for refusing to do so on advantageous terms.

Here as well the problem of ozone depletion had a very different character, because developing countries could credibly threaten to hold out, and thus threaten to

²⁵² W. Kip Viscusi, *Rational Discounting for Regulatory Analysis*, U Chi L Rev (forthcoming 2007).

²⁵³ See Shelley Taylor, *Positive Illusions* (1989); Bazerman and Watkins, *supra* note, at 74-77.

²⁵⁴ See Percival et al., *supra* note.

²⁵⁵ In general, see Gary Charness and Matthew Radin, *Understanding Social Preferences with Some Simple Tests*, 117 Q J Econ 817 (2002); for an interesting application, see Chaim Fershtman and Uri Gneezy, *Discrimination in A Segmented Society: An Experimental Approach*, Q J Econ 351 (2001).

²⁵⁶ See Linda Babcock and George Loewenstein, *Explaining Bargaining Impasse: The Role of Self-Serving Biases*, 11 J Econ Persp 109 (1997).

²⁵⁷ On fairness and self-serving bias in connection with ozone, see Benedict, *supra* note.

²⁵⁸ See Fershtman and Gneezy, *supra* note.

inflict serious risks of skin cancer and cataracts on American citizens. This credible threat helped to lead wealthy nations, including the United States, to offer financial inducements to poor nations in order to ensure their participation.²⁵⁹ In 1990, the original treaty was amended to compensate developing countries for their expense, and hundreds of millions of dollars were pledged to that effect for the first several years, producing a total of \$1.22 billion by 2001.²⁶⁰ In the context of climate change, the problem is that even if Americans are willing to sacrifice their self-interest for the sake of those elsewhere, they will be unwilling to spend large sums of money to do so unless their unwillingness to do so can be punished. Perhaps China and India will ultimately prove able to threaten punishment, in the form of continued growth in greenhouse gas emissions, if the United States does not pay for their reductions. But it is unclear, to say the least, that the most vulnerable nations can threaten the United States if it refuses to reduce its own greenhouse gas emissions.

E. Boundedly Rational Risk Perception

The behavioral account, and indeed the exploration of the four approaches to risk perceptions, are now complete. Those who emphasize the availability heuristic, probability neglect, outrage, myopia, optimism, and self-interested judgments about fairness do not contend that risk perception and risk-related behavior are “irrational”; instead they stress the role of mental short-cuts and emotions in heightening or dampening people’s judgments about risk. Those who suffer from bounded rationality do care about both costs and benefits, but their assessment of these is affected by heuristics and biases, in a way that can lead to severe and systematic errors. If the argument thus far is correct, bounded rationality provides the best and most complete account of the divergent American reactions to terrorism and climate change.

1. *A problem.* There is an evident difficulty with this argument: It is exceedingly difficult to contend that anyone is making “errors” here. We might be tempted to think that because of availability bias, the risk of terrorist attacks is inflated; we might similarly think that because of unavailability bias, the risks associated with climate change are underestimated. But there is no universally accepted benchmark from which to make these judgments. With respect to terrorism, the questions of probability are too uncertain to justify a conclusion that Americans are excessively fearful; a “best estimate” of 300 terrorism-related deaths in, say, the next year²⁶¹ may turn out to be too high or too low, but no clear evidence justifies any such judgment, in the present year, that this estimate is optimistic or pessimistic. In retrospect, some of the terrorism-related probability judgments of Americans in 2003 did seem inflated,²⁶² but this is not an area in which availability is clearly leading to excessive fear. With climate change, it is also difficult to say that Americans are underestimating the current risks. Perhaps they are doing too little

²⁵⁹ See note supra.

²⁶⁰ See Barrett, supra note, at 347-49.

²⁶¹ See note supra.

²⁶² See Feigelson et al., supra note.

to respond to those risks, but existing evidence does not justify a confident conclusion that their perception of risk is too low.²⁶³

What can be said, then, is not that there are any clear errors, but that the behavioral factors—availability, probability neglect, and outrage in particular—help to explain the divergent American reactions to terrorism and climate change, and that a purely rational account is to that extent incomplete. Of course it is possible to insist that the United States has operated sensibly on the basis of available information; that the events of 9/11 supplied valuable information; and that the risks of climate change are, on the basis of available information, insufficient to justify more aggressive controls. But this account is insufficiently sensitive to what is generally known about risk perception, and it disregards the fact that the behavioral factors would predict exactly the divergence that we observe. Of course boundedly rational people are attentive to the costs and benefits of risk regulation. The problem is that their assessments of the relevant factors are affected by behavioral influences.

2. *Prescription.* It is for this reason that in the United States, national leaders are under little pressure to attempt to reduce the risks associated with climate change. Of course such leaders have considerable room to maneuver. So long as Americans are not greatly affected in economic or other terms, real steps to reduce greenhouse gases would be publicly acceptable. But if leaders believe that the argument for such steps is weak, we would not expect them to be forthcoming. Let us suppose that the American government should, in principle, be doing much more to control greenhouse gas emissions.²⁶⁴ How might it be encouraged to do so?

1. *Costs.* The easiest way would be to attempt to replicate the success of efforts to combat depletion of the ozone layer—by showing that the costs of reduction efforts would be far lower than feared. The magnitude of those costs is of course an empirical question. But as I have emphasized, the replacement of ozone-depleting chemicals turned out to be far less expensive than originally anticipated, and the unexpectedly low costs helped to spur American enthusiasm for international restrictions.²⁶⁵ In sharp contrast to climate change, the American public was willing to support steps to protect the ozone layer, while the European public was indifferent or even opposed to such steps.²⁶⁶

On the cost side, everything depends on technological innovations. Technology-forcing has proved successful in many domains. If the costs of reducing greenhouse gas

²⁶³ For evidence of sensible risk perceptions, see W. Kip Viscusi and Richard Zeckhauser, *The Perception and Valuation of the Risks of Climate Change: A Rational and Behavioral Blend* (2005), available on ssrn.com

²⁶⁴ See, e.g., Daniel Abbasi, *supra* note; Posner, *supra* note; Robert Stavins, *Can An Effective Global Climate Treaty Be Based on Sound Science, Rational Economics, and Pragmatic Politics* (unpublished manuscript 2005); Richard B. Stewart & Jonathan B. Wiener, *Reconstructing Climate Policy* (2003); Sheila Olmstead and Robert Stavins, *An International Policy Architecture for the Post-Kyoto Era* (unpublished manuscript 2006). A valuable set of perspectives can be found in *Kyoto and Beyond: Alternative Approaches to Global Warming*, 96 *Am Econ Rev* 22 (2006).

²⁶⁵ See the account in Robert Percival et al., *Environmental Regulation* 1049-1051 (4d ed. 2003).

²⁶⁶ *Id.* at 1050.

emissions remain high, aggressive action is unlikely. But if it is possible to force technological innovation with respect to greenhouse gases, the American posture would surely shift, perhaps dramatically.

2. *Benefits.* A second way to affect American attitudes would operate on the benefit side. If the United States actually had, and believed that it had, a great deal to lose from climate change, and in the immediate future rather than the long-run, more costly regulation would be anticipated.²⁶⁷ Here we might replicate the experience not of the Montreal Protocol but of the acid deposition program of the Clean Air Act, which was spurred in part by new evidence of the risks associated with acid deposition.²⁶⁸ No salient incident lay behind the acid deposition program. A clearer appreciation of the risks of climate change would undoubtedly affect American attitudes.²⁶⁹ But for purposes of understanding public perceptions, it is important to underline the potential role of vivid images of harm. Such images, introduced by a salient incident, can have large effects on legislative initiatives²⁷⁰; and if there is anything like a kind of 9/11 for climate change, aggressive measures might well be anticipated.

I have emphasized the role of leaders in the private and public sector; public beliefs and desires are endogenous to their claims, and hence the salience of 9/11, and the continuing sense of fear, had a great deal to do with the statements and actions of President Bush.²⁷¹ In 2004, the White House released a fact sheet on the war on terror, starting with a quotation from President Bush: “[W]e’re still not safe. . . . We are a Nation in danger.”²⁷² By contrast, Prime Minister Tony Blair argued that there is “no bigger long-term question facing the global community” than the threat of climate change, and that “Climate change is the most important issue facing the world today.”²⁷³ Because of the fact of 9/11, and because serious efforts to control climate change would inevitably impose high costs on the United States, any American official will have limited ability to shift the public’s current levels of concern. But there is no question that fear of terrorist attacks can be heightened or diminished²⁷⁴—and that it would be possible to increase the salience and hence the level of concern about the risks associated with climate change, and hence to magnify the public demand for a regulatory response.

²⁶⁷ See Lane, *The Political Economy of U.S. Greenhouse Gas Controls*, supra note, at 182-83.

²⁶⁸ See A. Denny Ellerman et al., supra note.

²⁶⁹ This is the basic message of Abbasi, supra note.

²⁷⁰ See Hamilton, supra note, at 178-92 (emphasizing role of Bhopal disaster in spurring Toxic Release Inventory); Kahn, supra note (investigating congressional responses to disasters).

²⁷¹ See Robert Goodin, *What’s Wrong With Terrorism?* 164-70 (2006).

²⁷² *Id.* at 166.

²⁷³ See Norton and Leaman, supra note, at 2.

²⁷⁴ See Goodin, supra note, at 160-172.

3. *Costs and benefits: a final comparison.* I have offered a number of comparisons between the problem of ozone depletion and that of climate change, and it may be useful to conclude by offering a more systematic comparison. In 1988, the Environmental Protection Agency offered the following account of the costs and benefits of the Montreal Protocol²⁷⁵:

Costs and Benefits of Montreal Protocol to the United States (in billions of 1985 dollars):

	No Controls	Montreal Protocol	Unilateral Implementation of Montreal Protocol by the United States
Benefits	—	3,575	1,363
Costs	—	21	21
Net Benefits	—	3,554	1,352

It should be clear that for the United States, unilateral action was well-justified, because the health benefits of American action would create substantial benefits to the American public. And if the world joined the Montreal Protocol, the benefits would be nearly tripled, because it would prevent 245 million cancers, including more than five million cancer deaths.²⁷⁶ One of the most noteworthy features of the ozone depletion problem is that over time, the United States was anticipated to be a decreasingly large contributor to that problem. By 2050, no controls were expected to mean a 15.7% decrease in the ozone layer, whereas unilateral American action would produce a 10.4% decrease, and the international agreement would result in a mere 1.9% decrease. By 2100, no controls were expected to mean a 50% decrease; unilateral action a 49% decrease; and the international agreement a 1.2% decrease.²⁷⁷ In the short-run, aggressive action by the United States alone was amply justified by the cost-benefit calculus. In the long-run, the United States would do much better with global cooperation. At the same time, the expected cost of the Montreal Protocol, a mere \$21 billion, greatly dampened public resistance; and the cost turned out to be even lower than anticipated because of technological innovation.²⁷⁸

Compare in this regard the relevant figures for the Kyoto Protocol²⁷⁹:

Costs and Benefits of Kyoto Protocol (in billions of 2000 dollars):

	No Controls	Kyoto Protocol	Unilateral Action to Comply with Kyoto Protocol
Benefits	—	12	0
Costs	—	325	325
Net Benefits	—	-313	-325

What is noteworthy here is that the costs of the Kyoto Protocol were much higher than the costs of the Montreal Protocol (by some \$313 billion), and the benefits of the former were much lower than the benefits of the later (by some \$3,562 billion!). For the Kyoto Protocol, The cost-benefit ratio here is so terrible that from the standpoint of

²⁷⁵ See Barrett, *supra* note, at 228.

²⁷⁶ *Id.*

²⁷⁷ *Id.*

²⁷⁸ *Id.* at 231.

²⁷⁹ Compiled on the basis of Nordhaus and Boyer, *supra* note, at 156-67.

American self-interest, a great deal would have to be done to justify American support, at least from that standpoint. A broader agreement, including China and India in particular, would significantly increase the benefits of greenhouse gas reduction, simply because it would include increasingly important contributors to the problem, with developing countries projected to account for over half of total global emissions by 2020 and possibly before.²⁸⁰ Hence a broader agreement would significantly increase the benefits to both the United States and the world.²⁸¹ It would also be possible to design an agreement, with global emissions trading and with emissions reduction requirements that grow over time, that dramatically reduce the costs for America and elsewhere.²⁸²

The point is not, however, to suggest an ideal treaty to handle the problem of climate change. It is only to suggest that American perceptions and behavior are likely to change only if the assessment of costs and benefits changes as well. A purely technocratic analysis and good policy design, of the sort that culminated in the Montreal Protocol, may be sufficient to accomplish that task. But it is reasonable to suspect that in light of the complexity of the climate change problem, and the inevitably high cost of addressing it, vivid incidents, real or imagined, will have to play a role.

Conclusion

My principal goal here has been to make some progress in understanding the divergent American reactions to the risks associated with terrorism and climate change, and in that way to help explain the existing patterns of law and regulation. The psychometric account does not fare well. In terms of the qualitative factors emphasized by those who endorse that account, there is no reason to think that climate change would produce little public concern; indeed, it might be expected to produce greater concern than terrorism. The affect heuristic is certainly not falsified by the divergence in people's level of concern; affective reactions are consistent with the observed pattern of regulation. The problem is that affect itself requires explanation, and for that reason it cannot explain the divergence.

The idea of cultural cognition does help to explain risk perceptions with respect to climate change. Differences within the American public are correlated with what might be taken to be different cultural dispositions; environmental activists believe that the threat is very serious and that Americans should be willing to spend a great deal to reduce that threat, whereas other groups do not. But Americans generally believe that the risk associated with terrorism is quite serious, and there is no evidence that with respect to terrorism, risk perceptions greatly vary along cultural dimensions. As we have seen, the notion of "cultural cognition" is best broken up into two component mechanisms, involving normative bias and social influences. Both of these mechanisms play a role in explaining people's judgments about climate change and terrorism, and divergences

²⁸⁰ See Sheila M. Olmstead and Robert N. Stavins, *An International Policy Architecture for the Post-Kyoto Era*, 96 *Am. Econ. Rev.* 35, 35-36 (Papers and Proceedings) (2006).

²⁸¹ See Nordhaus and Boyer, *supra* note, at 123-44; Barrett, *supra* note, at 379.

²⁸² *Id.*

within the United States can be much better understood in their light; but normative bias and social influences are hardly the whole story.

The best and most general explanation involves bounded rationality. Intuitive cost-benefit balancing is a large part of that explanation. Americans believe that they have relatively little to lose from climate change and that expensive regulation would mostly help people in other nations in the distant future. Partly for that reason, they are unwilling to spend a great deal to reduce greenhouse gas emissions. Differences in risk perception are much affected by the availability heuristic, which helps to inform intuitive cost-benefit balancing. European nations are more concerned about climate change than the United States in part because certain environmental risks have become more salient in the former than in the latter, and in part because both intuitive and formal cost-benefit analysis suggests that with expensive precautionary measures, the United States is more likely to be a net loser.²⁸³

Of course interest-group pressures matter, and such pressures can help both to shape public perceptions and to affect the likelihood of any regulatory response to those perceptions. If the public's analysis of likely costs and benefits shifted, perhaps as a result of more vivid incidents of tangible harm,²⁸⁴ domestic controls on greenhouse gases, and American participation in international agreements, would be far more probable. For the risks associated with climate change, the most serious of which are not likely to come to fruition in the near future, it is exceedingly difficult to promote availability; but vivid images are possible to provide here as well. There are multiple equilibria: Single incidents and small shocks can make an extraordinary difference in terms of law and regulation.²⁸⁵ With respect to terrorism, the attack of 9/11 was not exactly a small shock, but a single incident, on a single day, radically altered the associated risk perceptions of Americans, and greatly affected law as well.

To be sure, what is available to some may not be available to all, in part because of social influences, and in part because of individual, cultural, and national predispositions. It follows that some cultures will find risks of climate change "available" not because of simple facts about what citizens have to gain and to lose, but also because the relevant citizens are predisposed to focus on some risks rather than others. But even across cultural differences, intuitive cost-benefit balancing can be altered by available incidents; if vivid incidents become salient, aggressive regulation is far more likely to be forthcoming.

²⁸³ See Nordhaus and Boyer, *supra* note.

²⁸⁴ Hence Michael Crichton's controversial best-seller, *State of Fear* (2005), shows a strong understanding of behavioral factors. (To avoid giving away the punchline, I offer no details.) The same is true of the controversial film, *An Inconvenient Truth* (2006).

²⁸⁵ See Hamilton, *supra* note, at 178-86; Repetto, *supra* note, at 9; William Brock, Tipping Points, Abrupt Opinion Changes, and Punctuated Policy Change, in *Punctuated Equilibrium and the Dynamics of U.S. Environmental Policy*, *supra* note, at 47; Kahn, *supra* note; Thomas Birkland, *Lessons of Disaster: Policy Change After Catastrophic Events* (2006); Thomas Birkland, *After Disaster: Agenda Setting, Public Policy, and Focusing Events* (1997).

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