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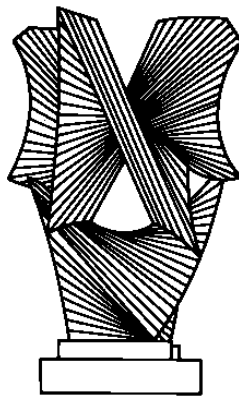
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THE LAWS OF FEAR

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The Laws of Fear

Cass R. Sunstein*

Abstract

Cognitive and social psychologists have uncovered a number of features of ordinary thinking about risk. Giving particular attention to the work of Paul Slovic, this review-essay explores how an understanding of human cognition bears on law and public policy. The basic conclusion is that people make many mistakes in thinking about risk and that sensible policies, and sensible law, will follow statistical evidence, not ordinary people. The discussion explores the use of heuristics, the effects of cascades, the role of emotions, demographic differences, the role of trust, and the possibility that ordinary people have a special “rationality” distinct from that of experts. Because people are prone to error, what matters, most of the time, is actual risk, not perceived risk.

In the late 1980s, the Environmental Protection Agency embarked on an ambitious project, designed to compare the views of “the public” and “EPA experts” on the seriousness of environmental problems.¹ The project revealed some striking anomalies, for the two groups sharply diverged on some crucial issues.

With respect to health risks, the public’s top five concerns included radioactive waste, radiation from nuclear accidents, industrial pollution of waterways, and hazardous waste sites.² But in the view of EPA experts, not one of these problems deserved a “high” level of concern. Two of the public’s top concerns (nuclear accident radiation and radioactive waste) were not even

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¹ Counting on Science At EPA, 249 Science 616 (1990).

² Id.

ranked by EPA experts.³ Of health risks considered by the public, the very lowest ranked were indoor air pollution and indoor radon—both ranked “high” by experts. EPA concluded that there was a remarkable disparity between the views of the public and the views of its own experts. It also noted, with evident concern, that EPA policies and appropriations seemed to reflect the public’s preoccupations, not its own. If law and policy reflect a combination of “hysteria and neglect,”⁴ the public’s own concerns may be largely responsible.⁵

With respect to risks, the persistent split between experts and ordinary people raises some of the most interesting problems in all of social science. For purposes of understanding these disputes, we might distinguish between two approaches: the *technocratic* and the *populist*. Good technocrats tend to think that ordinary people are frequently ill-informed and that the task of regulators is to follow science, not popular opinion.⁶ On the technocratic view, the central question is what the facts really show, and when people are mistaken on that point, they should be educated so that they do not persist in their errors. Of course technocrats acknowledge that science will often leave gaps and that the proper course of action cannot be determined by science alone. But they urge that facts are often the key issue, and that when they are, government should follow the evidence, rather than public beliefs.

For their part, populists tend to distrust experts and to think that in a democracy, government should follow the will of the citizenry rather than a self-appointed technocratic elite.⁷ On this view, what matters, for law and policy, is

³ Id.

⁴ See John Graham, Making Sense of Risk, in Risks, Costs, and Lives Saved: Getting Better Results from Regulation 183, 183 (Robert Hahn ed. 1996).

⁵ Of course interest groups play a large role, both independently and in dampening and heightening public concern.

⁶ This view is represented, in various ways, by Stephen Breyer, Breaking the Vicious Circle(1993); Howard Margolis, Dealing With Risk (1997).

⁷ This view is represented in Elizabeth Anderson, Value in Ethics and Economics (1993); Lisa Heinzerling Political Science, U Chi L Rev (1995) (reviewing Stephen Breyer, Breaking the Vicious Circle (1995)). See also the remarks of Senator Joseph Biden in Justice Breyer’s confirmation hearings: “The American people have no doubt that more people die from coal dust than from nuclear reactions, but they fear the prospect of a nuclear reactor more than they do the empirical data that would suggest that more people die from coal dust, having coal-fired burners. They also know that more lives would be saved if we took that 25 percent we spend in the intensive care units in the last few months of the elderly’s lives, more children would be saved. But part of our culture is that we have concluded as a culture that we are going to rightly, or wrongly, we are going to spend the money, costing more lives, on the elderly. . . . I think it’s incredibly presumptuous and elitist for political scientists to conclude that the American people’s cultural

what people actually fear, not what scientists, with their own, inevitably fallible judgments, happen to think. For populists, ordinary intuitions have normative force, and deserve to count in the democratic arena.

To make progress on the disagreement, it would be very valuable to have a clearer sense of what, exactly, accounts for the split between experts and ordinary people. Is one or another group biased? Are ordinary people systematically ill-informed, and if so exactly why? Are intuitions likely to reflect mistaken judgments of fact, or worthy judgments of value? Once we answer these questions, there will remain normative problems, raising questions about what should be done in the face of the relevant divisions. Perhaps what matters is not whether people are right on the facts, but whether they are frightened. Perhaps ordinary people have a kind of “thick” rationality, as worthy in its own way as that of experts. Certainly experts can have their own biases and agendas.⁸ Perhaps the real issue is how to increase the public’s role in risk regulation, so that government will respond to their concerns.

Of all those who have contributed to an understanding of the division between experts and ordinary people, Paul Slovic has been the most systematic and wide-ranging. Slovic has engaged in a series of empirical studies designed to elicit people’s perception of risk—to see when they are frightened and when they are not, and exactly why. Slovic’s own views defy easy categorization, but he has strong populist leanings. In some of his most striking papers, Slovic urges not that ordinary people are irrational or confused, but that as compared with experts, they display a kind of “rival rationality” that is worthy of consideration and respect.⁹ Insisting that “risk” is not simply a matter of numbers, Slovic urges that a good system of risk regulation should be democratic as well as technocratic –and that it should pay a great deal of attention to what he sees as the structured and sometimes subtle thinking of ordinary people.¹⁰

values in fact are not ones that lend themselves to a cost-benefit analysis and presume that they would change their cultural values if in fact they were aware of the cost-benefit analysis.”⁷ Confirmation Hearings for Stephen G. Breyer, to be an Associate Justice of the United States Supreme Court, Senate Committee on the Judiciary, 103d Cong., 2d Sess. 42 (July 14, 1994) (Miller Reporting transcript). I take up the relationship between Breyer’s views of risk and Slovic’s findings in Part V below.

⁸ For a colorful popular treatment, see Sheldon Rampton and John Stauber, *Trust Us, We’re Experts* (2001).

⁹ See, e.g., Paul Slovic et al., *Regulation of Risk: A Psychological Perspective*, in *Regulatory Policy and the Social Sciences* (Roger Noll ed. 1985).

¹⁰ See *id.*

The essays in this illuminating and important book, written over a number of years with many coauthors,¹¹ cover a great deal of ground. Among other things, Slovic deals with trust and distrust¹²; the “social amplification” of risk¹³; risk-taking by adolescents¹⁴; smokers’ (lack of) awareness of the risks of smoking¹⁵; the role of emotions in assessing, taking, and avoiding risks¹⁶; differences across lines of race and gender¹⁷; the nature of “intuitive toxicology”¹⁸; and much more. In this space it would be foolhardy to try to examine all of these issues in detail. Instead I will focus on Slovic’s own unifying theme: the different risk judgments of experts and ordinary people. I will also try to connect Slovic’s claims to issues in policy and law, issues with which he deals only briefly.

In my view, though not necessarily Slovic’s, the overriding message of these essays is that because of predictable features of human cognition, ordinary people deal poorly with the topic of risk. This lesson has major implications for private and public law. . Slovic casts a new light on why the system of regulation has taken its current form, showing some of the cognitive mechanisms that produce “paranoia and neglect.” Some of his principal lessons involve how to make law and policy work—including how to structure information campaigns, which are unlikely to succeed unless their designers have a sense of how people perceive risks. At the same time, I believe that Slovic establishes, with new clarity, why sensible policymakers should generally follow science, not the public. This point bears on the design of government institutions, as well as the functioning of Congress, regulatory agencies, judges, and even juries

I will make two basic objections to this admirable book. The first is that Slovic says too little about the social mechanisms by which individuals come to think that a risk is serious or instead trivial. These mechanisms have multiple connections with the cognitive points that Slovic emphasizes. Discussion with others, for example, can make a risk both vivid or salient, and when individuals see a risk as salient and vivid, they are likely to talk to others, thus increasing

¹¹ I will refer to the author of the papers discussed here as “Slovic,” for ease of exposition, even though in many cases, the paper in question has more than one author.

¹² Perceived Risk, Trust, and Democracy at p. 316.

¹³ The Social Amplification of Risk: A Conceptual Framework, at p. 220.

¹⁴ Do Adolescent Smokers Know the Risks?, at p. 364.

¹⁵ Id.

¹⁶ The Affect Heuristic in Judgments of Risks and Benefits, id. at 413.

¹⁷ Trust, Emotion, Sex, Politics, and Science, in id. at 390.

¹⁸ Intuitive Toxicology: Expert and Lay Judgments of Chemical Risks, in id. at 285.

both salience and vividness. The second is that some of Slovic's own findings seem to me to undermine his claim to have found a "rival rationality"—and that whatever Slovic's intentions, much of the importance of his work is to the strong empirical support that it provides for a more technocratic view of regulation, one that draws ordinary intuitions into grave doubt. As we shall see, both of these objections have implications for law and for government institutions.

The review comes in several parts, separating Slovic's claims into various categories. In each part, I offer an outline of the relevant claims, evaluate them, and discuss some of their implications for law. Part I deals with the idea of heuristics, or mental shortcuts. My emphasis here is on the availability heuristic, by which people think a risk is more serious if an example can be readily brought to mind. I also deal with what Slovic calls "intuitive toxicology." Part II discusses Slovic's "psychometric paradigm," the basis for his effort to claim that ordinary people have a kind of "rival rationality." Part III explores the role of emotions and in particular Slovic's claim that the "affect heuristic" helps to explain people's reactions to risks. Part IV discusses some of Slovic's fascinating findings about demographic differences, knowledge of risks, and trust. Part V offers a brief, general discussion of issues of policy and law.

I. Mental Shortcuts and Intuitive Toxicology

In several chapters, Slovic emphasizes that people use heuristics, or mental shortcuts, to assess the presence and magnitude of risks. As Slovic makes clear, he owes a large debt here to Daniel Kahneman and Amos Tversky, who, in a series of pathbreaking experiments, have uncovered several heuristics that people use to assess probabilities.¹⁹ Consider, for example, the "availability heuristic," in accordance with which people assess the probability of an event by seeing whether relevant examples are cognitively "available."²⁰ Thus, for example, people are likely to think that more words, on a random page, end with the letters "ing" than have "n" as their next to last letter²¹—even though a moment's reflection will show that this could not possibly be the case.

In the relevant experiments, Kahneman and Tversky were focussing on cognition in general, and they did not deal with policy issues, or with people's

¹⁹ See *Judgment Under Uncertainty: Heuristics and Biases* (Daniel Kahneman and Amos Tversky eds. 1983), for an overview. For an illuminating discussion, see Daniel Kahneman and Shane Frederick, *Attribute Substitution* (unpublished manuscript 2001, forthcoming).

²⁰ See note 18 *supra*.

²¹ *Id.*

evaluation of social risks. Slovic's major contribution is to show the great importance of the availability heuristic in helping to generate ordinary judgments about risks to health, safety, and the environment. But Slovic also shows a more general way that ordinary people go wrong. They rely on "intuitive toxicology," which contains a range of scientifically implausible judgments, many of them apparently working as mental shortcuts. Moving beyond individual cognition, Slovic also urges attention to the "social amplification" of risk. In this Part, I outline Slovic's findings and offer one criticism, or perhaps friendly amendment: Slovic seems to me to have paid too little attention to the social forces by which people come to fear, and not to fear, certain hazards. I provide a brief discussion of how this gap might be filled.

A. The Availability Heuristic

In Slovic's view, "[t]he notion of availability is potentially one of the most important ideas for helping us understand the distortions likely to occur in our perceptions of natural hazards" (p. 14). These distortions have concrete consequences for behavior. For example, whether people will buy insurance for natural disasters is greatly affected by recent experiences (p. 40). If floods have not occurred in the immediate past, people who live on flood plains are far less likely to purchase insurance (*id.*). In the aftermath of an earthquake, insurance for earthquakes rises sharply—but it declines steadily from that point, as vivid memories recede (*id.*).²²

Note that the use of the availability heuristic, in these contexts, is hardly irrational. Insurance can be expensive, and what has happened before seems, much of the time, to be the best available guide to what will happen again. Imperfectly informed people might do well to rely on the availability heuristic. The problem is that the availability heuristic can lead to serious errors of fact. Here as elsewhere, the use of a reasonable heuristic can produce decisions that are wrong, from the standpoint of those who have an accurate of the actual probabilities.

Do people know which risks led to many deaths, and which risks lead to few? They do not. In fact they make huge blunders. In some especially striking studies, Slovic demonstrates that the availability heuristic helps to explain people's mistakes in assessing the frequency of various causes of death. In one study, people were told the annual number of deaths from motor vehicle

²² There is a link here with Slovic's claims about the role of affect; see below.

accidents in the United States (at the time about 50,000), and then asked to estimate the number of deaths from forty other causes of death (pp. 106-09).²³ In another study, people were given two causes of death and asked to say which produced more fatalities (p. 38). People tended to make large mistakes, and when they did so, the availability heuristic was partly responsible. “In keeping with availability considerations, overestimated items were dramatic and sensational whereas underestimated items tended to be unspectacular events which claim one victim at a time and are common in non-fatal form.” (p. 107). Specifically, people significantly overestimated highly publicized causes of death, including tornadoes, cancer, botulism, and homicide. By contrast, they underestimated the number of deaths from stroke, asthma, emphysema, and diabetes (*id.*). At the same time, people tend to think that the number of deaths from accidents is higher than the number of deaths from disease, whereas the opposite is true. In the same vein, people mistakenly believe that more people die from homicides than from suicides. Availability can also “lull people into complacency,” as when certain risks, not easily accessible, seem invisible, and what is out of sight is “effectively out of mind” (p. 109).

These points suggest that highly publicized events are likely to lead people to be exceedingly fearful of statistically small risks.²⁴ Both law and policy are likely to be adversely affected by people’s use of mental shortcuts. Public officials, no less than ordinary people, are prone to use the availability heuristic.²⁵ And in a democracy, officials, including lawmakers, will be reactive to public alarm. If people are extremely concerned about the risk of airplane accidents, we should expect aggressive regulation of airlines, perhaps to the point of diminishing returns. If people are worried about abandoned hazardous waste dumps, we might well expect a large amount of resources to be devoted to cleaning them up, even if the risks are relatively small.²⁶ Similar problems will

²³ There is an important point here, not discussed by Slovic: People have little idea what number is in the ballpark, and they need some kind of “anchor,” in the form of an annual death toll for some familiar activity, in order to reduce, to a manageable degree, the “noise” in the data. For a more recent study in the same vein, see W. Kip Viscusi. On the centrality of anchors when people have a hard time generating “ballpark figures,” see Cass R. Sunstein, Daniel Kahneman, and David Schkade, *Assessing Punitive Damages*, Yale LJ (1998).

²⁴ For a vivid demonstration in the context of catastrophes, see Jacob Gersen, *Strategy and Cognition: Regulatory Catastrophic Risk* (unpublished manuscript 2001).

²⁵ See Roger Noll and James Krier, *Some Implications of Cognitive Psychology for Risk Regulation*, 19 J Legal Stud 747, 749-60 (1990); Timur Kuran and Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 Stan L Rev 683 (1999).

²⁶ For evidence, see James Hamilton and W. Kip Viscusi, *Calculating Risks* (1999); Timur Kuran and Cass R. Sunstein, *supra* note.

appear in courts, with juries and judges taking “phantom risks” quite seriously.²⁷ There is also a lesson here about how to attract public attention to a risk: *Make a vivid example of its occurrence highly salient to the public*. This way of proceeding, far more than statistical analysis, is likely to activate public concern.

B. Intuitive Toxicology

Are ordinary people toxicologists? Slovic thinks so (p. 285). He uncovers the content of “intuitive toxicology” by comparing how experts (professional toxicologists) and ordinary people think about the risks associated with chemicals. The result is a fascinating picture. It is not clear that any identifiable heuristics are at work in intuitive toxicology. But it is clear that people are using mental shortcuts, and that these lead to errors.

Slovic elicits the views of toxicologists and ordinary people on the following kinds of propositions (p 291):

1. There is no safe level of exposure to a cancer-causing agent.
2. If you are exposed to a carcinogen, then you are likely to get cancer.
3. If a scientific study produces evidence that a chemical causes cancer in animals, then we can be reasonably sure that the chemical will cause cancer in humans.
4. The land, air and water around us are, in general, more contaminated now than ever before.
5. Natural chemicals, as a rule, are not as harmful as man-made chemicals.
6. Residents of a small community (30,000 people) observed that several malformed children had been born there during each of the past few years. The town is in a region where agricultural pesticides have been in use during the last decade. It is very likely that these pesticides were the cause of the malformations.
7. All use of prescription drugs must be risk-free.

Ordinary people agree with such statements, by pluralities or even majorities (p. 291). By contrast, toxicologists disagree with such statements, usually by overwhelming majorities (id.). What are ordinary people thinking?

²⁷ See Phantom Risk, supra note, at 425–28 (discussing scientifically unsupportable outcomes involving “traumatic cancer” and harm to immune systems); id. at 137-46 (discussing lawsuits with unclear scientific basis).

Can we discern some structure to their thinking? Three beliefs seem to be playing a large role. *First*, many people appear to believe that risk is an “all or nothing” matter. Something is either safe or dangerous, and there is no middle ground.²⁸ *Second*, many people seem committed to a belief in the benevolence of nature. They think that the products of human beings, and human activities, are more likely to be dangerous than the products of natural processes.²⁹ *Third*, many people tend to subscribe to the “zero risk” mentality, at least in some domains. Many people believe that it is both possible and appropriate to abolish risk entirely, a belief that appears closely connected with the notion that risk is a matter of “all or nothing.”

Experts believe that all three beliefs are false. Moreover, it seems clear that with respect to them, experts are thinking far more clearly than are ordinary people. Why do people think this way? It might well be that at least some of these ideas work well in most contexts in which nonspecialists find themselves.³⁰ People want, for example, to know whether an activity is “safe,” not to know about the statistical probability of harm; and the excessively simple category of “safe” can tell them essentially what they need to know.³¹ The problem is that ideas of this kind misfire in contexts in which regulatory choices, and some daily decisions, have to be made. Nonspecialists may do well to rely on such principles, but policymakers should do a good deal better.

Slovic also finds that experts do not entirely agree among themselves (p. 311; pp. 292–93). Most interestingly, toxicologists employed by industry are far more optimistic about chemical risks than toxicologists employed by government or academic institutions; there is a large “affiliation bias,” so that people tend to believe what their institution would want them to believe (p. 311). I shall have

²⁸ The point is connected with an aspect of prospect theory, described as the “certainty effect,” in accordance with which “people overweight outcomes that are considered certain, relative to outcomes that are merely probable.” See Daniel Kahneman and Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, in *Choices, Values, and Frames* 17, 20 (Daniel Kahneman ed. 2000).

²⁹ For an interesting challenge from the perspective of ecology, see Botkin, *Adjusting Law to Nature’s Discordant Harmonies*, 7 *Duke Env. Law & Policy Forum* 25 (1996).

³⁰ This is a standard defense of most heuristics. See Tversky and Kahneman, *supra* note; Gerd Gigerenzer, *Simple Heuristics That Make Us Smart* (1999).

³¹ It cannot, however, be said that a belief in the benevolence of nature is a sensible heuristic. In fact, this is a dangerous idea, because the unnatural is often safer than the natural. See Alan McHughen, *Pandora’s Picnic Basket* (2000). On ecology, see Botkin, *supra* note. The belief in the benevolence of nature might well be a holdover from certain theological views. See Janet Radcliffe Richards, *Human Nature After Darwin* (2001).

more to say about that particular bias below. But the differences among toxicologists are dwarfed by the differences between toxicologists and ordinary people. We should conclude that one's social role will move one's judgment in predictable directions, and that experts are likely to be biased if they are working with someone having a stake in the outcome—but also that even acknowledging this point, experts are, on many fundamental issues, to be in basic accord with one another.

C. Social Amplification

As Slovic is aware, mental shortcuts do not operate in a social vacuum, and interpersonal influences can play a large role. With respect to risks, most of us, most of the time, lack independent knowledge, and we must therefore rely on the beliefs of others.

Slovic's principal treatment of this point comes in a discussion of what he calls the "social amplification of risk" (p. 232). Strikingly, the major point of this discussion is not to explain how social influences affect people's perception of risks, but instead to show what might be missed by conventional efforts to tabulate the costs and benefits associated with risks. For example, the 1979 accident at Three Mile Island "demonstrated dramatically that factors other than death, injury, and property damage can impose serious costs and social repercussions" (p. 234). Even though no one was killed or even harmed by the accident, the result was to impose "enormous costs"—in the form of stricter regulations, reduced operation of reactors worldwide, greater public opposition to nuclear power, and a less viable role for one of the major long-term energy sources—on the entire nuclear industry and on society as a whole" (pp. 234–35). Slovic is concerned that a conventional risk analysis, focussed on the likelihood and probability of harm, will overlook these kinds of consequences. He adds that in some domains, society provides not amplification, but a kind of "social attenuation of risk" (p. 235), producing underestimation of and underresponse to potentially serious harms. As examples, he offers the cases of indoor radon, smoking, and driving without a seat belt (p. 235).

In dealing with the social amplification of risks, then, Slovic is especially concerned about the "secondary impacts" of dangers usually viewed in narrower terms. When a problem emerges, there might be a sharp overall decline in social trust; liability and insurance costs might increase; people might impose pressure for new regulations; social disorder is quite possible (p. 239). Because dramatic events are an important determinant of individual risk judgments, a highly

publicized incident might well move people in the direction of fear that is quite unwarranted by reality. The flow of information, especially via the media, can be extremely important here, not only in spreading facts but also in shaping perceptions. This is Slovic's effort to cast light on the processes by which "seemingly minor risks or risk events often produce extraordinary public concern and social and economic impacts, with rippling effects across time, space and social institutions" (245).

D. Social Amplification: The Search for Mechanisms

By emphasizing that social amplification of risks, Slovic seems to me to be pointing in a helpful direction, one that provides a valuable supplement to his general focus on individual cognition. But his discussion suffers from being too much of a collection of factors, one that does not give a clear sense of the *mechanisms* by which "social amplification" occurs. Here, then, is a criticism, or at least extension, of Slovic's treatment of mental shortcuts, intuitive toxicology, and social forces. There is much to be said about the social origins of individual beliefs, emphasizing that people contribute to the creation and intensity of the same forces by which they are influenced. My aim here is to fill a gap in Slovic's presentation by offering a sketch of the relevant influences.

1. *Informational influences.* A good way to begin is by drawing on emerging work on the nature of social *cascades*,³² and by sketching an understanding of "risk perception cascades" in particular. The starting point, and what makes cascades possible, is a simple recognition that in many domains, people lack much in the way of first-hand information. Certainly this is the case for many hazards. Because few people know, for a fact, about the dangers of arsenic in water, or global warming, or Lyme Disease, or asbestos in the workplace, they must rely on the signals given by other people.

To see how risk perception cascades work, consider a stylized example. John is unsure whether global warming is a serious problem, but Sarah, whom John trusts, believes that it is. Giving consideration to Sarah's views, John decides that global warming is indeed a serious problem. Frank would be inclined, on his own, to discount the risk; but confronted with the views of Sarah

³² See, e.g., Sushil Biikhchandani et al., Learning from the Behavior of Others, *J. Econ. Persp.*, Summer 1998, at 151; Lisa Anderson and Charles Holt, Information Cascades in the Laboratory, 87 *Am. Econ. Rev.* 847 (1997); Abhijit Banerjee, A Simple Model of Herd Behavior, 107 *Q. J. Econ.* 797 (1992); Andrew Daughety and Jennifer Reinganum, Stampede to Judgment, 1 *Am. L. & Ec. Rev.* 158, 159-65 (1999).

and John, Frank might well come to believe that global warming is indeed a serious problem. Pauline, a skeptic about global warming, would have to have a great deal of confidence to reject the shared beliefs of Frank, Sarah, John, and Frank. Before long, the members of this little community will come to share a belief that global warming is a matter of considerable concern.³³

Stylized though it is, this description seems to capture the dynamics of many social movements with respect to risk,³⁴ captured in the notion of an *informational cascade*.³⁵ The spreading belief in Lyme disease appears to be a case in point, with many people believing that they have the disease, and many doctors confirming the diagnosis, simply because they have heard from others of connection between Lyme disease and certain symptoms.³⁶ Because of the availability heuristic, the cascade can be greatly fueled, or accelerated, if a salient event is easily brought to mind.³⁷

2. *Reputational influences.* Of course informational forces are not all that is at work; reputation matters too. Because most people care about the views of others, it is easy to imagine *reputational cascades* with respect to actions or stated beliefs.³⁸ Suppose, for example, that Allan and Betty would think ill of anyone who argues that the global warming is not a problem. Carl, who is not sure what to think about global warming, might be unmoved privately by the views of Allan and Betty, and might even consider them fanatical; but he might nonetheless not want to incur the wrath of Allan and Betty, or to seem ignorant, or to appear indifferent to the welfare of future generations. If so, Carl might show no opposition to dramatic steps to halt global warming, or might even agree publicly with Allan and Betty that such steps are necessary. If Deborah is otherwise in equipoise, she might be most reluctant to oppose Allan, Betty, and Carl publicly. Mounting reputational pressures might well lead Ellen, Frank, George, and Helen, and many more, to join the bandwagon. The eventual result

³³ See Biikhchandani et al, *supra* note; David Hirschleifer, *The Blind Leading the Blind*, in *The New Economics of Human Behavior* (1998).

³⁴ For many examples, see Penina Glazer and Myron Glazer, *The Environmental Crusaders* (1998).

³⁵ See sources cited in note 33 *supra*.

³⁶ See *Stalking Dr. Steele*, *The New York Times Magazine*, July 17, 2001, at 52. On informational cascades among experts, see Hirschleifer, *supra* note.

³⁷ See Timur Kuran and Cass R. Sunstein, *Availability Cascades and Risk Regulation*, *supra* note.

³⁸ See Kuran, *supra* note.

would be to affect law and policy, as citizens seem support massive social efforts.³⁹

I believe that with respect to risk, informational influences are the most important, as individual fear grows with a sense that other (reasonable) people are frightened; but reputational influences are also pertinent. If the example just given seems artificial, consider the suggestion of a medical researcher who questions a number of Lyme disease diagnoses: “Doctors can’t say what they think anymore. . . . If you quote me as saying these things, I’m as good as dead.”⁴⁰ Or consider the remarks of a sociologist who has publicly raised questions about the health threats posed by mad-cow disease, suggesting that if you raise those doubts publicly, “You get made to feel like a pedophile.”⁴¹

In the context of regulation of hazardous waste dumps, it is clear that reputational factors actually helped to fuel a cascade effect, eventually leading to the Superfund statute.⁴² Lawmakers, even more than ordinary citizens, are vulnerable to reputational pressures; in fact that is part of their job. Hence they might support legislation to control risks that they know to be quite low. Nor is the only problem one of excessive legal controls. In a phenomenon similar to Slovic’s “social attenuation of risks,” we can imagine “unavailability cascades,” in which people’s relative indifference to statistically significant risks leads other people to be indifferent too.⁴³ Undoubtedly informational and reputational forces of this kind help account for public indifference to many hazards that trouble experts. Thus perceptions of risk are often a product of those forces.

Note that these points are complementary to Slovic’s emphasis on the availability heuristic and intuitive toxicology. What is “available” will be a function of informational and reputational forces: If people are talking about the risks associated with pesticides, or disposal diapers, those risks will be available in the public mind. And if people are spreading the idea that arsenic “causes cancer,” and should therefore be banned, the premises of intuitive toxicology will spread as if by contagion.

³⁹ See *id.*

⁴⁰ *Stalking Dr. Steele*, *supra*, at 56.

⁴¹ *Wall Street Journal*.

⁴² See Kuran and Sunstein, *Availability Cascades and Risk Regulation*, *supra* note.

⁴³ See *id.*

3. *Group polarization.* A related phenomenon, that of *group polarization*,⁴⁴ helps to strengthen these forces. It is well established that when a group of people engages in deliberation, group members *will tend to move toward a more extreme position in line with their pre-deliberation inclinations.* This is the typical pattern among deliberating bodies. Thus, for example, a group of people who fear the effects of second-hand smoke, or who believe that pesticides carry significant risks, is likely, after discussion, to believe that the health dangers here are extremely serious. So too, a group of people who tend to think that the risks of global warming have been exaggerated will tend to think, after discussion, that global warming is no cause for concern. In fact there is no reason to think that experts are immune to group polarization; they are certainly vulnerable to cascade effects.⁴⁵ Massive evidence, from many different countries, supports the basic prediction.⁴⁶ If like-minded people are talking, much of the time, with one another, it is especially likely that large groups of people will show heightened concern about certain risks, whatever the evidence suggests—and also that large groups of people will show no concern at all, even if the evidence gives cause for alarm. There can be no doubt that group polarization has contributed to social divisions with respect to risk regulation; indeed, Slovic’s demonstrated “affiliation bias” probably has a great deal to do with group polarization. And when society generally shows alarm, or indifference, group polarization is likely to be part of the reason.

⁴⁴ See Roger Brown, *Social Psychology* (2d ed. 1986); Cass R. Sunstein, *Deliberative Trouble: Why Groups Go To Extremes*, 110 *Yale LJ* (2000).

⁴⁵ See Hirschleifer, *supra* note.

⁴⁶ Why does group polarization occur? Though no cascade need be involved, the two principal explanations are close to the explanations for informational and reputational cascades. See Brown, *supra* note, which I summarize here. The first involves informational influences. In a deliberating group with an initial tendency in favor of X and against Y, there will be a disproportionate number of arguments in favor of X, simply because most people will speak out on behalf of X. Group members will have thought of some, but not all, of the arguments in that direction. After deliberating, the arguments for X will seem stronger, to individual members, and the arguments for Y will seem even weaker. Hence it is to be expected that discussion will move people to a more extreme form of their original enthusiasm for X. The second explanation points to social influences. Most people care about their reputations and their self-conception. Suppose, for example, that you are inclined to think that nuclear power is not dangerous, but you are not entirely sure; suppose too that you find yourself in a group which also rejects the idea that nuclear power is dangerous. If you think of yourself as the sort of person who is, more than most, inclined to support nuclear power, you might move a bit, if only to maintain your reputation within the group and your self-conception on the issue at hand. The evidence strongly supports the proposition that this happens.

In sum: Slovic has performed a valuable service in showing how the availability heuristic and intuitive toxicology help to produce inaccurate judgments about risk. As compared with ordinary people, experts are able to reach accurate judgments, if only because they have access to more information, making the easily-recalled incident a less important determinant of judgment and producing more accuracy than can come from the simple ideas on which ordinary people rely.⁴⁷ Slovic is also right to emphasize that social forces can amplify the effect of the heuristic. The principal gap in his discussion lies in his treatment of those forces. There is much more to be done here, both at the level of theory and at the level of empirical detail. In addition, Slovic's psychological claims offer some clues to the development of federal regulatory policy—showing, for example, how the vivid example can play such a significant role in producing new legislation or new rules at the agency level. Sometimes the use of such examples will be valuable, because it will activate social concern about previously neglected problems; but sometimes it will lead to perverse results, in the form of massive expenditures on small problems, or even nonproblems.⁴⁸ Here too much remains to be done.

II. The Psychometric Paradigm: Are Experts Irrational?

Thus far the discussion has involved the vulnerability of ordinary people to mistaken beliefs about risks. But Slovic also insists that in many ways, ordinary people are not mistaken at all. Their judgments about risks involve evaluative judgments that are worthy of respect. For Slovic, experts seem, much of the time, to be obtuse. This is one of the most striking claims in Slovic's book; it deserves careful attention, in part because the federal government is now taking Slovic's arguments directly into account.⁴⁹

A. Rival Rationality? The Basic Claim

The idea that ordinary people are making subtle judgments of value is embodied in what Slovic calls the "psychometric paradigm" (p. 222) According to the psychometric paradigm, ordinary people certainly care, as experts do,

⁴⁷ For a detailed treatment, see Howard Margolis, *Dealing With Risk* (1997).

⁴⁸ See Noll and Krier, *supra* note (arguing for "striking when the iron is cold"); Phantom Risk, *supra* note.

⁴⁹ See the "sensitivity analysis" for arsenic regulation, which includes a 7% increase in monetized risk for the involuntary nature of the exposure and also for its uncontrollability. See Fed. Reg. (2000). See also Environmental Protection Agency, *Benefit-Cost Analysis* (2000) (discussing these factors).

about the number of lives at risk as a result of some product of activity. But there is also a significant difference between the two camps. Experts tend to focus on one variable: *the number of lives at stake*. But ordinary people have a less crude and more complex approach (p. 223). They care about a range of qualitative variables that can lead to materially different evaluations of statistically identical risks.

Thus Slovic uncovers a long list of “factors” that can make risks more or less acceptable, holding expected fatalities constant. These include whether the risk is (1) dreaded; (2) potentially catastrophic; (3) inequitably distributed; (4) involuntary; (5) uncontrollable; (6) new; and (7) faced by future generations (p. 140). Because these factors are so crucial, “riskiness means more to people than ‘expected number of fatalities’” (p. 231). And because they focus on such factors, Slovic thinks that in an important respect, ordinary people think better, and more rationally, than experts do. According to Slovic, people’s “basic conceptualization of risk is much richer than that of experts and reflects legitimate concerns that are typically omitted from expert risk assessments” (p. 231). This is the basis for Slovic’s claim that experts and ordinary people display “rival rationalities” and that “each side must respect the insights and intelligence of the other” (id.).

This is a striking and provocative claim. It has also been highly influential.⁵⁰ And in some ways, it is clearly correct. The risks associated with voluntary activities (skiing, horseback riding) receive less public concern than statistically smaller risks from involuntary activities (food preservatives, pesticides, herbicides, certain forms of air pollution). People do seem to be willing to pay more to prevent a cancer death than to prevent a sudden unanticipated death,⁵¹ and one reason is that cancer is especially “dreaded.”⁵² In pointing to the importance of qualitative factors, Slovic has made a significant advance, one that deserves to be incorporated into regulatory policy, as indeed it appears to be doing.⁵³ We can go further. If Slovic is right, the populist view has received strong empirical support, and the technocratic position has taken a serious blow. The reason is that technocrats miss important values to which ordinary people rightly call attention. Indeed, if Slovic is right, regulatory policy

⁵⁰ See id.

⁵¹ See George Tolley et al., *Valuing Health for Policy* (1995).

⁵² See Richard Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 *Col L Rev* 941 (1999).

⁵³ See the EPA’s use of involuntariness and uncontrollability as part of its sensitivity analysis in valuing arsenic reductions, *Fed. Reg.* (2001).

should be rethought in quite fundamental ways, with government incorporating the relevant values far more thoroughly than it has yet done.⁵⁴

I do not believe, however, that Slovic's evidence establishes as much he thinks he does, and some of the central ideas here—dread, voluntariness, control—seem to me underanalyzed. I also suspect that Slovic has missed an important part of the picture; and an understanding of what he has overlooked reinforces the view that when experts and ordinary people differ, experts are right and ordinary people are wrong.

B. Rival Rationality? Data, Questions, and Doubts

Evidence first. How do we know that ordinary people think that these qualitative factors are so important? The answer is **not** that people spontaneously point to such factors in explaining their assessments of risk. We do not have data to suggest that ordinary people have an accurate sense of the number of lives at stake, and that their judgments stem from qualitative judgments.⁵⁵ Instead the answer is that Slovic and his fellow experimenters **expressly** identify these factors and set them before experimental subjects (p. 222, pp. 203–6). Slovic and his collaborators ask people to rate certain risks along these specific dimensions (id.). On a seven-point scale, people are asked to rate various risks in terms of their catastrophic potential, their dreadedness, their threat to future generations, their controllability, and so forth (id.). Is it at all surprising, or even informative, that the risks that people most fear tend to be rated most severely along these dimensions?

Slovic finds that the most feared risks include DDT, pesticides, herbicides, and smoking (p. 143), whereas X-rays, microwave ovens, non-nuclear electric power, marijuana, and sunbathing (pp 144–45) are ranked far lower. He also finds that the most feared risks do worse, along several of the “qualitative” dimensions, than those risks that are least feared. But this finding does not establish that the qualitative dimensions are the **grounds** for people's rankings of these risks. Nothing in the data is inconsistent with the possibility that people fear certain risks because they think that they are statistically large; that this is the judgment that best explains their rankings; but that people's rankings of statistically large risks will, on the qualitative dimensions, suggest more

⁵⁴ See id., which is simply a start toward a more thorough-going effort, some of whose implications are traced in Revesz, *supra* note.

⁵⁵ In Slovic finds that people do not know the actual numbers. See *supra*.

concern than their judgments, on those same dimensions, of statistically small risks. On this view, the rankings on the qualitative dimensions are explained by, and do not themselves explain, people's concern about the large statistical risks associated with certain products and practices. Slovic is undoubtedly right to say that the qualitative factors matter. But his evidence seems to me too crude to disprove a competing hypothesis, to the effect that people's rankings of risks reflect, in significant part, inaccurate statistical assessments, and are not mostly driven by a "richer rationality."⁵⁶

If we look closely at Slovic's actual list of hazards, it is not clear how to explain the results in terms of qualitative factors. Of ninety hazards, smoking is ranked ninth, while marijuana is ranked 85th (pp. 143–45); what "qualitative factors" on Slovic's list could account for this dramatic difference? Are the risks of smoking less voluntary and more inequitably distributed? What is the richer rationality that produces these judgments? One hypothesis is that people know that the risks from smoking are quite large, but believe that the risks from marijuana are quite low, and that this is the reason for the otherwise inexplicably different rankings. Or consider the fact (*id.*) that pesticides and herbicides rank seventh and eighth on the list, while X-rays rank 30th, food preservatives 35th, and food irradiation 39th. Can this pattern of judgments really be explained in terms of voluntariness, equity, potentially catastrophic quality, and risk to future generations? This does not seem plausible. It is far from clear what accounts for this pattern of judgments. But the idea that people are showing a "richer rationality" has not been demonstrated.⁵⁷

⁵⁶ Consider the possibility, pressed by Margolis, *supra* note, that these factors operate as *ex post* justifications for decisions reached on other grounds. It is well established that people are not especially good at offering the actual grounds for their judgments, and that sometimes they will offer accounts that demonstrably diverge from reality. In an especially interesting experiment, people were asked to choose one item of clothing from a pair. Actually the two items were identical, and people generally picked the item on the left side, apparently for no other reason than that it was on the left side. But asked for the basis for their decisions, people offered elaborate accounts, citing superior texture and color. See *id.* In this light there is reason to be cautious about the suggestion that these qualitative factors are the actual basis for people's judgments about risks. In fact things are still worse for Slovic's causal hypothesis, because (as I have noted) the qualitative factors said to support ordinary risk perceptions are not generated by people on their own, but are suggested by experimenters.

⁵⁷ One possibility, stressed by Slovic himself (p. 413) and taken up in detail below, is that the "affect heuristic" underlies people's judgments. See below.

C. Elaborating a Competing Hypothesis

It is possible to explain people's perceptions in multiple different ways. Slovic's own discussion of the availability heuristic offers the beginning of one such competing account: When a relevant incident readily comes to mind, people are much more likely to be fearful than when it does not. The risks associated with nuclear power, smoking, and pesticides receive a great deal of publicity; little attention is given to the risks associated with x-rays, food preservatives, and food irradiation. If this point is right, people are concerned largely with the number of lives at risk. They simply err on that key question. The various qualitative considerations are not, on this view, irrelevant; but they place much less of a role than Slovic suggests in explaining the split between experts and ordinary people.

It is even possible that some of people's judgments are attributable to rough-and-ready assessments of whether the activities in question are beneficial or harmful on balance—and that these assessments drive evaluations in varying directions.⁵⁸ Consider, for example, Howard Margolis' powerful and detailed criticisms of the psychometric paradigm,⁵⁹ a criticism with which Slovic does not engage. Margolis thinks that the psychometric paradigm does not explain lay/expert divisions, and he suggests a quite different analysis of those divisions. Margolis' bottom-line: Experts know the facts and ordinary people do not. While Slovic attempts to vindicate the richer thinking of lay people, Margolis leans heavily in the technocratic direction, challenging the populist underpinnings of those who celebrate the 'rival rationality' of ordinary people.

Margolis' basic account is exceedingly simple.⁶⁰ He thinks that in some cases, ordinary people are alert to the hazards of some activity, but not much alert to its benefits, which are cognitively "off-screen." In such cases, people will tend to think, "better safe than sorry," and they will have a highly negative reaction to the risk. In such cases, they will demand aggressive and immediate regulation. In other cases, the benefits of the activity will be very much on people's minds, but not the hazards—in which case they will tend to think, "nothing ventured, nothing gained." In such cases, they will think that regulators

⁵⁸ . Of course this point is not meant to deny the fact that a potentially catastrophic risk is likely to attract more attention than its discounted value warrants. Note on prospect theory. High levels of risk aversion with respect to low-probability, disastrous outcomes. Connect to prospect theory in general, not discussed by Slovic, an unfortunate omission.

⁵⁹ See Howard Margolis, *Dealing With Risk* (1998).

⁶⁰ *Id.* at 75-92.

are overzealous, even fanatics. In still other cases—in Margolis’ view, the cases in which observers are being most sensible—both benefits and risks will be “on screen,” and people will assess risks by comparing the benefits with the costs.

It is reasonable to think that for experts, benefits and costs are usually on-screen, and that when ordinary people are much more alarmed than experts, it is sometimes because the risks are apparent but benefits are not. How else are we to make sense of the fact that the very small risks associated with X-rays do not occasion much concern, while the very small risks associated with pesticides and herbicides frequently appear on the list of most feared risks? A sensible conjecture is that people know that on balance, a world with x-rays is safer, and better, than a world without them. For pesticides and herbicides, by contrast, the benefits seem far less tangible and vague, if they are visible at all. It is safe to predict that if people were told, by a reliable source, that eliminating pesticides would lead to serious health problems—for example, because pesticide-free fruits and vegetables carried special dangers—the perceived risk of pesticides would decline dramatically. Indeed I predict that if people were informed that eliminating pesticides would lead to a significant cost in the price of apples and oranges, the perceived risk would go down as well.

Margolis offers a nice example to support this prediction. The removal of asbestos from schools in New York was initially quite popular, indeed demanded by parents, even though experts believed that the risks were statistically small. But when it emerged that the removal would cause schools to be closed for a period of weeks, and when the closing caused parents to become greatly inconvenienced, parental attitudes turned right around, and asbestos removal seemed like a bad idea. When the costs of the removal came on-screen, parents thought much more like experts, and the risks of asbestos seemed like the risks of X-rays: Statistically small, and on balance worth incurring.

A reasonable conjecture, then, is that when ordinary people diverge from experts, it is because ordinary people see the risks but not the benefits, whereas experts see both. Some evidence for this conjecture comes from some of Slovic’s most interesting data. Slovic finds that when people think that a product has a high risk, they tend to think that it has low benefits (pp. 415–17)—and that when they think that a product has a high benefit, they tend to think that it carries a low risk too (id.). It is unusual for people to think that a product with a high risk also has a high benefit. This finding strongly suggests that when ordinary people are more fearful than experts, it is often because ordinary people are not looking at the benefits that accompany the product at issue. It also suggests that when

ordinary people are less fearful than experts—as was the case, for many years, for cigarettes—it is because ordinary people are not looking at the risks, but instead only at the benefit side. In sum: Slovic’s findings might be explained not only or mostly by reference to rival rationality, but also and more fundamentally to some combination of the availability heuristic and a failure, on the part of ordinary people, to put all of the effects of risks “on screen.”

D. No Dichotomies Here

There is a further problem. Many of the qualitative factors that are said to lead people to a “rich” conception of risk need a good deal of unpacking. Slovic seems to take the qualitative variables as marking dichotomies, or at least clear distinctions. But they raise many questions.

1. *The example of dread.* Some risks are said to be “dread,” whereas other risks are not. But what does this mean? In the abstract, to say that a risk is “dread” seems to be to say that people fear it—which suggests that the idea of dread is just a synonym for perception of risk, not an explanation for it. If so, it is no surprise that there is a correlation between risks perceived as serious and risks deemed to be dread. (Is it surprising that people are scared of things that they find frightening?) It is even possible that when people say that a risk is “dread,” what they mean, in part, is that the risk is large in magnitude. People do not “dread” being attacked by unicorns or Martians. But they do dread cancer, partly because the risk of getting cancer is not so low.

Slovic himself uses the term “common” as an antonym to “dread” (p. 94), but that raises further problems. Cancer is a common risk. But it is also the prototype of a dread risk. In trying to explain how the qualitative factors of dread explains the divergence between experts and ordinary people, we seem to be reaching a dead end.

If progress is to be made here, perhaps we can assume that a dread risk is one that is accompanied by significant pain and suffering before death.⁶¹ This is certainly an intelligible idea. Perhaps people are especially fearful of fatality risks that involve, not especially high probabilities of death, but deaths that are unusually difficult or gruesome. This speculation is supported by data suggesting that people are willing to pay significantly more to avert deaths from

⁶¹ I try to defend this view in Cass R. Sunstein, *Bad Deaths*, *J. Risk and Uncertainty* (1998).

cancer than deaths from heart disease.⁶² But if dread is understood in this way, a great deal of work would be necessary to establish that this is what people are really thinking; and Slovic's data do not specifically confirm the point.

2. *Voluntariness and controllability.* Now turn to the ideas of voluntariness and controllability.⁶³ At first glance, the risks associated with pesticides and herbicides might seem involuntary and uncontrollable, whereas the risks from smoking and driving might seem voluntary and controllable. People choose to smoke and to drive. At least this is what people seem to say, when asked to rank risks along the relevant dimensions on seven-point scales.

On reflection, however, these issues are complicated. It is not especially difficult to avoid pesticides. Many people can and do select pesticide-free food. The decision to smoke seems voluntary, but smoking is addictive, and many people seek to quit but find, or say, that they cannot. The decision to drive might seem voluntary, but in many places, it is hard, or expensive, to get to work without a car. Perhaps the risks associated with driving are controllable, but many accidents are not the fault of one of the drivers involved. Are the risks from ambient air pollution involuntarily incurred? It might seem that they are, but people have a choice of where to live, and some areas have much cleaner air than others. Are the risks from flying uncontrollable? Many people seem to think so. But no one is under a legal obligation to fly. Why are the risks of flying so much less controllable than the risks from bicycles or microwave ovens (p. 142)?

In this light, it is probably best not to see a dichotomy between voluntariness and involuntariness, but to start by asking about two issues: (a) whether those who are subject to a risk are informed of its existence and (b) whether it is costly, or burdensome, to avoid the risk in question. When a risk seems "involuntary," it is usually because people who face the risk do not know about it, or because it is especially difficult, or costly, to avoid it. When a risk seems "voluntary," it is usually because those who run the risk are fully aware of it, and because risk avoidance seems easy or cheap. And if we think of things in these terms, there is no sharp dichotomy between "controllable" and "uncontrollable" risks, or even between "voluntary" and "involuntary" risks.

⁶² See Revesz, *supra* note, at; Tolley et al., *supra* note, at.

⁶³ These are the two factors emphasized by the EPA in its sensitivity analysis involving arsenic. See note *supra*.

Indeed these terms seem far too crude to capture what is really important.⁶⁴ To the extent that ordinary people rely on them, they might be gesturing toward a sensible way of thinking about risks. But it is too much to claim that they have a “rival rationality.”

E. A Mixed Verdict

I have been claiming, not that Slovic is wrong to say that qualitative factors matter to ordinary perceptions of risk, but that he claims more than the evidence establishes, and that the same evidence said to support “rival rationality” might reflect simple errors of fact. An interesting way to test my claims would be to see whether people are able to generate statistically accurate judgments about certain risks. When specifically asked about the number of expected deaths from various sources, do people make roughly the same judgments that experts do? If so, then it might indeed be that when ordinary people diverge from experts, it is because of the qualitative factors to which Slovic points.⁶⁵ But if ordinary people err in estimating the number of lives at risk, and if their perceptions of risk severity are correlated with their estimates, then their errors might well explain the divergences.

Actually Slovic does provide some evidence on this point (pp. 105–07), and I believe that it undermines his claim. On the purely factual issues, he finds systematic mistakes by ordinary people (*id.*), and these mistakes must have some connection to their disagreements with experts. Other evidence supports Slovic’s findings here.⁶⁶ Slovic has not sorted out the extent to which these errors, or instead qualitative judgments, underlie the relevant disagreements. There remains a large empirical agenda here.

Where does this leave us? It suggests that many of the disagreements between experts and ordinary people stem from the fact that experts have more information, and are also prepared to look at the benefits as well as the risks associated with controversial products and activities. To the extent that experts focus only on the number of lives at stake, they are genuinely obtuse. It is

⁶⁴ In this way they have much in common with intuitive toxicology, which also sees things in “all or nothing” terms. Is it unfair to say that the use of such dichotomies reflects a form of intuitive psychometrics?

⁶⁵ The “might well” is necessary. It might be that when people are assessing risks, they are not much thinking about the number of lives at stake, and that when they are forced to think about the important matter, their assessments change. Cf. Kahneman on dates.

⁶⁶ Viscusi.

reasonable to devote special attention to dangers that are hard to avoid, or accompanied by special suffering, or faced principally by children. But there is no “rival rationality” in taking these factors into account. On the positive side, what is needed is more empirical work to determine the extent to which ordinary risk perceptions are based on errors or instead on values. On the normative side, what is needed is more thought about the nature of concepts like “dread,” “involuntary,” and “uncontrollable.” With respect to policy, what is needed is incorporation of people’s values, to the extent that they can survive a process of reflection.

III. Emotions and Trust

Thus far the discussion has focussed on individual and social *cognition*. As Slovic emphasizes, most psychological work on risk has been highly cognitive in orientation, asking whether mental heuristics produce errors, and how people generally depart from what is generally considered to be rational behavior. But there seems to be a gap in thinking about perceived risks only in these terms. With respect to risks, many of our ordinary ways of speaking suggest strong emotions: panic, hysteria, terror.⁶⁷ Slovic also wants to explore some central question: How do people’s *feelings* affect their reactions to risks?

Slovic’s interest in this topic appears to have been triggered by a remarkable finding, mentioned above: When asked to assess the risks and benefits associated with certain items, people tend to think that risky activities contain low benefits, and that beneficial activities contain high risks (pp. 415–16). In other words, people are likely to think that activities that seem dangerous do not carry benefits; it is rare that they will see an activity as **both** highly beneficial and quite dangerous, or as both benefit-free and danger-free. This is extremely odd. Why don’t people think, more of the time, that some activity is both highly beneficial and highly risky? Why do they seem to make a kind of general, gestalt-type judgment, one that drives assessment of both risks and benefits? Aware that risk and benefit are “distinct concepts,” Slovic thinks that “affect” comes first, and helps to “direct” judgments of both risk and benefit. Hence it suggests an “affect heuristic,” by which people have an emotional, all-things-considered reaction to certain processes and products, and that heuristic operates as a mental shortcut for a more careful evaluation.

⁶⁷ See George Loewenstein et al., *Risk As Feelings* (forthcoming 2001).

To test this hypothesis, Slovic offers several studies. One of the most interesting is designed to provide new information about the *risk* associated with some item, and then to see if the information altered people's judgments about the *benefit* associated with it—and also to provide new information about the benefit of some item, and to test whether that information would alter people's judgments about the accompany risk (pp. 421–26). The motivation for this study is simple. If people's judgments were purely cognitive, information about the great *benefits* of (say) food preservatives should not produce a judgment than the *risks* are low—just as information about the great risks of (say) natural gas should not make people think that the benefits are low.

Strikingly, Slovic finds that information about benefits alters judgments about risks, and that information about risks alters judgments about benefits (pp. 423–25). 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. Slovic concludes that people assess products and activities through affect, and that information that improves people's affective response will improve their judgments of all dimensions of those products and activities. Slovic acknowledges that work on emotion and risk remains in a preliminary state, but he proposes the affect heuristic as a useful place to start.

Slovic concludes that people assess products and activities through “affect,” and that information that improves people's affective response will improve their judgments of all dimensions of those products and activities. The central idea is to be that when presented with a risk, people have a general emotional attitude to it—hence an “affect”—and that this general attitude operates as a heuristic, much affecting people's judgments about both benefits and dangers.

B. What's an Emotion?

Slovic's analysis here is intriguing and important. The basic claim has considerable truth, for emotions play a large role in reactions to risks, and they help to explain otherwise anomalous behavior.⁶⁸ Indeed, the “affect heuristic” operates in many social domains. To take some issues far afield from Slovic's own concerns, consider the sharp split, along political lines, in people's reactions to the impeachment of President Clinton and the Supreme Court's decision in

⁶⁸ See *id.*

Bush v. Gore.⁶⁹ In the abstract, there is no reason to think that Republicans would believe in a lower standard than Democrats for impeachment of the President; in the abstract, there is no reason to think that Republicans would be more sympathetic than Democrats to an equal protection challenge to a manual recount. In both cases, and for people on both sides, an intense emotional reaction, or affect, seems to have driven conclusions on technical issues in law. In fact there is empirical confirmation of this point.⁷⁰ In the area of risk in particular, “all things considered” emotions do seem to play a role in explaining people’s perceptions.

At the same time, Slovic’s analysis seems to me undertheorized, and also to raise a number of additional issues that require further research. The most basic problem is the distinction between cognition and emotion, about which Slovic says too little. The distinction is complex and contested,⁷¹ and the bare idea of “affect” cannot much help in unpacking that distinction. In the domain of risks (and most other places), any “affect” is based on thinking; it is hardly cognition-free. When a negative emotion is associated with a certain risk—nuclear power, for example—cognition is playing a central role. In fact there are large debates about whether an emotion is a form of thought, or whether thoughts are necessary and sufficient conditions for emotions, and whether emotions is a sense precede or outrun cognition.⁷² But it is clear that no simple line can be drawn between emotions and cognition in most social domains. Whatever they are, emotions can lead us astray; but the same is true for math, biology, and animal experiments. I am not entirely sure what Slovic understands an “emotion” to be, or how he thinks that emotions and cognition relate to one another.

There are several ways to make progress here. Some scientific work suggests that the brain has special sectors for emotions, and that some types of emotions, including some fear-type reactions, can be triggered before the more cognitive sectors become involved at all.⁷³ It is not clear, however, that fear in human beings is pre-cognitive or noncognitive, and even if it is in some cases, that kind of fear would be triggered by few of the risks involved in actual human lives. Perhaps more to the point, existing experiments, not mentioned by Slovic,

⁶⁹ 121 S. Ct. (2000).

⁷⁰ See Drew Weston.

⁷¹ For varying views, see Ronald deSousa, *The Rationality of Emotion* (1993); Jon Elster, *Alchemies of the Mind* (1999); Martha Nussbaum, *Upheavals of Thought* (2001).

⁷² See *id.*

⁷³ See Joseph LeDoux, *The Emotional Brain* (1996).

suggest that when it comes to risk, a key question is whether people can imagine or visualize the “worst case” outcome—and that surprisingly little role is played by the stated probability that that outcome will occur.⁷⁴ In other words, people’s reactions to risks are often based mostly on the badness of the outcome, and the vividness of that outcome, rather than the probability of its occurrence. Consider these points:

—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.⁷⁵

—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.⁷⁶

—People show “alarmist bias.” When presented with competing accounts of danger, they tend to move toward the more alarming account.⁷⁷

A possible conclusion is that with respect to risks, vivid images and concrete pictures of disaster can “crowd out” other kinds of thoughts, *including the crucial thought that the probability of disaster is really small*. With respect to hope, those who operate gambling casinos and state lotteries play on the emotions in the particular sense that they conjure up palpable pictures of victory and easy living. With respect to risks, insurance companies and environmental groups do exactly the same. With respect to products of all kinds, advertisers try to produce a good affect to steer consumers into a certain direction, often through the use of appealing celebrities, through cheerful scenes, or through the creation of an association between the product and the consumer’s preferred self-image.

An important lesson follows: If government is seeking a method to ensure that people will take a more rational approach to risk, it might well attempt to appeal to their emotions. With respect to a cigarette smoking, abuse of alcohol, reckless driving, and abuse of drugs, this is exactly what government occasionally attempts to do. It should be no surprise that some of the most effective efforts to control cigarette smoking appeal to people’s emotions, by

⁷⁴ See Loewenstein, *supra* note; Yuval Rottenstreich and Christopher Hsee, Money, Kisses, and Electric Shocks: On the Affective Psychology of Probability Weighting (Working paper, University of Chicago, 1999).

⁷⁵ See Loewenstein, *supra* note.

⁷⁶ See Paul Slovic, Perception of Risk, *supra* note.

⁷⁷ W. Kip Viscusi, Alarmist Decisions With Divergent Risk Information, 107 *Ec. Journal* 1657, 1657-59 (1997)

making them feel that if they smoke, they will be dupes of the tobacco companies or imposing harms on innocent third parties.⁷⁸

IV. Demography, Paternalism, and Trust

I now turn to three issues on which Slovic offers a number of intriguing findings. These involve demographic differences, paternalism, and the crucial issue of trust.

A. Demography

Do members of different social groups disagree about risks? Slovic has many interesting findings. The most general is what he calls “the white male effect” (p. 399). Apparently white men are less concerned about risks than are members of any other group. With respect to nearly every risk, white women, black women, and black men are far more troubled than are white men (pp. 397–99). But this is the punchline of the story, and it will be helpful to provide a few details.

Slovic has asked large numbers of people to rank large numbers of risk; the ranking occurs by saying whether the hazard poses little or no risk; a slight risk; a moderate risk; or a high risk. Women rank nearly every risk as higher than men do (pp. 396–402). The same difference is observed for British toxicologists as well as for ordinary Americans; women toxicologists in Britain rank risks as more serious than do male toxicologists in Britain (p. 397). The differences are especially large with respect to nuclear waste, nuclear power, outdoor air pollution, alcoholic beverages, and suntanning (p. 397). There are other demographic differences too: As education and income increase, fear of almost all risks decreases (p. 399).

Once the data are disaggregated, however, a more interesting and somewhat different picture emerges. It is too simple to draw a distinction between men and women. Race is important too (p. 400). Across a large number of hazards, white men perceive risks as consistently lower than do white females, non-white males, and non-white females (pp. 398–400). In fact there are no large-scale differences among the latter three groups. White men are the real outliers. Slovic shows that the results are still more interesting. What drives the “white male effect” is that not the general view of white males, but the view of

⁷⁸ See JAMA (1997).

about 30% of them, who believe almost all risks to be very low (pp. 398–99). The other 70% of white males are not greatly different from the other subgroups.

What can be said about the key 30%? They tend to have more education and more household income, and also to be more conservative (pp. 399–400). They also tend, more than most, to disagree with the view that technological development is destroying nature, to reject the idea that they have very little control over risks to their health, and to think that future generations can take care of themselves when facing risks imposed as a result of today’s technologies. Slovic thinks that “affect” is part of what is responsible for this distribution of beliefs about risks (pp. 403–9).

All this is extremely interesting. There is, however, a serious gap in Slovic’s studies. We know that white men are less concerned about certain risks than members of other demographic groups. But we do not know whether white men believe that the risks are lower, **in terms of statistical risk of harm**, than do members of other demographic groups. White men might believe that the risks of pesticides deserve a “2” on a seven-point scale, whereas others believe that those risks deserve a “5,” but all groups might have the same basic sense of the statistical risks. Does a lifetime risk of 1 in 1 million count as a “1” or a “5”? How can we tell?

On the data that Slovic presents here,⁷⁹ it is possible that white men have a more accurate understanding of the numbers; it is possible that demographic groups do not much differ in their judgments of the numbers, but that white men, or the key 30%, are simply less worried than are other people. If they are less worried, it might be because they have a better sense of the facts. Or it might be because people who are well-educated, and wealthy, have a sense of relative security, so that they believe that most of the risks of life are relatively low. Women and African-Americans, by contrast, have a sense of relative insecurity, and so think of most risks are higher. Two of Slovic’s other concerns are relevant here. If people are most concerned about risks that they consider involuntarily incurred, beyond their control, and unfairly distributed, it should be unsurprising that for most risks, white men are especially concern-free. And trust is relevant to people’s assessment of the severity of risks; it might well be that white men have comparatively greater trust in private and public institutions, and hence rank risks as relatively low. I now turn to this point.

⁷⁹ Some of Slovic’s studies suggest that he has the relevant data. But

B. Trust

Slovic also provides an illuminating discussion of the topic of trust, a greatly neglected issue in legal treatments of risk regulation (p. 316 et seq.). A basic puzzle here is the fact that in the last twenty years, our society has grown healthier and safer, in part because it has spent billions of dollars on risk reduction; but at the same time, the American public has become more, not less, concerned about risks (p. 317). Slovic emphasizes that a lack of trust has played an important role on controversies over managing hazardous technologies. He also shows that when people are concerned about a hazard, it is often because they do not trust those who manage it. Consider, for example, the fact that people tend to view medical technologies involving radiation and chemicals (such as X-rays) as high-benefit, low-risk, whereas they view industrial technologies involving radiation and chemicals (such as nuclear power and pesticides) as high-risk, low-benefit (id.). Far more important than technical risk assessments is the level of trust in those who try to manage risks and to give assurance.

Slovic also stresses the fragility of trust. A distinctive feature of trust is that it is far easier to destroy it than to create it. Thus Slovic offers a study of forty-five hypothetical news events involving nuclear power; some of these events were designed to increase trust, whereas others were designed to decrease it (pp. 321–23). Negative events were judged to have a much more significant effect than positive events. For example, a nuclear power plant accident in another state was seen by many to have a powerful effect on trust, whereas careful selection and training of employees, and an absence of any safety problems in the past year, had little effect in increasing trust (id.). He also finds that sources of bad, trust-destroying news are seen as more credible than are sources of good, trust-creating news (pp. 322–23) This finding is in line with a related one, mentioned above: When people are unconcerned about a risk, discussion that is designed to provide still more assurance tends to increase anxiety, rather than to diminish it.

With respect to trust, Slovic therefore establishes the existence of an “asymmetry principle” (p. 320): Events that might weaken trust have a significant effect, whereas events that strengthen trust do very little. Does this mean that people are confused or irrational? Slovic doesn’t think so. “Conflicts and controversies surrounding risk management are not due to public irrationality or ignorance but, instead, can be seen as expected side effects of these psychological tendencies, interacting with our remarkable form of

participatory democratic government, and amplified by powerful technological and social changes in our society” (p. 323). Many of these changes involve the news media, which can publicize risk-related events from anywhere in the world instantaneously. And the news media, no less than ordinary people, give special emphasis to bad, trust-destroying events. “The young science of risk assessment is too fragile, too indirect, to prevail in such a hostile atmosphere” (p. 324).

What can be done? Slovic favors an increase in public participation in decision-making, going well beyond public relations to include much more in the way of actual power-sharing (p. 325). His fear is that governmental efforts to reassure people are unlikely, without broad participation, to breed anything but further distrust.⁸⁰ On this count Slovic might be right, but his own data raise questions about the value of public participation in increasing distrust. If bad news is more salient than good news, and if people are intuitive toxicologists, there is a risk that high levels of public participation in highly technical domains will simply increase public fear, with unfortunate consequences for policy.

I am not sure of the solution to this dilemma. Slovic is right to emphasize the importance of trust, and also to connect that issue to the split between experts and ordinary people. But efforts to increase public participation in the regulatory process raises many complexities, and if people come to that process with the intuitions that Slovic catalogues, then it is not clear that broad public involvement will be helpful for either sound regulation or trust itself.

C. Paternalism—and Smokers

Do smokers know the risks associated with smoking? In an important study, W. Kip Viscusi has argued that they do.⁸¹ Viscusi asked both smokers and nonsmokers to say how many smokers are likely to die from various causes as a result of smoking. Viscusi’s basic finding is that people do indeed know the risks, and in fact they overestimate them.

With respect to adolescents, at least, Slovic is quite critical of Viscusi’s findings. He urges that people tend to be overoptimistic, thinking that they themselves are peculiarly immune from risks that others face (p. 366). Hence Slovic believes that people’s ability to generate accurate statistical figures is consistent with the claim that smokers typically underestimate the risk that they

⁸⁰ For some support, see Kuran and Sunstein, *supra* note.

⁸¹ See W. Kip Viscusi, *Smoking* (1992).

themselves face. Slovic also contends that people's quantitative judgments depend on the way that questions are asked, and hence that slight alterations in questions could generate far more inaccurate numbers (pp. 367–68). He objects as well that people who know the statistical risk do not have a sufficient sense of what it is actually like to experience the adverse effects of smoking. He claims, finally, that people are not likely to understand either the cumulative nature of the risk or its addictive quality (p. 367). Thus many smokers have no clear sense of the short-term risks of smoking, and high-school seniors greatly overestimate the likelihood that they will not be smoking five years after starting to smoke (p. 369). Fewer than half of those who predicted that they would quit smoking after five years turned out, in fact, to quit. "Many young smokers perceive themselves to be at little or no risk from smoking because they expect to stop smoking before any damage to their health occurs. In reality, a high percentage of young smokers continue to smoke over a long period of time and are placed at risk by this behavior." (p. 369).

Slovic's discussion of these points is brief but highly suggestive. There is a great deal to sort out here, on the vexing questions associated with ensuring adequate information, and with the proper place of paternalism, in the domain of risk-taking. With respect to smoking, people have been saturated with evidence about the adverse health effects. Viscusi's claims should not be shocking in this light. But neither Viscusi nor Slovic offers a great deal of evidence about a key question: the statistical risk that each smoker believes he or she is running—as opposed to the statistical risk that smokers believe that smokers *generally* are running. If it is true that people generally suffer from excessive optimism with respect to the risks that they personally are facing, there is a problem of inadequate information even when people are well aware of the statistical risks. At the very least, this problem justifies a governmental effort to provide a corrective. (Consider the advertising campaign: "Drive defensively; watch out for the other guy.") And this point raises the expert/lay person split from another angle. In some areas, the source of the split may be an emphasis on statistical realities on the part of experts—and an overinflated sense of personal invulnerability on the part of risk-takers.

IV. Risk Regulation, Psychologically Informed

Slovic is a psychologist, not a policy analyst. While he gestures in the direction of legal reform, this is not his principal topic. Nonetheless, his work carries enormous importance for those concerned with policy and law. This is so partly because an understanding of human cognition (not excluding emotion)

helps to explain people's reactions to risks, and their demand for legal responses. It is so partly because such an understanding can help us see which approaches to risk regulation will work, and which will not. And it is so partly because of the continuing battle between technocratic and populist approaches to risk. If we know why people think what they do, and whether their views are based on mistakes or instead reasonable judgments of value, we will be able to make some progress in understanding the role of science, and experts, in the world of risk regulation.

It is useful here to distinguish among three different enterprises: positive, prescriptive, and normative.⁸² Positive work is concerned with making predictions. When will law take certain forms? What will be the effect of a particular step on human behavior? Prescriptive work is concerned with identifying the means of achieving shared goals. If government seeks to increase people's fear of certain risks, and to dampen their fear of others, it needs to know which strategies will work. Normative work is concerned to show what government's ends should be. If people make systematic mistakes about the risks that they face, perhaps government should feel more free to override their views.

Slovic's emphasis on conflicts between experts and ordinary people casts considerable light on all of these enterprises. If the availability heuristic helps to drive certain judgments about risks, we will be able to make predictions about the likely effects of salient events, both on people's judgments about when to insure and to take precautions, and on the demand for legal responses.⁸³ In the aftermath of a highly publicized incident, considerable movement should be expected; if illustrations of harm do not come to mind, people might persist in failing to take care of themselves. If emotions play a large role in risk-related behavior, educational campaigns are far more likely to work if they involve memorable images, rather than statistical probabilities. If government wants to encourage people to protect themselves, it should use particular examples and try to make them as vivid as possible. And if people make a large number of mistakes about risks—partly because of emotions, partly because of cognition—there are reasons to be skeptical of populist conceptions of regulatory government, and also about the kind of reflexive antipaternalism of much work on risk regulation. We might, in short, see Slovic's findings as supportive of the conception of administration associated with the New Deal, which placed a high

⁸² See Christine Jolls et al., *A Behavioral Approach to Law and Economics*, *Stan. L. Rev.* (1998).

⁸³ See Krier and Noll.

premium on ensuring regulatory choices by people immersed in the subject at hand.⁸⁴

In this light, Slovic's findings can be brought in close contact with Justice Stephen Breyer's discussion of risk regulation,⁸⁵ probably the most influential treatment among students of law. Breyer urges, quite plausibly, that the regulatory state suffers from poor priority-setting. In his view, government is devoting a lot of resources to small problems, and spending too little time and effort on large problems.⁸⁶ Breyer urges the creation of a new body of risk specialists, with expertise in many fields.⁸⁷ The task of the specialists would be to reallocate resources from small problems to large ones.

Breyer offers an impressive analysis of the problem of poor priority-setting, and he provides a promising institutional correction. In many ways Breyer calls for a kind of newer New Deal—a system of administration run in substantial part by technocrats, subject of course to democratic override. But his book says almost nothing about how people think about risks.⁸⁸ With reference to Slovic's findings, Breyer's analysis might well be criticized on the ground that ordinary people would distrust any body of risk specialists, on the ground that they were unlikely to be sufficiently responsive to their concerns. Perhaps more interestingly, Breyer's approach might be criticized on the ground that the sheer numbers cannot tell us whether a problem is "large" or "small." People are reasonably concerned about a range of other variables. This is a large thrust of Slovic's work.

In the end, however, Slovic's findings seem to me mostly supportive of Breyer's analysis; indeed Slovic provides strong cognitive ammunition for Breyer's diagnosis and even his remedy. Slovic shows that ordinary people make many mistakes in thinking about the risks associated with various activities. He also shows that much of the time, people treat safety as a kind of "all or nothing" matter, are vulnerable to the "zero risk mentality," overreact to small signals of dangers, and in some domains show excessive optimism. In these circumstances, a sensible system of risk regulation will not respond mechanically to what people think; it will impose large filters on the public's own conception of appropriate priority-setting.

⁸⁴ See James Landis, *The Administrative Process* (1925).

⁸⁵ Breyer, *supra* note.

⁸⁶ *Id.* at 10-29.

⁸⁷ *Id.* at 59-68.

⁸⁸ Breyer does offer a brief treatment of cognitive factors. See *id.* at 16.

But there are two grounds for objecting to a purely technocratic approach to risk regulation. The first emerges from analysis of some of the qualitative factors that Slovic highlights. Some deaths are particularly bad, and these deserve unusual attention. When it is especially easy to avoid certain risks, government should not spend a great deal of time and effort in response. It would indeed be obtuse to treat all risks as if they were the same, regardless of context and quality. But it remains true that a sensible society is greatly concerned to ensure that people have longer and healthier lives, and that if policies lead government to spend a lot on small problems, and little on large problems, something is amiss. Note in this regard that a more sensible allocation of resources could save tens of thousands of lives, tens of billions of dollars, or both.⁸⁹

The second criticism of a purely technocratic approach involves people's likely reaction to it. To work well, a regulatory system needs public support and confidence, even if we do not believe that a lack of confidence would be fully rational. To the extent that government relies on statistical evidence alone, it is unlikely to promote its own goals. Partly this is because people will assess that evidence in light of their own motivations and their limited cognitive capacities. Regulators who are alert to the importance of both confidence and trust will do what they can to provide information in a way that is well-tailored to how people think about risk—and that tries to educate people when their usual ways of thinking lead them astray. In some circumstances, an understanding of how people think will lead government toward approaches that technocrats, insensitive to Slovic's findings, will not have on their view screen. We might say that good technocrats need to know not only economics and science, but psychology as well.

But the most important lesson of this book seems to me to lie elsewhere. Because of predictable features of human cognition, people's intuitions are unreliable,⁹⁰ and they are prone to blunder about the facts. As we have seen, these blunders have harmful consequences for regulatory policy. To be effective, regulators must be aware of perceived risk, not only actual risk. But for purposes of policy, what is most important, most of the time, is actual risk rather than perceived risk. The task for the future is to respond to people's values, not to their errors.

⁸⁹ See Tammy Tengs and John Graham, *The Opportunity Costs of Haphazard Social Investments in Life-Saving*, in *Risks, Costs, and Lives Saved* 167, 172-74 176 (Robert Hahn ed. 1996).

⁹⁰ See the discussion of System 1 and System 2 in Kahneman and Frederick, *supra* note.

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