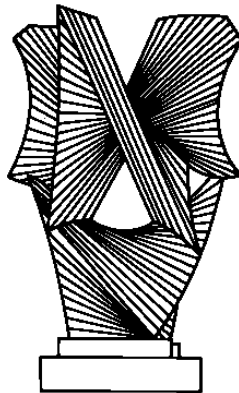


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## COGNITION AND COST-BENEFIT ANALYSIS

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# Cognition and Cost-Benefit Analysis

*Cass R. Sunstein\**

“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 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.”<sup>1</sup> Joseph Biden

Many people have argued for cost-benefit analysis on economic grounds.<sup>2</sup> On their view, a primary goal of regulation is to promote economic efficiency, and cost-benefit analysis is admirably well-suited to that goal. Arguments of this kind have met with sharp criticism from those who reject the efficiency criterion<sup>3</sup> or who believe that in practice, cost-benefit analysis is likely to produce a kind of regulatory paralysis.<sup>4</sup>

In this essay I offer support for cost-benefit analysis, not from the standpoint of conventional economics, but on grounds associated with cognitive psychology and behavioral economics. My basic suggestion is that cost-benefit analysis is best defended as a means of overcoming predictable problems in individual and social cognition. Most of these problems might be collected under the general heading of *selective attention*. Cost-benefit analysis should be understood as a method for putting “on screen” important social facts that might otherwise escape private and public attention. Thus understood, cost-benefit analysis is a

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<sup>1</sup> 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).

<sup>2</sup> See, e.g., W. Kip Viscusi, *Fatal Tradeoffs: Public & Private Responsibilities for Risk* (1992); W. Kip Viscusi, *Risk Equity*, *J. Legal Stud.* (forthcoming 2000).

<sup>3</sup> See Elizabeth Anderson, *Value in Ethics and Economics* (1993).

<sup>4</sup> See, e.g., Thomas O. McGarity, *Reinventing Rationality: The Role of Regulatory Analysis in the Federal Bureaucracy* (1991).

way of ensuring better priority-setting and of overcoming predictable obstacles to desirable regulation, whatever may be our criteria for deciding the hardest questions about that topic.

Of course much of the controversy over cost-benefit analysis stems from the difficulty of specifying, with particularity, what that form of analysis entails. None of the cognitive points made here supports any particular understanding of cost-benefit analysis. Certainly I do not mean to embrace the controversial and indeed implausible proposition that all regulatory decisions should be made by aggregating private willingness to pay, as if economic efficiency is or should be the goal of all regulation.<sup>5</sup> I will attempt instead to provide an understanding of cost-benefit analysis that is agnostic on large issues of the right and the good, and that can attract support from people with diverse theoretical commitments, or with uncertainty about the appropriate theoretical commitments.<sup>6</sup> In this sense I attempt to produce an *incompletely theorized agreement* on a certain form of cost-benefit analysis—an agreement on a form of cost-benefit analysis to which many different people, with diverse and competing views, should be willing to subscribe. This is partly an attempt to respond to the most natural objection to my principal claim here, an objection that would stress the possibility that cognitive problems would reappear in the values that end up being associated with various states of affairs.

The paper is organized as follows. In sections I, II, and III, I seek to defend the general idea of cost-benefit analysis, not as embodying any sectarian conception of value, but as a way of overcoming predictable problems in understanding risks to life and health at both the individual and social levels. In section IV, I briefly attempt to specify what cost-benefit analysis might be understood to entail. My goal is to show how this method, conceived in a particular way, might attract support from people with varying conceptions of the good and the right, including, for example, neoclassical economists and those who are quite skeptical about some normative claims in neoclassical economics, and including those who do and who do not take private preferences, and willingness to pay, as the proper foundation for regulatory policy. In other

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<sup>5</sup> See Matthew Adler and Eric A. Posner, Rethinking Cost-Benefit Analysis, 109 Yale L.J. (forthcoming 1999); Cass R. Sunstein, Free Markets and Social Justice ch. 9 (1997); Amartya Sen, The Discipline of Cost-Benefit Analysis, J. Legal Stud. (forthcoming 2000) ; Matthew Adler and Eric A. Posner, J. Legal Stud. (forthcoming 2000). See, in particular, Amartya Sen, Rationality and Social Choice, 85 Am. Econ. Rev. 1, 17 (1995) (“There are plenty of social choice problems in all this, but in analyzing them, we have to go beyond looking only for the best reflection of given individual preferences, or the most acceptable procedures for choices based on those preferences.”) (emphasis in original).

<sup>6</sup> See Adler & Posner, Rethinking Cost-Benefit Analysis, *supra* note, which is in the same general spirit as this essay, and from which I have learned a great deal. See also Amartya Sen, The Discipline of Cost-Benefit Analysis, J. Legal Stud. (forthcoming 2000), which seems to me in the same basic family.

words, I try to show how a certain understanding of cost-benefit analysis might contain considerable appeal precisely because it overcomes problems in individual cognition, and do so without taking a stand on controversial issues about the ultimate goals of regulation and law.

#### A. A Tale of Two Tables

Let us begin with two simple tables. It is well known that there is a great deal of variability in national expenditures per life saved. Consider the following, which has come to define many discussions of these problems<sup>7</sup>:

Table 1: Cost Per Life Saved

<b>Cost-Effectiveness of Selected Regulations</b>		
<b>Regulation</b>	<b>Agency</b>	<b>Cost per premature death averted (\$ millions 1990)</b>
Unvented Space Heater Ban	CPSC	0.1
Aircraft Cabin Fire Protection Standard	FAA	0.1
Auto Passive Restraint/Seat Belt Standards	NHTSA	0.1
Steering Column Protection Standard	NHTSA	0.1
Underground Construction Standards	OSHA-S	0.1
Trihalomethane Drinking Water Standards	EPA	0.2
Aircraft Seat Cushion Flammability Standard	FAA	0.4
Alcohol and Drug Control Standards	FRA	0.4
Auto Fuel-System Integrity Standard	NHTSA	0.4
Standards for Servicing Auto Wheel Rims	OSHA-S	0.4
Aircraft Floor Emergency Lighting Standard	FAA	0.6
Concrete & Masonry Construction Standards	OSHA-S	0.6
Crane Suspended Personnel Platform Standard	OSHA-S	0.7
Passive Restraints for Trucks & Buses (Proposed)	NHTSA	0.7
Side-Impact Standards for Autos (Dynamic)	NHTSA	0.8
Children's Sleepwear Flammability Ban	CPSC	0.8
Auto Side Door Support Standards	NHTSA	0.8
Low Altitude Windshear Equipment & Training Standards	FAA	1.3
Electrical Equipment Standards (Metal Mines)	MSHA	1.4
Trenching and Excavation Standards	OSHA-S	1.5

<sup>7</sup> Based on data from Office of Management and Budget, Budget of the United States Government Fiscal Year 1992 Pt 2, 370 Tbl C-2 (GPO 1991).

<b>Cost-Effectiveness of Selected Regulations</b>		
<b>Regulation</b>	<b>Agency</b>	<b>Cost per premature death averted (\$ millions 1990)</b>
Traffic Alert and Collision Avoidance (TCAS) Systems	FAA	1.5
Hazard Communication Standard	OSHA-S	1.6
Side-Impact Standards for Trucks, Buses, and MPVs (Proposed)	NHTSA	2.2
Grain Dust Explosion Prevention Standards	OSHA-S	2.8
Rear Lap/Shoulder Belts for Autos	NHTSA	3.2
Standards for Radionuclides in Uranium Mines	EPA	3.4
Benzene NESHAP (Original: Fugitive Emissions)	EPA	3.4
Ethylene Dibromide Drinking Water Standard	EPA	5.7
Benzene NESHAP (Revised: Coke Byproducts)	EPA	6.1
Asbestos Occupational Exposure Limit	OSHA-H	8.3
Benzene Occupational Exposure Limit	OSHA-H	8.9
Electrical Equipment Standards (Coal Mines)	MSHA	9.2
Arsenic Emission Standards for Glass Plants	EPA	13.5
Ethylene Oxide Occupational Exposure Limit	OSHA-H	20.5
Arsenic/Copper NESHAP	EPA	23.0
Hazardous Waste Listing for Petroleum Refining Sludge	EPA	27.6
Cover/Move Uranium Mill Tailings (Inactive Sites)	EPA	31.7
Benzene NESHAP (Revised: Transfer Operations)	EPA	32.9
Cover/Move Uranium Mill Tailings (Active Sites)	EPA	45.0
Acrylonitrile Occupational Exposure Limit	OSHA-H	51.5
Coke Ovens Occupational Exposure Limit	OSHA-H	63.5
Lockout/Tagout	OSHA-S	70.9
Asbestos Occupational Exposure Limit	OSHA-H	74.0
Arsenic Occupational Exposure Limit	OSHA-H	106.9
Asbestos Ban	EPA	110.7
Diethylstilbestrol (DES) Cattlefeed Ban	FDA	124.8
Benzene NESHAP (Revised: Waste Operations)	EPA	168.2
1,2 Dichloropropane Drinking Water Standard	EPA	653.0
Hazardous Waste Land Disposal Ban (1 <sup>st</sup> 3 <sup>rd</sup> )	EPA	4,190.4
Municipal Solid Waste Landfill Standards (Proposed)	EPA	19,107.0
Formaldehyde Occupational Exposure Limit	OSHA-H	86,201.8
Atrazine/Alachlor Drinking Water Standard	EPA	92,069.7
Hazardous Waste Listing for Wood-Preserving Chemicals	EPA	5,700,000

This table should be taken with many grains of salt.<sup>8</sup> It does not contain nearly all of the benefits from regulation, including those that fall short of mortalities averted (including illnesses averted, benefits for animals, and aesthetic and recreational gains). An adequate cost-benefit analysis would certainly take those benefits into account. We will shortly see that the table depends on many contentious assumptions, above all involving the appropriate discount rate; modest changes in the discount rate can greatly reduce the expenditures and the disparities. But at the very least, the table creates a presumption that the current system of regulation suffers from serious misallocation of resources. It also suggests that with better allocations, we could obtain large gains. Indeed, a recent study finds that it would be possible to save the same number of lives that we now save with tens of billions of dollars left over—and that better priority-setting could save 60,000 lives, and 636,000 life-years, annually at the same price.<sup>9</sup>

What is the source of the misallocations? Interest-group power undoubtedly plays a substantial role, as well-organized groups are able to obtain measures in their interest or to fend off measures that would harm them, and as poorly organized ones typically fail. Indeed, cost-benefit analysis might be defended partly as a corrective to interest-group power, operating as it might as a kind of technocratic check on measures that would do little good or even produce net harm (and also on measures that do much less good than they should).<sup>10</sup> But officials are of course responsive not only to interest groups but also to general public pressures, and thus part of the answer must lie in the distinctive judgments of ordinary people, who do not assess risks through a well-informed cost-benefit lens. Indeed, divergences between expert and lay assessments of risks have been demonstrated in many places. Consider this comparison.<sup>11</sup>

Table 2: Rating health risks

<b>Public</b>	<b>EPA Experts</b>
1. Hazardous waste sites	Medium-to-low
2. Exposure to worksite chemicals	High
3. Industrial pollution of waterways	Low

<sup>8</sup> See Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 *Yale L.J.* 1981 (1998).

<sup>9</sup> See Tammy O. Tengs & John D. Graham, *The Opportunity Costs of Haphazard Social Investments in Life-Saving*, in *Risks, Costs, and Lives Saved* 167, 172-74 (Robert W. Hahn ed., 1996).

<sup>10</sup> Of course it is possible that the content of the cost-benefit test will reflect interest-group power.

<sup>11</sup> See Stephen G. Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* 21 (1993).

<b>Public</b>	<b>EPA Experts</b>
4. Nuclear accident radiation	Not ranked
5. Radioactive waste	Not ranked
6. Chemical leaks from underground storage tanks	Medium-to-low
7. Pesticides	High
8. Pollution from industrial accidents	Medium-to-low
9. Water pollution from farm runoff	Medium
10. Tap water contamination	High
11. Industrial air pollution	High
12. Ozone layer destruction	High
13. Coastal water contamination	Low
14. Sewage-plant water pollution	Medium-to-low
15. Vehicle exhaust	High
16. Oil spills	Medium-to-low
17. Acid rain	High
18. Water pollution from urban runoff	Medium
19. Damaged wetlands	Low
20. Genetic alteration	Low
21. Non-hazardous waste sites	Medium-to-low
22. Greenhouse effect	Low
23. Indoor air pollution	High
24. X-ray radiation	Not ranked
25. Indoor radon	High
26. Microwave oven radiation	Not ranked

The EPA itself has found that EPA policies are responsive not to expert judgments, but to lay assessments of risks.<sup>12</sup> Indeed, EPA policies track ordinary judgments extremely well.

If we put together these two tables, we can suggest a general hypothesis. The government currently allocates its limited resources poorly, and it does so partly because it is responsive to ordinary judgments about the magnitude of risks. A government that could insulate itself from misinformed judgments could save tens of thousands of lives and tens of billions of dollars annually. Let us attempt to be more specific about the cognitive problems that help account for current problems.

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<sup>12</sup> See *id.*

## I. Six Problems in the Public Demand for Regulation

For the moment, I attempt no controversial specification of cost-benefit analysis and understand the term broadly to refer to a regulatory method that calls for regulators to identify, and make relevant for purposes of decision, the good effects and the bad effects of regulation, and to quantify those as much as possible in terms of both dollar equivalents and life-years saved, hospital admissions prevented, workdays gained, and so forth. Let us also assume that cost-benefit analysis, thus understood, can accommodate distributional factors, by, for example, giving distributional weights to certain adverse effects, or by assuming uniform numbers for various goods (such as increased longevity) so as to ensure that they do not vary in accordance with wealth.

It is obvious that people, including government officials, often lack risk-related information; they may not know the nature of the health risks at issue, nor may they know the adverse consequences of risk reduction. By itself this point argues for cost-benefit analysis, simply as a means of producing the relevant information. The public demand for regulation is often based on misunderstandings of facts.<sup>13</sup> But put this obvious point to one side. Why, exactly, might people's judgments about risk and risk regulation go badly wrong?<sup>14</sup> There are six points here.

### A. *The Availability Heuristic*

The first problem is purely cognitive: the use of the *availability heuristic* in thinking about risks.<sup>15</sup> It is well-established that people tend to think that events are more probable if they can recall an incident of its occurrence.<sup>16</sup> Consider, for example, the fact that people typically think that more words, on any given page, will end with the letters "ing," than have "n" as the second-to-last letter (though a moment's reflection shows that this is not possible).<sup>17</sup> With respect to risks,

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<sup>13</sup> A colorful discussion is Barry Glassner, *The Culture of Fear: Why Americans are Afraid of the Wrong Things* (1999).

<sup>14</sup> Some of these problems may infect market behavior as well, and when this is so there is a problem with using private willingness to pay as the basis for regulation, since private willingness to pay will (by hypothesis) be based on a misunderstanding of the facts. But markets contain some safeguards against these errors, through the budget constraint and opportunities for learning, and in any case the form of cost-benefit analysis that I support would not rest on mistaken factual judgments, as discussed in more detail below.

<sup>15</sup> See Roger G. Noll & James E. Krier, *Some Implications of Cognitive Psychology for Risk Regulation*, 19 *J. Legal Stud.* 747, 749-760 (1990).

<sup>16</sup> See Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, in *Judgment Under Uncertainty: Heuristics and Biases* 3, 11 (Daniel Kahneman, Paul Slovic & Amos Tversky eds., 1982) (describing the availability heuristic).

<sup>17</sup> Amos Tversky & Daniel Kahneman, *Extensional Versus Intuitive Reasoning: The Conjunction Fallacy in Probability Judgment*, 90 *Psychol. Rev.* 293, 295 (1983).

judgments are typically affected by the availability heuristic, so that people overestimate the number of deaths from highly publicized events (motor vehicle accidents, tornadoes, floods, botulism), but underestimate the number from less publicized sources (stroke, heart disease, stomach cancer).<sup>18</sup> Similarly, much of the concern with nuclear power undoubtedly stems from its association with memorable events, including Hiroshima, Chernobyl, and Three-Mile Island.

To the extent that people lack information, or base their judgments on mental short-cuts that produce errors,<sup>19</sup> a highly responsive government is likely to blunder. Cost-benefit analysis is a natural corrective, above all because it focuses attention on the actual effects of regulation, including, in some cases, the existence of surprisingly small benefits from regulatory controls. To this extent cost-benefit analysis should not be taken as undemocratic, but, on the contrary, should be seen as a means of fortifying (properly specified) democratic goals, by ensuring that government decisions are responsive to well-informed public judgments.

### *B. Aggravating Social Influences: Informational and Reputational Cascades*

The availability heuristic does not, of course, operate in a social vacuum. It interacts with emphatically social processes, and in particular with informational and reputational forces.<sup>20</sup> When one person says, through words or deeds, that something is or is not dangerous, he creates an *informational externality*.<sup>21</sup> A signal by some person A will provide relevant data to others. When there is little private information, such a signal may initiate an *informational cascade*, with significant consequences for private and public behavior, and with possibly distorting effects on regulatory policy.<sup>22</sup>

Imagine, for example, that A says that abandoned hazardous waste sites are dangerous, or that A initiates protest activity because such a site is located nearby. B, otherwise skeptical or in equipoise, may go along with A; C, otherwise an agnostic, may be convinced that if A and B share the relevant belief, the belief

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<sup>18</sup> Jonathan Baron, *Thinking and Deciding* 218 (2d ed. 1994).

<sup>19</sup> Other heuristics are likely to be at work, such as the representativeness heuristic, but availability is the most important source of distorted public judgments. See generally Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases* (Daniel Kahneman, Paul Slovic & Amos Tversky eds., 1982).

<sup>20</sup> I draw in this section on Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 *Stan. L. Rev.* 683 (1999).

<sup>21</sup> See Andrew Caplin & John Leahy, *Miracle on Sixth Avenue: Information Externalities and Search*, 108 *Econ. J.* 60 (1998).

<sup>22</sup> See Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 *Stan. L. Rev.* 683, 720 (1999).

must be true; and it will take a confident D to resist the shared judgments of A, B, and C. The result of this set of influences can be social cascades, as hundreds, thousands, or millions of people come to accept a certain belief simply because of what they think other people believe.<sup>23</sup> There is nothing fanciful to the idea. Cascade effects help account for the existence of widespread public concern about abandoned hazardous waste dumps (a relatively trivial environmental hazard), and in more recent years, they spurred grossly excessive public fears of the pesticide Alar, of risks from plane crashes, and of dangers of shootings in schools in the aftermath of the murders in Littleton, Colorado. Such effects recently helped produce massive dislocations in beef production in Europe in connection with “mad cow disease”; they are currently giving rise to growing European fear of genetic engineering of food.

On the reputational side, cognitive effects may be amplified as well.<sup>24</sup> If many people are alarmed about some risk, you may not voice your doubts about whether the alarm is merited, simply in order not to seem obtuse, cruel, or indifferent. And if many people believe that a certain risk is trivial, you may not disagree through words or deeds, lest you appear cowardly or confused. The result of these forces can be cascade effects, mediated by the availability heuristic. Such effects can produce a public demand for regulation even though the relevant risks are trivial. At the same time, there may be little or no demand for regulation of risks that are, in fact, quite large in magnitude. Self-interested private groups can exploit these forces, often by using the availability heuristic. Consider the fact that European companies have tried to play up fears of genetically engineered food as a way of fending off American competition.

Cost-benefit analysis has a natural role here. If it is made relevant to decision, it can counteract cascade effects induced by informational and reputational forces, especially when the availability heuristic is at work. The effect of cost-benefit analysis is to subject a public demand for regulation to a kind of technocratic scrutiny, to ensure that the demand is not rooted in myth, and to ensure as well that government is regulating risks even when the public demand (because insufficiently informed) is low. And here too there is no democratic problem with the inquiry into consequences. If people’s concern is fueled by informational forces having little reliability, and if people express concern even though they are not fearful, a governmental effort to “cool” popular reactions is hardly inconsistent with democratic ideals. Similarly, there is

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<sup>23</sup> See David Hirshleifer, *The Blind Leading the Blind: Social Influence, Fads, and Informational Cascades*, in *The New Economics of Human Behavior* 188 (Mariano Tommasi & Kathryn Ierulli eds., 1995).

<sup>24</sup> See *id.* at 727.

nothing undemocratic about a governmental effort to divert resources to serious problems that have not been beneficiaries of cascade effects.

### *C. Dangers On-Screen, Benefits Off-Screen*

Why are people so concerned about the risks of nuclear power, when experts tend to believe that the risks are quite low—lower, in fact, than the risks from competing energy sources, such as coal-fired power plants, which produce relatively little public objection? Why do they believe that small risks from pesticides should be regulated, even if comparatively small risks from X-rays are quite tolerable?

Suggestive answers come from research suggesting that for many activities that pose small risks but that nonetheless receive public concern, people perceive low benefits as well as high risks.<sup>25</sup> For example, nuclear power itself is seen as a low-benefit, high-risk activity. Similar findings appear for some activities that are in fact relatively high-risk: a judgment of “low risk” accompanies a judgment of “high benefits.” The very fact that they are known to have high benefits skews judgment in their favor, and hence makes people understate the costs as well.

The obvious conclusion is that sometimes people favor regulation of some risks because the underlying activities are not seen to have compensating benefits.<sup>26</sup> Thus for some activities, tradeoffs are not perceived at all. Dangers are effectively on-screen, but benefits are off-screen. Note that this is not because such activities do not, in fact, have compensating benefits. It is because of a kind of perceptual illusion.

An important factor here is *loss aversion*. People tend to be loss averse, which means that a loss from the status quo is seen as more undesirable than a gain is seen as desirable.<sup>27</sup> In the context of risk regulation, the consequence is that any newly introduced risk, or any aggravation of existing risks, is seen as a serious problem, even if the accompanying benefits (a gain from the status quo and hence perceived as less salient and less important) are considerable.<sup>28</sup> Thus when

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<sup>25</sup> The fact that nuclear power, and application of pesticides, produce benefits as well as risks may not “register” on the lay viewscreen, and this may help produce a “high risk” judgment. See Ali Siddiq Alhakami and Paul Slovic, A Psychological Study of the Inverse Relationship Between Perceived Risk and Perceived Benefit, 14 Risk Analysis 1085, 1088 (1994).

<sup>26</sup> See Howard Margolis, *Dealing With Risk* (1996), for a detailed discussion of how this point bears on the different risk judgments of experts and lay people.

<sup>27</sup> See Richard H. Thaler, The Psychology of Choice and the Assumptions of Economics, in *Quasi Rational Economics* 137, 143 (Richard H. Thaler ed., 1991) (arguing that “losses loom larger than gains”); Daniel Kahneman, Jack L. Knetsch, and Richard H. Thaler, Experimental Tests of the Endowment Effect and the Coase Theorem, 98 J. Pol. Econ. 1325, 1328 (1990); Colin Camerer, Individual Decision Making, in John H. Kagel and Alvin E. Roth, eds, *The Handbook of Experimental Economics* 665-670 (1995).

<sup>28</sup> For some policy implications of loss aversion, see Jack L. Knetsch, Reference States, Fairness, and Choice

a new risk adds danger, people may focus on the danger itself, and not on the benefits that accompany the danger. And an important problem here is that in many cases where dangers are on-screen and benefits off-screen, the magnitude of the danger is actually quite low. Cost-benefit analysis can be a corrective here, by placing the various effects on-screen.

#### *D. Systemic Effects and “Health-Health Tradeoffs”*

Often people focus on small pieces of complex problems, and causal changes are hard to trace. Consider an analogy. The German psychologist Dietrich Dorner has done some illuminating computer experiments designed to see whether people can engage in successful social engineering.<sup>29</sup> Participants are asked to solve problems faced by the inhabitants of some region of the world. Through the magic of the computer, many policy initiatives are available to solve the relevant problems (improved care of cattle, childhood immunization, drilling more wells). But most of the participants produce eventual calamities, because they do not see the complex, system-wide effects of particular interventions. Only the rare participant can see a number of steps down the road—to understand the multiple effects of one-shot interventions on the system.

Often regulation has similar systemic effects. A decision to regulate nuclear power may, for example, increase the demand for coal-fired power plants, with harmful environmental consequences.<sup>30</sup> A decision to impose fuel economy standards on new cars may cause a “downsizing” of the fleet, and in that way increase risks to life. A decision to ban asbestos may cause manufacturers to use less safe substitutes. Regulation of tropospheric ozone may control the health dangers of ozone, but ozone has various benefits as well, including protection against cataracts and skin cancer; hence regulation of ozone may cause health problems equal to those that it reduces.<sup>31</sup> Indeed, regulation of ozone will

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of Measure to Value Environmental Changes, in *Environment, Ethics, and Behavior: The Psychology of Environmental Valuation and Degradation* 52, 64-65 (Max H. Bazerman, David M. Messick, Ann E. Tenbrunsel & Kimberly A. Wade-Benzoni eds., 1997).

<sup>29</sup> See Dietrich Dorner, *The Logic of Failure: Why Things Go Wrong and What We Can Do to Make Them Right* (1996).

<sup>30</sup> See Stephen Breyer, *Vermont Yankee and the Court’s Role in the Nuclear Energy Controversy*, 91 *Harv. L. Rev.* 1833, 1835-90 (1978). See generally Peter Huber, *Electricity and the Environment: In Search of Regulatory Authority*, 100 *Harv. L. Rev.* 1002 (1987).

<sup>31</sup> See Randall Lutter & Christopher Wolz, *UV-B Screening by Tropospheric Ozone: Implications for the NAAQS*, 31 *Envl. Sci. & Tech.* 142A, 144A (1997) (estimating that the EPA’s new ozone NAAQS could cause 25 to 50 more melanoma skin cancer deaths and increase the number of cataract cases by 13,000 to 28,000 each year). See also Ralph L. Keeney & Kenneth Green, *Estimating Fatalities Induced by Economic Impacts of EPA’s Ozone and Particulate Standards 8* (Reason Public Policy Institute, Policy Study No. 225, June 1997) (calculating that if attainment of the new standards costs \$10 billion annually, a number well within EPA’s estimated cost range, it will contribute to 2,200 premature deaths annually). On the general

increase electricity prices, and because higher electricity prices will deprive poor people of air conditioning or lead them to use it less, such regulation may literally kill people.<sup>32</sup>

These are simply a few examples of situations in which a government agency is inevitably making “health-health tradeoffs” in light of the systemic effects of one-shot interventions. Indeed, any regulation that imposes high costs will, by virtue of that fact, produce some risks to life and health, since “richer is safer.”<sup>33</sup> A virtue of cost-benefit analysis is that it tends to overcome people’s tendency to focus on parts of problems, by requiring them to look globally at the consequences of apparently isolated actions.

### *E. Emotions and Alarmist Bias*

A set of data now suggests that people are subject to “alarmist bias.”<sup>34</sup> The mere existence of discussions of new risks can aggravate concern, even when the discussions take the form of assurances that the risk level is relatively low. And when presented with information suggesting that a risk may range from A (low) to Z (high), the high risk number is especially salient, and it appears to have a disproportionate effect on behavior.

A recent paper by George Loewenstein et al. suggests that risk-related concerns are often based on “feelings” rather than judgments.<sup>35</sup> Thus risk-related objections can be a product not so much of thinking as of intense emotions, often produced by extremely vivid images of what might go wrong. This point is supported by evidence that reported feelings of worry are sometimes sensitive not to the probability of the bad outcome, but only to the severity of the bad outcome.<sup>36</sup> Vivid mental pictures of widespread death or catastrophe can drive a demand for risk regulation. Consider, for example, the motivations of those who press for regulation of airplane safety in the aftermath of an airplane crash, even though such regulation may increase travel risks on balance (by driving up the

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phenomenon, see John D. Graham and Jonathan Baert Wiener, *Risk Versus Risk* (1995).

<sup>32</sup> See C. Boyden Gray, *The Clean Air Act Under Regulatory Reform*, 11 *Tulane Env'tl L.J.* 235 (1998).

<sup>33</sup> John D. Graham, Bei-Hung Chang, & John S. Evans, *Poorer Is Riskier*, 12 *Risk Analysis* 333, 333-35 (1992); Frank B. Cross, *When Environmental Regulations Kill: The Role of Health-Health Analysis*, 22 *Ecol. L. Q.* 729 (1995); Ralph L. Keeney, *Mortality Risks Induced by the Costs of Regulations*, 8 *J. Risk & Uncertainty* 95 (1994); Aaron Wildavsky, *Richer is Safer*, 60 *Pub. Interest* 23 (1980); Aaron Wildavsky, *Searching for Safety* 59-75 (1988).

<sup>34</sup> See W. Kip Viscusi, *Alarmist Decisions with Divergent Risk Information*, 107 *Econ. J.* 1657, 1657-58 (1997) (studying situations under which “[n]ew information about risks may generate alarmist actions that are not commensurate with the magnitude of the risks”).

<sup>35</sup> See Loewenstein, G. F., Weber, E. U., Hsee, C. K. & Welch, E. S., *Risk as Feelings* (unpublished draft 5/4/99).

<sup>36</sup> Loewenstein, Weber, Hsee, & Welch, *Draft* at 12.

price of flying and causing a shift to driving, a more dangerous form of transportation).<sup>37</sup>

It is important to be careful with the relevant categories here. There is no sharp distinction between “cognition” and “emotion.”<sup>38</sup> Emotions are generally the products of beliefs, and hence an emotional reaction to risk—terror, for example—is generally mediated by judgments.<sup>39</sup> But this is not always true; sometimes the operation of the brain allows intense emotional reactions with minimal cognitive activity.<sup>40</sup> In any case the judgments that fuel emotions may be unreliable. We need not venture into controversial territory in order to urge not that emotions are free of cognition, but that some risks seem to produce extremely sharp, largely visceral reactions. These reactions are sometimes largely impervious to argument. Indeed, experience with “mass panics” has shown exactly this structure, as assurances based on statistical evidence have little effect in the face of vivid images of what might go wrong.<sup>41</sup> Some fears even appear to have a genetic foundation; consider, as a possible example, fear of snakes, which appears in people who have no reason to think that snakes are dangerous.

The role of cost-benefit analysis is straightforward here. Just as the Senate was designed to have a “cooling effect” on the passions of the House of Representatives, so cost-benefit analysis might ensure that policy is driven not by hysteria or alarm, but by a full appreciation of the effects of relevant risks and their control. If the hysteria survives an investigation of consequences, then the hysteria is fully rational, and an immediate and intensive regulatory response is entirely appropriate.

Nor is cost-benefit analysis, in this setting, only a check on unwarranted regulation. It can and should serve as a spur to regulation as well. If risks do not produce visceral reactions, partly because the underlying activities do not yield vivid mental images, cost-benefit analysis can show that they nonetheless warrant regulatory control. The elimination of lead in gasoline is a case in point.<sup>42</sup>

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<sup>37</sup> See Robert W. Hahn, *The Economics of Airline Safety and Security: An Analysis of the White House Commission's Recommendations*, 20 *Harv. J.L. & Pub. Pol'y* 791 (1997).

<sup>38</sup> See Dan M. Kahan & Martha C. Nussbaum, *Two Conceptions of Emotion in the Criminal Law*, 96 *Colum. L. Rev.* 269 (1996); Jon Elster, *Alchemies of the Mind* (1999).

<sup>39</sup> See Martha Nussbaum, *Upheavals of Thought* (forthcoming); Elster, *supra* note.

<sup>40</sup> See Loewenstein et al., *supra*.

<sup>41</sup> See the discussion of Love Canal in Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 *Stan. L. Rev.* 683, 691-98 (1999).

<sup>42</sup> See *Economic Analyses at EPA: Assessing Regulatory Impact* (Richard D. Morgenstern ed., 1997).

### *F. Separate Evaluation and Incoherence*

Suppose that you are asked to say, without reference to any other problem, how much you would be willing to pay to protect certain threats to coral reefs. Now suppose that you are asked to say, without reference to any other problem, how much you would pay to protect against skin cancer among the elderly. Suppose, finally, that you are asked to say how much you would be willing to pay to protect certain threats to coral reefs and how much you would be willing to pay to protect against skin cancer among the elderly. Empirical evidence suggests that people's answers to questions, taken in isolation, are very different from their answer to questions when they are asked to engage in cross-category comparisons.<sup>43</sup> It appears that when people assess problems in isolation, they do so by reference to other problems in the same basic category—and that this intuitive process is dramatically altered when people are explicitly told to assess problems from other categories as well. The result of assessing individual problems, taken in isolation, is to produce what people would themselves consider a form of incoherence.

The forms of regulatory spending shown in Table I undoubtedly reflect, in part, the kinds of irrationality that follow from judgments that are made without close reference to other problems from different categories. Incoherence is the natural result of the relevant cognitive processes. The argument for a form of cost-benefit analysis is straightforward: It operates as a built-in corrective to some of the distortions that come from taking problems in isolation. The point applies to “contingent valuation” assessments; but it operates more broadly with respect to expenditure decisions that otherwise risk incoherence, simply by virtue of the fact that they operate without looking at other problems, including those from other categories.

### *G. General Implications*

The cognitive argument for cost-benefit analysis, thus understood, is now in place. It is true but obvious to say that people lack information and that their lack of information can lead to an inadequate or excessive demand for regulation, or a form of “paranoia and neglect.”<sup>44</sup> What is less obvious is that predictable features of cognition will lead to a demand for regulation that is unlikely to be based on the facts. When people ask for regulation because of fears fueled by availability cascades, and when the benefits from the risk-producing activity are not

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<sup>43</sup> See Daniel Kahneman, David Schkade, Iliana Ritov, & Cass R. Sunstein, *Reversals of Judgment: The Effect of Cross-Category Comparisons on Intendedly Absolute Responses* (unpublished manuscript 1999).

<sup>44</sup> See John D. Graham, *Making Sense of Risk: An Agenda for Congress*, in *Risks, Costs, and Lives Saved: Getting Better Results from Regulation* 183 (Robert W. Hahn ed., 1996).

registering, it would be highly desirable to create cost-benefit filters on their requests. When interest-groups exploit cognitive mechanisms to create unwarranted fear or diminish concern with serious problems, it is desirable to have institutional safeguards. When people fail to ask for regulation for related reasons, it would be desirable to create a mechanism by which government might nonetheless act if the consequences of action would be desirable. Here too cost-benefit balancing might be desirable, as in fact it has proved to be in connection not only with the phase-out of lead but also with the Reagan Administration's decision to phase-out CFC's, motivated by a cost-benefit analysis suggesting that the phase-out would do far more good than harm.<sup>45</sup>

A caveat: It is entirely possible that the public demand for regulation will result from something other than cognitive errors, even if the relevant risk seems low as a statistical matter. People may think, for example, that it is especially important to protect poor children from a certain risk in a geographically isolated area, and they may be willing to devote an unusually large amount to ensure that protection. What seems to be a cognitive error may turn out, on reflection, to be a judgment of value, and a judgment that can survive reflection. I will return to this point. For the moment note two simple points. Whether an error is involved is an empirical question, subject, at least in principle, to empirical testing. And nothing in cost-benefit analysis would prevent people from devoting resources to projects that they consider worthy, even if the risk is relatively low as a statistical matter.

I have not yet discussed what cost-benefit analysis might specifically entail, and there are potentially serious controversies here. But it will be best to discuss that question after dealing with some direct objections.

## II. Objections: Populism, Quantification, and Rival Rationalities

The argument made thus far, cautious though it may seem, runs into three obvious objections. The first involves democratic considerations; the second points to the limitations of quantification; the third involves the possibility that ordinary people's judgments are based not on cognitive limitations, but on a kind of "rival rationality."

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<sup>45</sup> See Economic Analysis at EPA, *supra* note 33. See also Richard Elliot Benedick, *Ozone Diplomacy: New Directions in Safeguarding the Planet* 63 (1991) (Reagan administration supported aggressive regulation largely because cost-benefit analysis from the Council of Economic Advisers demonstrated that "despite the scientific and economic uncertainties, the monetary benefits of preventing future deaths from skin cancer far outweighed costs of CFC controls as estimated either by industry or by EPA").

### *A. Populism*

The first objection, populist in character, is captured by the opening quotation from Senator Biden. The objection would be that in a democracy, government properly responds to the social “demand” for law. Government does not legitimately reject that demand on the ground that cost-benefit analysis suggests that it should not act. On this view, a democratic government should be accountable. Any approach that uses efficiency, or technocratically-driven judgments, as a brake on accountability is fatally undemocratic.

The problem with this objection is that it rests on a controversial and even unacceptable conception of democracy, one that sees responsiveness to citizens’ demands, whatever their factual basis, as the foundation of political legitimacy. If those demands are uninformed, it is perfectly appropriate for government to resist them. Indeed, it is far from clear that reasonable citizens want, or would want, their government to respond to their uninformed demand. The analysis thus far suggests that the relevant demands are, in fact, uninformed or unreflective. If this is so, they should be subject to deliberative constraints of the sort exemplified by cost-benefit analysis. After that analysis has been generated, and public officials have taken it into account, democratic safeguards continue to be available, and electoral sanctions can be brought to bear against those who have violated the public will. The simple point is that if, once informed of the cost-benefit tradeoff, people continue to seek some particular regulation, then democratic considerations require government to restrict their choice.<sup>46</sup> At the very least, cost-benefit analysis should be an ingredient in the analysis, showing people that the consequences of various approaches might be different from what they seem.

### *B. Quantification and Expressive Rationality*

I have noted that the cost-benefit chart described above raised many questions. Those questions might be made into a thoroughgoing challenge to cost-benefit analysis. In an extensive discussion, Lisa Heinzerling has attempted to do precisely that.<sup>47</sup> Heinzerling argues that many of the values depend on controversial judgments of value, and that the table itself masks those judgments. Her first point is that the table includes many regulations that were in fact rejected. Some of them were not issued on the ground that their benefits would exceed their costs. The table is also underinclusive, for many regulations have been issued that impose dramatically lower costs than many of those included on the table. But by itself this is no indictment of cost-benefit analysis. Indeed, it

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<sup>46</sup> At least assuming the decisions involve nothing peculiar or invidious, such as racial animus.

<sup>47</sup> See Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 Yale L.J. 1981 (1998).

provides support for cost-benefit analysis insofar as it suggests that the tool has resulted in a rejection of undesirable regulations.

But Heinzerling goes further. She contends that many of these numbers depend on controversial judgments about how to discount future benefits. Above all, the charts depend on a 10% discount rate, whereas the agencies tended to use a lower discount rate, or not to discount at all. Heinzerling also suggests that the charts depend on downward adjustment of the agency's estimates of risk. Her own estimates result in the following risk table, adjusted for inflation.

Table III: Corrected (?) Table on Cost-Effectiveness of Regulations

<b>Regulation</b>	<b>Adjusted Cost Estimate (Thousands of 1995 dollars)</b>
Asbestos (OSHA 1972)	\$700
Benzene (OSHA 1985)	\$2,570
Arsenic/Glass Plant (EPA 1986)	\$6,610
Ethylene Oxide (OSHA 1984)	\$3,020-\$5,780
Uranium Mill Tailings/Inactive (EPA 1983)	\$2,410
Acrylonitrile (OSHA 1978)	\$8,570
Uranium Mill Tailings/Active (EPA 1983)	\$3,840
Coke Ovens (OSHA 1976)	\$12,420
Asbestos (OSHA 1986)	\$3,860
Arsenic (OSHA 1978)	\$24,490
Arsenic/Los-Arsenic Copper (EPA 1986)	\$5,740
Land Disposal (EPA 1986)	\$3,280
Formaldehyde (OSHA 1985)	\$31,100

This table may be more accurate than Table I; certainly there are problems with any approach that assumes a 10% discount rate. But even if Heinzerling's table is better, it offers an ironic lesson, serving largely to confirm the point that current regulatory policy suffers from poor priority-setting. The disparities here are not as dramatic, and they certainly do not establish pervasive overregulation; but they do support the view that resources are being misallocated.

Heinzerling does not, however, conclude that this revised table is the appropriate basis for evaluating regulatory policy. Her aim is not to come up with a better table from which to reassess government behavior. On the contrary, she takes her argument to be a basis for rejecting cost-benefit analysis altogether.

This, then, is a lesson about “the perils of precision.”<sup>48</sup> Heinzerling also suggests that it “would be better if we left the picture blurry, and declined to connect the dots between all the confusing and sometimes conflicting intuitions and evidence.”<sup>49</sup> She is concerned that “some, probably many, people will be fooled into believing that numerical estimates of risks, costs, and benefits are impartial reflections of factual reality, in which case the likely result of increased reliance on quantification in setting regulatory policy will be that the side that best obscures the value choices implicit in its numbers will prevail.”<sup>50</sup>

There is considerable truth here; but I think that Heinzerling’s lesson is overdrawn. Truth first: If an agency says that the cost of regulation is one hundred million dollars, and the benefit seventy million dollars, we still know much less than we should. It is important to know who bears these costs, and if possible with what consequences. Will wages be lower? Whose wages? Will prices be higher? Of what products? A disaggregated picture of the benefits would also be important; what does the seventy million dollar figure represent? Consider, for example, a recent table explaining that the costs of skin cancer, from health effects of reducing tropospheric ozone, are between \$290 million and \$1.1 billion, with dollar subtotals for skin cancers and cataracts.<sup>51</sup> By itself, this table is insufficiently informative to tell people what they need to know.

Heinzerling is therefore on firm ground if she means to suggest that the dollar numbers cannot substitute for a fuller inquiry into what is at stake. Any cost-benefit analysis should include more than the monetary values by, for example, showing what the values are about, such as life-years saved and accidents averted (see the Appendix for illustrations). But her own table suggests that the general conclusion—that cost-benefit analysis can illuminate and discipline inquiry—remains unassailable. If regulation ranges from tens of thousands to tens of millions per life saved, at least there is a presumptive problem. One of the functions of cost-benefit balancing is to help show where limited resources should go. In fact there is much to be gained from attempting to quantify various effects, to the extent that this is possible. A regulation of particulates is hard to evaluate without knowing, for example, the number of deaths averted and the range of consequences for morbidity: How many work-

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<sup>48</sup> *Id.* at 2042.

<sup>49</sup> *Id.* at 2069.

<sup>50</sup> *Id.* at 2068.

<sup>51</sup> See Randall Lutter & Christopher Wolz, UV-B Screening by Tropospheric Ozone: Implications for the NAAQS, 31 *Envtl. Sci. & Tech.* 142A, 145 (1997). In fairness to the authors, it should be noted that a previous table in their essay describes adverse health effects in quantitative terms by listing the numbers of cases averted.

days will be saved that would otherwise be lost? How many hospitalizations will be avoided? How many asthma attacks will be prevented? It could even be useful to attempt to describe these effects in terms of “quality-adjusted life years,”<sup>52</sup> knowing that here too, a good analyst will go back and forth between bottom lines and the judgments that go into their creation.

I suspect that there may be theoretical claims behind Heinzerling’s skepticism about quantification. She may believe that many of the goods at stake in regulation (human and animal life and health, recreational and aesthetic opportunities) are not merely commodities, that people do not value these goods in the same way that they value cash, and that cost-benefit analysis, by its reductionism, is inconsistent with people’s reflective judgments about the issues at stake. Arguments of this sort have been developed in some philosophical challenges to cost-benefit analysis.<sup>53</sup>

Such arguments are convincing if cost-benefit analysis is taken to suggest a controversial position in favor of the commensurability of all goods—if cost-benefit is seen to insist that people value environmental amenities, or their own lives, in the same way that they value a bank account, or if cost-benefit is taken as a metaphysical claim to the effect that all goods can be aligned along a single metric, or if five lives saved is seen as the same, in some deep sense, as \$20-\$30 million saved. Part of what people express, in their daily lives, is a resistance to this form of commensurability, and some goods are believed to have intrinsic as well as instrumental value.<sup>54</sup> The existence of qualitative differences among goods fortifies the claim that any “bottom line” about costs and benefits should be supplemented with a more qualitative description of the variables involved. But cost-benefit analysis should not be seen as embodying a reductionist account of the good, and much less as a suggestion that everything is simply a “commodity” for human use. It is best taken as pragmatic instrument, agnostic on the deep issues and designed to assist people in making complex judgments where multiple goods are involved. To put it another way, cost-benefit analysis might be assessed pragmatically, or even politically, rather than metaphysically.

We should conclude that the final number may provide less information than the ingredients that went into it, and that officials should have and present cost-benefit analysis in sufficiently full terms to enable people to have a concrete sense of the effects of regulation. This is an argument against some

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<sup>52</sup> See Richard H. Pildes & Cass R. Sunstein, *Reinventing the Regulatory State*, 62 U. Chi. L. Rev. 1 (1995); *American Trucking Ass’n v. EPA*, 1999 WL 300618 (D.C. Cir. May 14, 1999).

<sup>53</sup> See Elizabeth Anderson, *Value in Ethics and Economics* (1993).

<sup>54</sup> See *id.*

overambitious understandings of what cost-benefit balancing entails. But it is not an argument against cost-benefit balancing.

### *C. Rival Rationalities*

The final objection to the discussion thus far is the most fundamental. On this view, cost-benefit analysis is not desirable as a check on ordinary intuitions, because those intuitions reflect a kind of “rival rationality.” Ordinary people have a complex understanding of what it is that they want to maximize. They do not simply tabulate lives saved; they ask questions as well about whether the relevant risk is controllable, voluntary, dreaded, equitably distributed, and potentially catastrophic. Consider the Table 4.

Some people suggest that to the extent that ordinary people disagree with experts, they have a “thicker” or “richer” rationality, and that democracy should respect their judgments.<sup>55</sup> On a more moderate view, government’s task is to distinguish between lay judgments that are products of factual mistakes (produced, for example, by the availability heuristic), and lay judgments that are products of judgments of value (as in the view that voluntarily incurred risks deserve less attention than those that are involuntarily occurred ones).<sup>56</sup> In any case the “psychometric paradigm” is designed show how ordinary people’s judgments are responsive to an array of factors other than lives saved.<sup>57</sup>

Table 4: Aggravating and mitigating factors in risk judgments

<b>Risk Traits</b>	<b>Aggravating</b>	Mitigating
Familiarity	New	Old
Personal control	Uncontrollable	Controllable
Voluntariness	Involuntary	Voluntary
Media attention	Heavy media coverage	Ignored by media
Equity	Unfairly distributed	Equitably distributed
Children	Children at special risk	Children not at risk
<b>Future generations</b>	Future generations at risk	Future generations not at risk

<sup>55</sup> See Paul Slovic, Baruch Fischhoff & Sarah Lichtenstein, Regulation of Risk: A Psychological Perspective, in *Regulatory Policy and the Social Sciences* 241 (Roger G. Noll ed., 1985);

<sup>56</sup> See Richard H. Pildes & Cass R. Sunstein, Reinventing the Regulatory State, 62 *U. Chi. L. Rev.* 1 (1995).

<sup>57</sup> See Paul Slovic, Trust, Emotion, Sex, Politics and Science: Surveying the Risk Assessment Battlefield, 44 *U. Chi. Leg. F.* 59 (1997).

Reversibility	Irreversible	Reversible
Identifiability of victims	Victims known	Victims not identifiable
Accompanying benefits	Benefits clear	Benefits invisible
Source	Human origin	Created by nature
Trust in relevant institutions	Low trust in relevant institutions	High trust in relevant institutions
Timing of adverse effects	Effects delayed	Effects immediate
Understanding	Mechanisms poorly understood	Mechanisms understood
Precedents	History of accidents	No past accidents

One problem with this view is that it may not be a criticism of cost-benefit analysis at all; it may suggest only that any judgment about benefits and costs (whether or not based on willingness to pay) will have to take account of people's divergent assessments of divergent risks. In principle, there is no problem with doing exactly that. There is, however, reason to question the now-conventional view that qualitative factors of this kind in fact explain people's disagreement with experts about certain risks of death. In fact I do not believe that the "psychometric paradigm" can defend its own central claims. The first point is technical. In the relevant studies, the key factors—voluntariness, controllability, potentially catastrophic nature—have not been generated spontaneously or independently by subjects. Instead those who conduct the relevant research ask people to rank risks along these dimensions. From this information it cannot be said that ordinary people think that these qualitative differences justify departing from the "lives saved" criterion. The evidence is simply too indirect.

Now this does not mean that the "rival rationalities" view is wrong. There is independent evidence to suggest that people consider some deaths to be worse than others.<sup>58</sup> They are apparently willing to pay more, for example, to prevent a cancer death than to prevent an unforeseen instant death, and there is some evidence that voluntarily incurred risks receive less social concern than risks that are involuntarily incurred. Distributional judgments also appear to play some role in assessments about how to allocate scarce resources. But these points raise further questions.<sup>59</sup>

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<sup>58</sup> Some of the data is collected in Cass R. Sunstein, *Bad Deaths*, 14 *J. Risk & Uncertainty* 259 (1997).

<sup>59</sup> I draw heavily in the next pages from *id.*; Margolis, *supra* note, contains an excellent discussion of this

No doubt it is *possible* that people's judgments about risk severity are a product of some of the more qualitative considerations listed above; this idea leads to the widespread view that ordinary people have a "richer" rationality than do experts, since ordinary people look at the nature and causes of death, not simply at aggregate deaths at issue. But it is also possible that an apparently "rich" judgment that a certain risk is severe, or not severe, depend not on well-considered judgments of value, but instead on an absence of ordinary contextual cues, on a failure to see that tradeoffs are inevitably being made, on heuristic devices that are not well-adapted to the particular context, or instead on a range of confusing or confused ideas that people cannot fully articulate. When people say, for example, that the risk of nuclear power is very serious, they may be responding to their intense visceral concern, possibly based on (uninformed) statistical judgments about likely lives at risk and on their failure to see (as they do in other contexts) that that risk is accompanied by a range of social benefits. Thus it is possible that a judgment that a certain risk of death is unusually bad is not a "rich" qualitative assessment but an (unreliable) intuition based on a rapid balancing that prominently includes perceived lives at stake and the perceived presence of small or no benefits associated with the risk-producing activity.

Thus the question becomes whether citizen judgments that certain deaths are especially bad can survive a process of reflection. My conclusion is that understood in a certain way, the notions of dreaded deaths and unfairly distributed deaths are fully reasonable and deserve a role in policy. But the special concerns about deaths stemming from involuntarily run and uncontrollable risks raise serious doubts; as frequently invoked, they do not justify according additional concern to deaths that "code" as a product of involuntary or uncontrollable risks. At most, they suggest that government might spend more resources on deaths where the cost of risk-avoidance is especially high, and devote less attention to deaths where the cost of risk-avoidance is especially low.

### *1. Dread*

It is often said, on the basis of evidence like that outlined above, that especially dreaded deaths deserve special attention. Deaths from cancer and AIDS fall in this category. There is nothing at all mysterious to this idea. The underlying point is probably that the relevant deaths are especially grueling and hence there is a kind of "pain and suffering premium"—not merely a life lost, but an antecedent period of intense emotional and physical difficulty as well. This period of intense difficulty might impose costs on those with the illness and on friends and family members as well. Sudden, unanticipated deaths can be

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point, from which I have learned a great deal.

dreaded too—consider the extremely unpleasant idea of dying in an airplane crash. But the dread here stems from some factor (perhaps terror) different from and much shorter than the extended period of suffering that precedes some deaths. Thus it might be concluded that dreaded deaths deserve special attention in accordance with the degree of suffering that precedes them. A special problem with cancer deaths is that at least some of the time, people like to have upward-sloping utility. It is particularly bad to be in a situation in which things will constantly get worse.<sup>60</sup> With cancer deaths, the slope goes downward fairly consistently until the point of death.

## 2. *Voluntariness*

People seem to perceive voluntarily incurred risks as less troublesome than involuntarily incurred risks. Consider diverse public reactions to airplane crashes and automobile crashes. Or consider the fact that tobacco is by far the largest source of preventable deaths in the United States. Why do we not devote much more of our regulatory effort to reducing smoking? The reason seems to lie in a judgment that smoking is a voluntary activity and hence the resulting deaths are less troublesome than other sorts of deaths. Here—it might be said—people have voluntarily assumed the relevant risks.

### *a. Puzzles: high cost of avoidance rather than involuntariness?*

It is tempting to think that the apparent lay preference for according greater weight to “involuntary” risks to life requires significant qualification of the criterion of lives or life-years saved. But a simple reference to voluntariness, if taken to suggest something special about “lay rationality,” raises many puzzles. The most important problem is that it is not simple to know when a risk is voluntarily incurred. “Voluntariness” may be entirely absent in the case of an unforeseeable collision with an asteroid; but voluntariness is not, in the cases under consideration, an all-or-nothing matter. Instead it is a matter of degree. Return to the conventional thought that airplane crashes are “involuntary” and automobile crashes more “voluntary.” Certainly it would be possible to see the risks from air travel as voluntarily run; people have a choice about whether to fly, and when they do fly, they pay a certain amount for a certain package, including risks of various sorts. The same is true of automobile safety—and it is not in any way less true, however disparately the two kinds of risks may “seem.” Perhaps people are responding to the perceived fact that they have no control over the pilot’s behavior, whereas they have considerable control over automobile safety since they are themselves drivers. But airlines respond to

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<sup>60</sup> See George Loewenstein & Nachom Sicherman, Do Workers Prefer Increasing Wage Profiles?, 9 J. Lab. Econ. 67, 71-75 (1991); George Loewenstein & Drazen Prelec, Negative Time Preference, 81 Am. Econ. Rev. (Papers & Proc.) 347, 347 (1991).

market forces, including the market for safety, and many people injured in automobile accidents are not at fault, and thus along the dimension of voluntariness this is hardly a crisp distinction. The difference between the two risks is hardly so categorical as to justify an assessment that they fall on poles of some voluntariness-involuntariness divide. Indeed, it is not clear even what is meant by the suggestion that one is voluntary and the other is not. Something else appears to underlie that suggestion.

*b. Three cases*

To shed some light on the issue, let us consider three classes of cases. First, consider the question whether workers exposed to cancer risks are voluntarily or involuntarily so exposed. If workers do not know about such risks—if they lack relevant information—we seem to have an easy case of involuntariness. Thus it makes sense to say that risks are run involuntarily when the people running them do not know about them. Lack of adequate information provides a legitimate case for a judgment of involuntary exposure to risk. But of course information itself can be obtained at some cost, pecuniary or otherwise. We are thus dealing, in cases of this kind, with high costs of risk avoidance, in the distinctive form of high costs of acquiring relevant information.

Second, suppose that people who are exposed to a certain risk are aware of the risk, but are not in an actual or potential contractual relation with the risk-producer. Many victims of pollution are in this position; recall that in surveys air pollution is a particular source of public concern. People in Los Angeles may well know that they face high levels of smog. Are they exposed involuntarily? If we conclude that they are, we may mean that a risk is incurred involuntarily when and in the sense that it is typically very expensive for people to avoid it—and when someone else can reduce the risks more cheaply. Here a claim that the risk is faced “involuntarily” may mean that those who “run” the risk can reduce it only at very high cost, at least compared to those who “produce” the risk. (The quotation marks are necessary for obvious Coasian reasons.) Or it is possible that we mean that on nonutilitarian grounds, the people exposed to the risk have a moral entitlement to be free from it, at least if they have not explicitly sold it.

But turn now to a third class of cases, involving a wage package or contract that does include compensation for the relevant risks. Assuming that point, we might want to distinguish between two different possibilities. In a case of a high-level scientist, knowledgeable about relevant risks and involved in work that he finds rewarding, people may well conclude that we have an instance of voluntariness. (In the same category can be found the case of an astronaut.) But people might not say the same about a low-level worker who does not like his work at all (cf. Anderson, 1993). What distinguishes the two cases? If knowledge is present, or if the compensation package includes payment for the relevant risk,

it is not clear how the two differ. The underlying judgment must be that the compensation is inadequate, perhaps because background inequality has produced a wage package that seems unfair even if voluntarily chosen by the parties.

From this discussion it seems reasonable to speculate that any judgment that a risk is run “involuntarily” is probably based on 1) a lack of knowledge of the risk, or, more accurately, high costs of obtaining information about the risk, 2) a belief that information to one side, it would be very costly for people to avoid the risk, or 3) a belief that the risk is unaccompanied by compensating benefits, notwithstanding their belief that the contract is in some sense worth signing. It may seem hard to make sense of 3); what might be at work is a judgment that background inequalities are producing the relevant bargain (not by itself a good reason to disrupt the deal), or perhaps a belief that workers are competing to their collective detriment, and an agreement not to compete would be in their best interests. On this view, the question whether a risk is run voluntarily or not is often not a categorical one but instead a question of degree, associated with information cost, risk-reduction cost, and the existence or not of accompanying benefits. Of course there are interesting background questions about why and when a risk “codes” as voluntary or involuntary; undoubtedly the answer depends a great deal on heuristic devices and selective attention.

*c. The purpose for which the risk is incurred and problems of responsibility and blame*

Death-risks may seem “voluntarily” run when people do not approve of the purpose for which people run the relevant risks, and involuntarily run when people think that the purpose for which the risk is run is laudable. It is predictable that people will not want to pour enormous taxpayer resources into lowering the risks associated with sky-diving, even if the dollars/life-years saved ratio is quite good. By contrast, it is doubtful that people think that it is wrong to spend enormous resources on the prevention of death from childbirth or being a police officer, even though the decision to have a child is (with appropriate qualifications) voluntary, and so too with the decision to become a police officer. People may think that when the appeal or purpose of the activity is associated with its very riskiness, resources should not be devoted to risk-reduction. At least this is plausible when the risk is an independent good or part of the benefit of the activity. And it is easy to imagine a belief that some activities—unsafe sex, cigarette smoking—are like the sky-diving case, perhaps because the risk is sometimes part of the benefit, perhaps because the risks are not incurred for a purpose that observers find worthy or valuable.

It might seem that this consideration—the purpose for which the risk is incurred—overlaps with or is even identical to the question whether there are high costs of risk-avoidance. When the costs are low, as in sky-diving, the

purpose might seem inadequate. But on reflection the two ideas are hardly the same. It may well be that failing to sky-dive, or sky-diving with some safety-increasing technology, imposes high costs on sky-divers. There seems to be an objective judgment, not necessarily connected with subjective costs, in the claim that some risks are voluntary, or deserve less attention, because they are run for inadequate purposes.

Relatedly, airplane accidents may seem different from automobile accidents not because the former are less voluntary, and not because of diverse costs of risk avoidance, but because the victims of airplane accidents are less blameworthy than the victims of automobile accidents, in the sense that the death is not a product of their own negligence or misconduct. In the case of an airplane disaster, weather conditions, mechanical failure, or pilot error are likely causes; in the case of an automobile accident, it is more likely (though not of course certain) that the victim could have avoided death through more careful driving. The point is crude, since many victims of automobile accidents are not drivers, and many drivers in accidents do not behave negligently. But the perceived difference, in a significant number of cases, may underlie an apparent judgment of “voluntariness” that is really a judgment about responsibility and blameworthiness. In any case judgments are likely to be affected, and distorted, by the fact that drivers seem to be risk optimists—with 90% ranking themselves as safer than the average driver and less likely to be involved in an accident.<sup>61</sup> This is another place—illusions of control and risk optimism—where cognitive psychology argues in favor of cost-benefit analysis.

*d. Underlying questions and assumption of risk*

We might therefore conclude that whether a risk qualifies as involuntary raises many of the questions raised by the question whether government should regulate the market at all. A risk might be characterized as involuntarily run because affected people lack relevant information; because the transactions costs of bargaining are high; because the risks should be seen to amount to externalities; because collective action problems make market outcomes unsatisfactory since (for example) workers are in a prisoner’s dilemma best solved through law; or because some motivational or cognitive defect makes successful solutions through markets unlikely. These of course are among the conventional grounds for regulation in the first instance. When a risk seems voluntary, and not worthy of substantial regulatory resources, the term “voluntary” is serving as a placeholder for an argument that there is no sufficient ground for government action, because the accompanying benefits are high or

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<sup>61</sup> See Shelley E. Taylor, *Positive Illusions* 10 (1994).

the risk-reduction costs are low, and because market arrangements take adequate account of these facts.

Should voluntarily run risks of death receive no public attention, on the ground that the relevant people have already received compensation? We might imagine a death-risk to be incurred voluntarily when an informed person decided to incur it in light of its costs and benefits. Suppose, for example, that someone purchases a small car with fewer safety features, or decides to become a boxer, an astronaut, or a police officer in a dangerous neighborhood. If a death results from such a choice, it might seem that the chooser has no legitimate ground for complaint; there has been *ex ante* compensation for the risk. But even in such cases, it is not clear that government lacks a role. If government can reduce a serious risk at low cost, and thus eliminate deaths, it should do so even if there was *ex ante* compensation for the relevant risk. There is a general point here. Sometimes observers confuse two quite different questions: (1) Should people be banned from running a certain risk, when they have run that risk voluntarily? (2) Should government attempt to reduce a certain risk, when people have run that risk voluntarily? A negative answer to question (1) does not answer question (2).

From this point we should conclude that a lay judgment that a risk is “voluntary” should not be decisive. A better understanding of what factors underlie and support that judgment should be used for purposes of regulatory policy. The basic criterion of decently livable life years might, then, be adjusted upward when those at risk lack relevant information or when the costs of risk-avoidance are especially high—or downward when those at risk have the information and when the costs of risk-avoidance are low.

### *3. Ripple Effects*

The psychological evidence suggests, though it does not squarely identify, an important and relevant fact: Some deaths produce unusually high externalities, in the sense that they generate widespread losses, including those stemming from empathy and fear, in a way that leads to predictable pecuniary and nonpecuniary costs. Consider, for example, the death of the President of the United States, a death that imposes a wide range of costs and that taxpayers invest significant resources to prevent. Part of the reason for allocating those resources is undoubtedly the greater risk that the President will be murdered; but the external costs associated with his death are undoubtedly important too. A parallel can be found in the relatively large level of resources devoted to prevent the assassination of many important public officials. But the point is hardly limited to the highest public officials. An airplane hijacking or crash, partly because it is likely to be well-publicized, may produce large externalities in the

form of empathy and fear. It may even deter air travel by making people unusually frightened of air travel, simply because of heuristic devices (availability) and other predictable factors that make people's probability assessments go awry. This fear may be damaging because it is itself a utility loss and because it may lead people to use less safe methods of transportation, such as automobiles. Or an airplane crash might be especially disturbing because the sudden loss of dozens or hundreds of people seems so unusually and senselessly tragic, in a way that produces large empathetic reactions, or because it signals the further possibility of random, apparently inexplicable events in which large numbers of people die.

Some catastrophes are especially disturbing because they appear to produce pointless and especially unnatural deaths. A recent airplane crash in Israel, killing over seventy soldiers, is an example, producing an extended period of national mourning—stemming from the youth of those who were killed, the fact that they were serving their country, and the highly unusual character of the accident, apparently stemming from preventable human error. These considerations suggest that special attention might justifiably be devoted to air safety in the time following a crash even if the relevant precautions do not cause a significant drop in deaths. The same idea may justify special safeguards of nuclear reactors. Even a minor and harmless accident may produce a kind of day-to-day fearfulness that properly places a role in an official calculus, at least if educative efforts cannot work against public fears to the extent that they are irrational or based on error-producing heuristic.

Special public concern about catastrophic events may thus reflect a judgment that certain kinds of deaths have ancillary effects, well beyond the deaths themselves. Consider in this regard the "Buffalo Creek Syndrome," documented several times in the aftermath of major disasters. Nearly two years after the collapse of a dam that left 120 dead and 4000 homeless, psychiatric researchers continued to find significant psychological and sociological changes; survivors were characterized by a loss of direction and energy, other disabling character changes, and a loss of communality.<sup>62</sup> One evaluator attributed this loss of direction specifically to "the loss of traditional bonds of kinship and neighborliness."<sup>63</sup> The non-linearity of lay evaluations of risk in the context of potential disasters may thus reflect a high premium on avoiding the distinctive kinds of losses distinctly associated with catastrophes. If so, differences between

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<sup>62</sup> Daniel Fiorino, Technical and Democratic Values in Risk Analysis, 9 *Risk Analysis* 293 (1989).

<sup>63</sup> Daniel Fiorino, Technical and Democratic Values in Risk Analysis, 9 *Risk Analysis* 293, 295 (1989). See also J.D. Robinson, M.D. Higgins, & P.K. Bolyard, Assessing Environmental Impacts on Health: A Role for Behavioral Science, 4 *Envir. Impact Assessment Rev.* 41 (1983).

lay and expert assessments rest on genuine value differences (four times as many deaths may be much more than four times as bad) rather than on factual errors in cognitive processes of ordinary people.

These various points raise a number of questions. We do not yet have a full understanding of the basis for special public concern with catastrophes. Moreover, the argument for devoting special resources to deaths with externalities is strongest when the externalities do not reflect irrationality or cannot be reduced through other means. For example, some of the fear that follows certain widely reported deaths is based on confusion or ignorance about actual probabilities; if it is possible to dispel the confusion, the fear should dissipate as well. Here the question is whether government can legitimately spend extra resources to avert the harms associated with irrational public attitudes. Perhaps information-based strategies would be preferable to allocating additional resources to deaths whose occurrence produces widespread panic. On the other hand, there are undoubtedly instances in which information is ineffective, and there are also cases in which high externalities, in the form of special fear, are not a product of factual ignorance. In such cases government is justified in giving additional resources to death-prevention.

#### *4. Inequitable Distribution*

Some risks might be, or be thought to be, inequitably distributed, above all because the victims are disproportionately members of socially disadvantaged groups. Certain deaths might, for example, be concentrated among poor people, African-Americans, or homosexuals. Consider the risk of lead paint poisoning suffered by inner city children, or the risk of AIDS, faced disproportionately by African-Americans as well as homosexuals. Citizens or elected representatives may think that inequitably distributed risks of death deserve special attention from government. Here the relevant deaths are bad not because each one is especially bad to experience, but because there is social concern about the fact that a certain cause of death falls disproportionately on members of certain social groups.

When such social concern exists, and when it is not objectionable on constitutional or other grounds, it is entirely legitimate for officials to respond.<sup>64</sup> Thus regulators should be permitted to use a uniform number per life or life-years saved; this is itself a (modest) redistributive strategy, because wealthy people (simply because they are wealthy) are willing to pay more to reduce risks than nonwealthy people. Regulators might also be permitted to give *distributional*

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<sup>64</sup> It is inadequate to respond that potential compensation could be made to losers in the context of efficient programs; if the compensation is only potential, the concern remains.

*weights* to risks whose distributional incidence is especially troublesome.<sup>65</sup> These weights might take a technical form (through adding numbers to the ones that would otherwise be used) or appear via the official judgment about how to proceed after the cost-benefit analysis has been supplied (through deciding in favor of a strategy not strictly suggested by the numbers). The distributional concern supports special efforts to control AIDS; environmental risks like asthma, which are concentrated among inner city children; and perhaps the spread of diseases whose incidence is concentrated among women. My minimal claim is that if there is a public judgment in favor of according a distributional weight to a certain death-reduction policy, and if that judgment is not unconstitutional or otherwise illegitimate, policy makers should not be barred from respecting that judgment.

### *5. No Rival Rationality*

I conclude that there is no “rival rationality,” and that people are willing to depart from the “lives saved” criterion for reasons that cast a clearer light on what it is that they are attempting to maximize. More particularly:

a. People are willing to pay a premium to avoid deaths that involve a high degree of pain and suffering. At least presumptively, this desire, or judgment, should be respected by government regulators; the presumption might be rebutted if, for example, the “premium” seems so high as to suggest that some kind of irrationality is at work.

b. People are willing to devote more resources to protect children. This judgment may depend on a belief that children are typically more vulnerable to risk, in the sense that they cannot protect themselves, or on a belief that more life-years are at stake when children are in jeopardy. In either case, this judgment too deserves respect.

c. People are willing to pay a premium to avert catastrophes. This may depend on a belief that catastrophes have “ripple effects” that outrun lives actually lost. A plane crash killing 100 people may be worse than 100 deaths from poor diet, if the consequence of the former is to create pervasive fear and anxiety. A shooting in a high school may warrant special attention, keeping lives saved constant, if only in order to ensure that students and parents are not constantly fearful about the safety of schools. These “ripple effects” qualify as social costs and at first

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<sup>65</sup> See the critical comments about willingness to pay in Amartya Sen, *The Discipline of Cost-Benefit Analysis*, *J. Legal Stud.* (forthcoming 2000), and in Matthew Adler and Eric A. Posner, *J. Legal Stud.* (forthcoming 2000).

glance seem to deserve special attention. The major qualification is that it may be possible to address them directly, rather than to cater (pander?) to them. Suppose, for example, that education can assure the public that flying is generally quite safe. If information can accomplish this end, it is better to provide it than to engage in regulation that is costly and that has no purpose other than to reassure.

d. People are willing to devote more resources to protect against dangers when the costs of risk avoidance are high. Perhaps people do not have information about certain risks, and perhaps information is costly to obtain. Perhaps third parties are in danger, and perhaps it is costly for them to avoid the danger. This point may involve fairness; it may involve efficiency. It involves fairness if people believe that those who bear high costs from risk avoidance should not, in principle, have to bear those costs. If this is the underlying belief, then it may follow that those who can easily avoid the cost of some risk should, in principle, do exactly that. The point involves efficiency if the judgment is that the best means of reducing aggregate costs (public as well as private) is to regulate the entity that is imposing the relevant risk.

e. People may believe that it is especially important to protect vulnerable or traditionally disadvantaged groups against certain risks. If, for example, AIDS is concentrated among African-Americans and homosexuals, there may be a special reason to devote resources to its prevention, even if quantitatively identical risks receive less attention.

These various points suggest that there is no “rival rationality.” The question is whether people believe that some dangers deserve more attention than (quantitatively identical) others, and if so, whether that belief can survive critical scrutiny. But these points also suggest that it is wrong to think that policy should follow the judgments of experts focussed on the single question of “lives at stake.”<sup>66</sup> This is not the social maxim and for reflective citizens. Such citizens have a different view about what their government ought to be doing. That different view does not embody any exotic conception of rationality.

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<sup>66</sup> This is the apparent recommendation in Margolis, *supra* note, though I am not sure that Margolis would agree with what I am suggesting here.

### III. An Incompletely Theorized Agreement on Cost-Benefit Analysis?

#### *A. Problems With Aggregated Willingness to Pay*

Thus far I have suggested that cost-benefit analysis is a sensible approach to cognitive problems faced by ordinary people in the assessment of risk. I have also suggested that there is no democratic objection to using cost-benefit analysis as an ingredient in decisions, even a crucial ingredient, and that cost-benefit analysis can be understood in a way that responds to reasonable concerns about quantification and about the idea that the only thing to be maximized is total lives saved (or, somewhat better, life-years saved).

But none of this deals with the general question how cost-benefit analysis should be understood. In the least contentious formulation—the formulation that I have used here—cost-benefit analysis is simply a form of open-ended consequentialism, an invitation to identify the advantages and disadvantages of regulation,<sup>67</sup> an invitation that does not say anything about appropriate weights. The virtue of this formulation is that it is uncontentious; the vice is that it is vacuous. People can agree with it, but it does not mean anything. In its most contentious formulation, cost-benefit analysis depends on asking people how much they are “willing to pay” for various goods, and making decisions depend on the resulting numbers.<sup>68</sup> Problems with this approach lie in a possible lack of private information; its possible distributional unfairness (since willingness to pay depends on ability to pay); potential differences between private willingness to pay and public aspirations<sup>69</sup>; and collective action problems of various sorts that might draw into doubt the privately-expressed amounts.<sup>70</sup> It will be worthwhile to spell out these points in a bit more detail.

“Willingness to pay” is a simple way to capture people’s valuations, and for this reason it has practical advantages. Indeed, it is a good place to start, especially in the absence of anything better. But it also suffers from several problems. *First*, willingness to pay may be a product of cognitive and motivational distortions of various kinds. Willingness to pay judgments may be insufficiently informed or reflective with respect to both facts and values. For

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<sup>67</sup> See Amartya Sen, *The Discipline of Cost-Benefit Analysis*, *J. Legal Stud.* (forthcoming 2000); compare the notion of cost-benefit analysis as a decision procedure in Matthew Adler and Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 *Yale L.J.* (forthcoming 1999).

<sup>68</sup> See Richard A. Posner, *Economic Analysis of Law* (5th ed. 1998).

<sup>69</sup> See Daphna Lewinson-Zamir, *Consumer Preferences, Citizen Preferences, and the Provision of Public Goods*, 108 *Yale L.J.* 377 (1999); Cass R. Sunstein, *Free Markets and Social Justice* ch. 2 (1997).

<sup>70</sup> See Daphna Lewinson-Zamir, *Consumer Preferences, Citizen Preferences, and the Provision of Public Goods*, 108 *Yale L.J.* 377 (1999); Amartya Sen, *Environmental Evaluation and Social Choice: Contingent Valuation and the Market Analogy*, 46 *Japanese Econ. Rev.* 23, 29 (1995).

example, people may overstate the risks from various hazards that receive disproportionate media attention. If this is so, it seems odd to base government policy on those judgments.

It is also possible that people will be willing to pay little to avoid some bad X simply because they are used to it and their preferences have adapted accordingly.<sup>71</sup> For example, people may not care about scenic areas simply because they have not been exposed to them. Preferences based on lack of information or adaptation to deprivation are hardly a good basis for regulatory policy. They need not be taken as given and translated into law. In any case private preferences may be a product of social norms over which individuals have little control, by which they live, but which they would like to change if they could. If people are willing to pay little to avoid some risk (for example, of smoking) because of prevailing norms that they would wish changed, willingness to pay is unjustified as a basis for policy, since the norm could be changed through collective action.<sup>72</sup>

*Second*, willingness to pay is imperfectly correlated with utility—at best the first is a proxy for the second—and the two should not be confused in principle. One problem is that poor people are willing to pay less than wealthy people simply by virtue of being poor, and their willingness to pay for something (eg, a reduced mortality risk) is crudely connected with the utility that they would gain from it. In the face of disparities in wealth, willingness to pay should not be identified with expected utility or with the value actually placed on the good in question.<sup>73</sup> *Third*, there is a purely distributive concern.<sup>74</sup> Because poor people have less money than wealthy people, they are willing to pay less for equivalent goods (such as reduced risks to life). The result of the use of willingness to pay would be to produce greater expenditures to protect wealthy people than poor people, a controversial result to say the least.<sup>75</sup> *Fourth*, the willingness to pay criterion will produce losers as well as winners, and many of the losers will go uncompensated; it is scant comfort to say that they *could* be

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<sup>71</sup> See Sen, *supra*; Jon Elster, *Sour Grapes* (1983).

<sup>72</sup> See Cass R. Sunstein, *Free Markets and Social Justice* ch. 2 (1997).

<sup>73</sup> This seems to me a mistake in Viscusi's illuminating discussion, W. Kip Viscusi, *Risk Equity*, *J. Legal Stud.* (forthcoming 2000).

<sup>74</sup> This is a standard point in economic discussions of cost-benefit analysis, though it is ignored in many discussions by economic analysts of law. See, e.g., Richard Tresch, *Public Finance: A Normative Theory* 541 (1981): "In our opinion the distributive question is the single most important issue in all of cost-benefit analysis." Tresch discusses how distributional considerations might be incorporated. See also A. Allan Schmid, *Benefit-Cost Analysis* 157-190 (1989), with a discussion of distributive weights at pp. 170-72.

<sup>75</sup> At least unless poor people are compensated for any losses via side payments.

compensated with side payments or a system of optimal taxation. Hence an attempt to defend cost-benefit analysis by reference to the efficiency criterion, as measured by private willingness to pay, runs into great difficulties, at least unless steps are taken to ensure against distributional bias.<sup>76</sup>

*Fifth*, and finally, there may be differences between the choices people make as consumers and the choices that they make as citizens, and it is not clear that the former should be preferred. The context of citizenship may evoke other-regarding or altruistic values, or preferences, that are not reflected in private choices. This is partly because aggregating private willingness to pay can replicate various collective action problems faced in the private domain; people may be willing to pay more simply because they know that other people are contributing as well.<sup>77</sup> If this is so, it makes no sense to base policy on private willingness to pay, where the collective action problem arises.

In any case we might think that government policy should be based on the reasons given for one or another outcome, and the fact that people are “willing to pay” a lot or a little for some outcome tells us too little about whether good reasons exist. Before discussion, for example, people may be willing to pay a fair bit to discriminate on the basis of sex, and they may be willing to pay little to protect large populations of animals that are at risk. These judgments may change as a result of reason-giving in the public domain. In other words, government is a place for exchanging reasons for one or another course or action. It is not simply a maximizing machine, taking private willingness to pay as the foundation, whatever the source or the grounds of pre-discussion preferences.

A particular problem here is that people may not want to spend a great deal to protect (for example) environmental amenities because they seek to protect their (relative) financial position.<sup>78</sup> A regulatory program supported by all might maintain relative position, which may be what people care about. Current willingness to pay numbers do not take account of this possibility. There is thus good reason for an empirical speculation here, one that suggests that current

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<sup>76</sup> There are some complexities here. Of course markets are ordinarily based on willingness to pay, and poor people are willing to pay less for safety, simply because they have less. Poor people are willing to pay less, as a class and other things equal, for safer cars, safer neighborhoods, and so forth. The aggregated willingness to pay approach simply generalizes this phenomenon; there is nothing unusual about it. Thus a system that assigns uniform values to life embeds a kind of subsidy, or redistribution, to people with relatively less resources or, more precisely, to people with less willingness to pay. A system of uniform values might be thought sufficient to correct any distributional bias in cost-benefits analysis.

<sup>77</sup> See Robert H. Frank, *Choosing the Right Pond: Human Behavior and the Quest for Status* (Oxford University Press) (1985); Lewinsohn-Zamir, *supra*; Amartya Sen, *supra*; Cass R. Sunstein, *Free Markets and Social Justice* (1997).

<sup>78</sup> See Frank, *supra* note.

numbers are far too low. Much further work remains to be done to test whether people would in fact be willing to spend more for safety, or for environmental amenities, if the result would be significant decreases in absolute income but the same relative income.

Nor would it be sensible to disregard the presence of tragic choices, as when cost-benefit analysis leads to a choice of course A over course B, but course A leads to uncompensated losers (a group whose members may suffer from serious illnesses and even death).<sup>79</sup> Perhaps it is possible, in such cases, to restructure social arrangements so as to reduce or eliminate the tragedy. But even if this is so, a cost-benefit analysis, of the sort to be described, can help inform a decision about what tragedy-reducing course to take, and whether such a course is worthwhile at all.

*B. Incomplete Theorization: Cost-Benefit Analysis As Political, Not Metaphysical*

Often it is possible to resolve hard questions of law and policy without resolving deeply contested issues about justice, democracy, or the appropriate aims of the state.<sup>80</sup> Often it is possible to obtain an incompletely theorized agreement on a social practice, and even on the social or legal specification of the practice. In many areas of law and public policy, people can reach closure about what to do despite their disagreement or uncertainty about why, exactly, that ought to do it. Thus people who disagree about the purposes of the criminal law can agree that rape and murder should be punished, and punished more severely than theft and trespass. Thus people can support an Endangered Species Act amidst disagreement about whether the protection of endangered species is desirable for theological reasons, or because of the rights of animals, plants, and species, or because of the value of animals, plants, and species for human beings. A great advantage of incompletely theorized agreements is that they allow people of diverse views to live together on mutually advantageous terms. An even greater advantage is that they allow people of diverse views to show one another a high degree of both humility and mutual respect.

I believe that incompletely theorized agreement is possible here; at least this should be the goal of those attempting to understand the uses of cost-benefit analysis in regulatory policy. For reasons just discussed, it would be difficult to obtain agreement on the view (which seems to me implausible) that all questions of regulatory policy should be resolved by asking how much people are “willing

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<sup>79</sup> See Martha C. Nussbaum, *The Fragility Of Goodness: Luck and Ethics In Greek Tragedy and Philosophy* (1983); Martha Nussbaum, *J. Legal Stud.* (forthcoming 2000).

<sup>80</sup> See Cass R. Sunstein, *Legal Reasoning and Political Conflict* (1996); Cass R. Sunstein, *One Case At A Time* (1999).

to pay” for various social goods.<sup>81</sup> But my basic claims here are that it should be possible for diverse people to agree on presumptive floors and ceilings for regulatory expenditures, and that the presumptions can do a great deal of useful work for policymaking and for law. In short, a great deal can be done without confronting the hardest theoretical questions raised by contentious specifications of cost-benefit analysis.

An obvious question here is: Who could join this incompletely theorized agreement? Who would reject it? My principal claim is that the agreement could be joined by a wide range of reasonable people, including utilitarians and Kantians, perfectionist and political liberals, and those who accept and those who doubt the idea that private willingness to pay is the appropriate foundation for regulatory policy. There is room here for deliberative democrats who emphasize the need for government to reflect on private preferences, rather than simply to translate them into law.<sup>82</sup> A prime purpose of the approach is to ensure more in the way of reflection; cost-benefit analysis, as understood here, is a guarantee of greater deliberation, not an obstacle to it. Nor is the approach rigid. Under the proposed approach, agencies have the authority to abandon the floors and ceilings if there is reason for them to do so. If, for example, agencies want to spend a great deal to protect African-American children from a risk disproportionately faced by them, they are entitled to do so, as long as they explain that this is what they are doing, and so long as what they are doing is reasonable.

### *C. Eight Propositions*

Here, then, are eight propositions, offered in the hope that they might attract support from diverse theoretical standpoints. I do not attempt to defend them in detail here; The goal is to provide a starting point for the effort to anchor cost-benefit analysis in an incompletely theorized agreement about regulatory policies.

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<sup>81</sup> See Matthew Adler and Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 *Yale L.J.* (forthcoming 1999).

<sup>82</sup> Absolutists of various kinds might refuse to join an agreement on these principles. Perhaps their refusal would be most reasonable in the case of the Endangered Species Act, where nothing said below explains why millions of dollars should be spent (at least in opportunity costs) to save members of ecologically unimportant species. It would be possible, however, to imagine a kind of “meta” cost-benefit analysis that would point in this direction, perhaps on the ground that it greatly simplifies decision without imposing high costs overall. For the regulatory issues dealt with here, an absolutist approach seems hard to justify, not least because there are dangers to life and health on both sides of the equation. Note that I am dealing here with environmental and related risks, and hence many of the most contentious issues (e.g., how to treat the wrongdoer’s motivation, or how to deal with rights violators) do not arise. See Sen, *The Discipline of Cost-Benefit Analysis*, *supra*.

1. *Agencies should identify the advantages and disadvantages of proposed courses of action, and also attempt to quantify the relevant effects to the extent that this is possible.* When quantification is not possible, agencies should discuss the relevant effects in qualitative terms, and also specify a range of plausible outcomes, e.g., annual savings of between 150 and 300 lives, or savings of between \$100 million and \$300 million, depending on the rate of technological change. The statement should include the full range of beneficial effects. The problem of particulates and ozone regulation poses some serious difficulties to challengers to cost-benefit analysis (CBA); if the EPA is not to do a form of CBA, what is it to do, concretely?
2. *The quantitative description should supplement rather than displace a qualitative description of relevant effects.* Both qualitative and quantitative descriptions should be provided. It is important to know the nature of the relevant effects, e.g., lost workdays, cancers averted, respiratory problems averted. To the extent possible, the qualitative description should give a concrete sense of who is helped and who is hurt, e.g., whether the beneficiaries are mostly or partly children, whether the regulation will lead to lost jobs, higher prices, more poverty, and so forth. Where the only possible information is speculative, this should be noted, along with the most reasonable speculations.
3. *Agencies should attempt to convert nonmonetary values (involving, for example, lives saved, health gains, and aesthetic values) into dollar equivalents.* This is not because a statistical life and (say) \$5 million are the same thing, but to promote coherence and uniformity and to ensure sensible priority-setting. There is nothing magical or rigid about the dollar equivalents; the conversion is simply a pragmatic tool to guide analysis and to allow informed comparisons.
4. *Agencies entrusted with valuing life and health should be controlled, by statute or Executive Order, via presumptive floors and ceilings.* For example, a statute might say that a statistical life will ordinarily be valued at no less than \$2 million and no more than \$10 million. Evidence of worker and consumer behavior, suggesting a valuation of between \$5 million and \$7 million per statistical life saved, is at least relevant here. The fact that the willingness to pay numbers are in this range is hardly decisive, but it is supplemented by the fact that similar numbers appear to represent the midpoint of agency practice. Thus both market and

governmental measures point in the same basic direction.<sup>83</sup> OMB should establish presumptive floors and ceilings for various regulatory benefits. If an agency is going to spend (say) no more than \$500,000 per life saved, or more than \$20 million, it should have to explain itself. Actual agency practice reveals a mixed record. EPA now values a life at \$4.8 million; some agencies go as high as \$5.6 or as low as \$1; and some agencies do not provide specific numbers at all.

5. *Agencies should be permitted to adjust the ceilings and floors, or to choose a low or high end of the range, on the basis of a publicly articulated and reasonable judgment that such an adjustment or such a choice is desirable.* Perhaps adjustments could be made if, for example, poor people are especially at risk. There should be no adjustments “downwards” for poor people; in other words, the fact that poor people are willing to spend less to protect their own lives (because they are poor) should not call for a correspondingly lower expenditures by government. The principal danger here is that well-organized groups will be able to use equitable arguments on behalf of their preferred adjustments. It is important to ensure a degree of discipline here, and perhaps the dangers of interest-group manipulation are serious enough to suggest that uniform numbers or ranges might be used, or that the presumptions are strong and rebuttable only in the most compelling cases.<sup>84</sup>

6. *Agencies should be permitted to make adjustments on the basis of the various “qualitative” factors discussed above.* For example, they might add a “pain and suffering premium,” or increase the level of expenditure because children are disproportionately affected or because the victims are members of a disadvantaged group. It would be reasonable to conclude that because AIDS has disproportionate adverse effects on homosexuals and poor people, special efforts should be made to ensure against AIDS-related deaths. To the extent possible, they should be precise about the nature of, and grounds for, the relevant adjustments, especially in light of the risk that interest-group pressures will convert allegedly qualitative adjustments in illegitimate directions.<sup>85</sup>

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<sup>83</sup> Note, however, that if relative position is what matters, these numbers may be too low, for reasons stated above.

<sup>84</sup> See Viscusi, Risk Equity, *supra* note.

<sup>85</sup> See *id.*; see also James Hamilton and W. Kip Viscusi, *Calculating Risks* (1999) (showing that allegedly equitable shifts are driven by political pressures not mapping onto any sensible conception of equity).

7. *The appropriate response to social fear not based on evidence, and to related “ripple effects,” is education and reassurance rather than increased regulation.*

Sometimes public concern about certain risks is general and intense, even though the concern is not merited by the facts.<sup>86</sup> The best response is educational; the government should not expend significant resources merely because an uninformed public believes that it should. But if education and reassurance fail, increased regulation may be defensible as a way of providing a kind of reassurance in the face of intense fears, which can themselves impose high costs of various kinds. (Consider, for example, the possibility that people who afraid of risks of plane crashes will shift to driving, a more risky method of transportation; consider also the fact that the fear is itself a cost.)

8. *Unless the statute requires otherwise, judicial review of risk regulation should require a general showing that regulation has produced more good than harm, on a reasonable view about valuation of both benefits and costs.*<sup>87</sup> On this view, courts should generally require agencies to generate and to adhere to ceilings and floors. But they should also allow agencies to depart from conventional numbers (by, for example, valuing a life at less than \$1 million, or more than \$10 million) if and only if the agency has given a reasonable explanation of why it has done so. The ultimate task would be develop a kind of “common law” of cost-benefit analysis, authorizing agencies to be law-making institutions in the first instance.<sup>88</sup>

#### IV. Conclusion

I have suggested that cost-benefit analysis, often defended on economic grounds, can be urged less contentiously on cognitive grounds. Cost-benefit analysis, taken as an inquiry into the consequences of varying approaches to regulation,<sup>89</sup> is a sensible response not only to interest-group power, but also to limited information and to predictable problems in the public demand for regulation. These problems include the use of the availability heuristic; social amplification of that heuristic via cascade effects; a failure to see the benefits that

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<sup>86</sup> See Timur Kuran & Cass R. Sunstein, Availability Cascades and Risk Regulation, 51 Stan. L. Rev. 683 (1999).

<sup>87</sup> See Margolis, *supra* note.

<sup>88</sup> This has started to happen in various areas. See the development of a common law of “risk significance” under OSHA, discussed in Cass R. Sunstein, Is the Clean Air Act Unconstitutional?, Michigan Law Review (forthcoming 1999).

<sup>89</sup> There is no alternative to regulation. What is sometimes described as deregulation, or a failure to regulate, is actually regulation via the common law.

accompany certain risks; a misunderstanding of systemic effects, which can lead to unanticipated bad (and good) consequences; and certain emotional reactions to risks. In all of these areas, an effort to identify costs and benefits can properly inform analysis.

These points do not show how cost-benefit analysis should be specified. Here I have raised questions about the willingness to pay criterion and suggested that at least in principle, it would be obtuse to attempt to assess regulatory proposals via a uniform number for lives saved; but I have also suggested that presumptive ranges, for life as well as other beneficial effects on health and other values, would be an excellent way to clarify and order regulatory policy, in a way that should lead both to greater consistency and more overall protection. If ordinary market behavior and ordinary government behavior point to a similar basic range (e.g., \$3 million to \$7 million per life saved), that is an excellent place to start.

My ultimate hope is that it would be possible to produce a convergence on a form of cost-benefit analysis that should be understood as a pragmatic instrument and that ought not to be terribly contentious—a form of cost-benefit analysis that does not take a stand on highly controversial questions about what government ought to do, and that promises to attract support from people with diverse conceptions of the right and the good. I have suggested here that the most promising source of such an agreement is not only or even mostly neoclassical economics, but also behavioral economics and cognitive psychology.

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