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BEHAVIORAL ANALYSIS OF LAW

*Cass R. Sunstein**

The future of economic analysis of law lies in new and better understandings of decision and choice.¹

In the last two decades, social scientists have learned a great deal about how people actually make decisions.² Much of this work requires qualifications of rational choice models.³ Those models are often wrong in the simple sense that they yield inaccurate predictions. Cognitive errors and motivational distortions may press behavior far from the anticipated directions; normative accounts of rational choice should not be confused with descriptive accounts.⁴ But it does not follow that people's behavior is unpredictable, sys-

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¹ These models sometimes go under the name of behavioral research or behavioral decision theory.

² I draw here on R. Thaler, *Quasi-Rational Economics* (1994); Conlisk, *Why Bounded Rationality?*, 34 *J Ec Literature* 669 (1996). A useful collection is *Environment, Ethics, and Behavior* (M. Bazerman et al., eds., 1997).

³ There is of course much controversy in specifying what rational choice models require. Some of the evidence I discuss shows how people react to the presence of decision costs, and it is far from irrational to take those costs into account. And it may be fully rational to consider the effects of social norms on choice, since norm-violations can count as costs. It is far less important to struggle over the question whether the evidence shows violations of "rationality" than to be as clear as possible on how human beings actually behave; it is the latter issue that I am concerned with here.

⁴ This is a prominent theme in the work of Amos Tversky, taking "normative accounts" to refer to certain aspects of expected utility theory; Tversky's emphasis here is on cognitive errors. See, e.g., Amos Tversky, *Rational Theory and Constructive Choice*, in Kenneth Arrow et al., eds., *The Rational Foundations of Economic Behavior* (1996).

tematically irrational, random, rule-free, or elusive to social scientists. On the contrary, the qualifications can be described, used, and sometimes even modeled. Those qualifications, and the resulting understandings of decision and choice,⁵ are playing a large and mounting role in many fields within economics and other social sciences.

Oddly, the relevant research has yet to find a significant place in the economic analysis of law.⁶ An enormous gap remains to be filled. The gap is especially important for economic analysis *of law*, which is concerned in significant part with nonmarket behavior. It is here that deviations from the conventional model are—it is generally conceded—most likely to occur.⁷

Much behavioral work suggests that preferences and values are sometimes constructed rather than elicited by social situations.⁸ “[O]bserved preferences are not simply read off some master list; they are actually constructed during the elicitation process. . . . Different elicitation procedures highlight different aspects of options and suggest alternative heuristics, which give rise to inconsistent

⁵ See, e.g., Kahneman and Tversky, Prospect Theory: An Analysis of Decision Under Risk, 4 *Econometrica* 263 (1979); Loomes & Sugden, Regret Theory, 92 *Econ. J.* 805 (1982).

⁶ Much of the relevant research involves experiments and survey data, and hence it is possible to question whether the findings apply to the real world. And there is of course a possibility that experiments, particularly in the form of answers to questionnaires, are imperfect predictors of actual behavior. By this stage, however, there is adequate basis to conclude that the findings I describe are replicated in the real world; in fact many of them are based on real world evidence. See, e.g., Kahneman, Knetsch and Thaler, Experimental Tests of the Endowment Effect and the Coase Theorem, 98 *J Polit Econ* 1325 (1990) (cataloguing evidence from experimental and real world settings). On the general topic, see Colin Camerer, Individual Decision Making, in *The Handbook of Experimental Economics* 587 (J. Kagel and A. Roth, eds., 1995); Thaler, The Psychology and Economics Conference Handbook, in *Quasi-Rational Economics* 189 (1993).

⁷See the revealing remarks to this effect in Shogren & Hayes, Reply, 87 *American Economic Review* 241, 243 (1997) (criticizing general claims about endowment effects but acknowledging their importance in nonmarket settings).

⁸See Paul Slovic, The Construction of Preference, 50 *Am. Psych.* 364 (1995); Amos Tversky, Rational Theory and Constructive Choice, in Kenneth Arrow et al., eds., *The Rational Foundations of Economic Behavior* (1996).

responses.”⁹ People do not generally consult a freestanding “preference menu” from which selections are made at the moment of choice; preferences can be a product of procedure, description, and context at the time of choice. “Alternative descriptions of the same choice problems lead to systematically different preferences; strategically equivalent elicitation procedures give rise to different choices; and the preference between x and y often depends on the choice set within which they are embedded.”¹⁰ What has been learned about human behavior and choice should be linked, at the theoretical and empirical levels, with analysis of the legal system.

This is so especially because the legal system is pervasively in the business of constructing procedures, descriptions, and contexts for choice. Of course the legal system creates procedures, descriptions, and contexts in the course of litigated cases. For example, the alternatives (selected to be) placed before the jury or judge may matter a great deal; liability or conviction on some count A may very much depend on the nature of counts B , C , and D .¹¹ In this respect the preferences and values of judges and juries may well be constructed, not elicited, by the legal system. Certainly this is true for the award of damages, where special problems may arise.¹² But similar points hold outside of the courtroom. The allocation of legal entitlements, and the structures created for exchange (or nonexchange) by law, may well affect both preferences and values. Thus law can construct rather than elicit preferences internally, by affecting what goes on in court, and externally, by affecting what happens in ordinary transactions, market and nonmarket.

For purposes of analysis we might distinguish among three different tasks: positive, prescriptive, and normative. Positive work is of course concerned with predictions. If, contrary to conventional assumptions, people dislike losses far more than they like equivalent gains, predictions will go wrong insofar as they rest on conventional assumptions. As we will shortly see, this point has important impli-

⁹ Tversky et al., Contingent Weighting in Judgment and Choice, 95 Psych. Rev. 371, 371 (1988).

¹⁰ Tversky, *supra* note 4, at 186.

¹¹ See below.

¹² See below.

cations for positive analysis of law, prominently including the Coase theorem.

Prescriptive work is concerned with showing how society might actually reach shared goals; this is a central purpose of economic analysis of law. Consider the following information campaigns, which conventional analysis deems equivalent. (a) If you use energy conservation methods, you will save $\$X$ per year. (b) If you do not use energy conservation methods, you will lose $\$X$ per year. It turns out that information campaign (b) is far more effective than information campaign (a).¹³ Some features of human judgment, properly understood, undermine conventional economic prescriptions about what will work best; they help explain, to take just one example, precisely why the public service advertising slogan “drive defensively; watch out for the other guy” is particularly ingenious.

Normative work is of course concerned with what the legal system should do. Recent revisions in understanding human behavior greatly unsettle certain arguments against paternalism in law. They certainly do not make an affirmative case for paternalism; but they support a form of anti-antipaternalism. If, for example, people use heuristic devices that lead to systematic errors, their judgments about how to deal with risks may be badly misconceived.¹⁴ If people are unrealistically optimistic, they may run risks because of a factually false belief in their own relative immunity from harm, even if they are fully aware of the statistical facts. And if people’s choices are based on incorrect judgments about their experience *after choice*, there is reason to question whether respect for choices, rooted in those incorrect judgments, is a good way to promote utility or welfare. None of these points makes a firm case for legal paternalism, not least because bureaucrats may be subject to the same cognitive and motivational distortions as everyone else.¹⁵ But they suggest that objections to paternalism should be more empirical and pragmatic, having to do with the possibility of education and likely failures of government response, rather than a priori in nature.

¹³ See E. Aronson, *The Social Animal* 124-25 (6th ed. 1996).

¹⁴ Thus the literature on heuristics and biases helps support the analysis in S. Breyer, *Breaking the Vicious Circle* (1993) (favoring technocratic assessments of risk).

¹⁵ See W. Kip Viscusi, *Fatal Tradeoffs* 138-46 (1993).

Now let me offer a few details, tracing some of the principal findings¹⁶ that emerge from behavioral research, and showing how they bear on positive, prescriptive, and normative work in law.¹⁷

1. *Loss aversion.*

People are especially averse to losses.¹⁸ They are more displeased with losses than they are pleased with equivalent gains—roughly

¹⁶ The discussion is illustrative, not exhaustive. Other examples are plentiful. For example, people appear not to ignore sunk costs. See Thaler, *supra* note 2, at 11-13, 148-49. This point bears on predictions about the behavior of contracting parties. Nor do I provide an exhaustive discussion of framing effects. For example, if it is said, of 400 people who undergo a certain operation, 350 are alive after five years, many more people will undergo the operation than if they are told, of 400 people who undergo an operation, 50 are dead after five years. See Redelmeier et al., *Understanding Patients' Decisions*, 270 *JAMA* 72, 73 (1993). People also make different judgments of probability after different descriptions of the same problem, partly because a description that stresses the components of a category (how likely is it that *X* will die from cancer, heart disease, or other natural causes?) produces higher numbers than one that refers to the category itself (how likely is it that *X* will die from natural causes?). See Tversky and Koehler, *Support Theory*, 101 *Psych Rev* 547 (1994). There is also a recent finding of a “focusing illusion,” by which people, focusing on a component of well-being, think that it is far more important to well-being than it is in fact. See Kahneman and Schkade, *Would You Be Happier In California?* (unpublished manuscript, 1997). See also R. Thaler, *The Winner's Curse* (1994), for an instructive collection.

¹⁷ An interesting question is whether these various effects vary across cultures and (relatedly) whether they might be changed through education. There is evidence that loss aversion can be found in a range of cultures, and also that the results of the ultimatum game are not culturally variant, see Thaler and Camerer, *Ultimatums, Dictators, and Manners*, 9 *J Econ Persp.* 209 (1995); *The Handbook of Experimental Economics* 282-88. But this is at most a start.

Of special interest is the fact that pigeons and rats appear to behave in accordance with prospect theory rather than expected utility theory! See Kagel, Battalio, Green, *Economic Choice Theory: An Experimental Analysis of Animal Behavior* 162-67 (1995).

There is also the general question whether some or all of these effects might be changed through information and education.

¹⁸ Kahneman, Knetsch and Thaler, *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 *J Polit Econ* 1325 (1990); R. Thaler, *Quasi-Rational Economics*, *supra* note 2; *The Handbook of Experimental Economics* 665-70 (John Kagel and Alvin Roth, eds., 1995). Loss aversion is an aspect of prospect theory. See Kahneman and Tversky, *supra* note 5. On policy implica-

speaking, twice as displeased. Contrary to economic theory, people do not treat out-of-pocket costs and opportunity costs as if they were equivalent.

Loss aversion has important implications for positive analysis of law. It means, for example, that the Coase theorem is in one respect quite wrong.¹⁹ The theorem is wrong because the allocation of the legal entitlement may well matter in the sense that those who are initially allocated an entitlement are likely to value it more than those without the legal entitlement. Thus workers allocated a (waivable) right to be discharged only for cause may well value that right far more than they would be if employers were allocated a (tradeable) right to discharge at will; thus breathers of air may well value their (tradeable) right to be free from air pollution far more than they would be if polluters had been given a (tradeable) right to emit polluting substances into the air. The legal entitlement creates an *endowment effect*, that is, a greater valuation stemming from the mere fact of endowment. This effect has been observed in many contexts.²⁰

There is a further point. People are averse to losses, but whether an event “codes” as a loss or a gain depends not on simple facts but on a range of contextual factors, including how the event is framed. The status quo is usually the reference point, so that losses are understood as such by reference to existing distributions and practices;²¹ but it is possible to manipulate the frame so as to make a

tions, see Knetsch, Reference Status, Fairness, and Choice of Measure to Value Environmental Changes, in *Environment, Ethics, and Behavior*, supra note 2.

¹⁹ Daniel Kahneman, Jack Knetsch and Richard Thaler, *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 *J Polit Econ* 1325 (1990). The Coase theorem remains correct insofar as it says that the allocation of the entitlement will not (under the stated conditions) affect efficiency.

²⁰See *id.*; Sunstein, *Endogenous Preferences*, *Environmental Law*, in Cass R. Sunstein, *Free Markets and Social Justice* (1997).

²¹See Samuelson & Zeckhauser, *Status Quo Bias*, 1 *J Risk & Uncertainty* 7 (1988). Note in this respect the phenomenon of “commission bias”—people would much prefer to make an error of omission than one of commission, even in the context of vaccinating their children, where commission bias can greatly increase risks to children. See Ritov and Baron, *Reluctance to Vaccinate*, 3 *J of Behavioral Decision Making* 263 (1991). Compare the finding that the status quo becomes more attractive when there are two alternatives to it rather than one. Thus doctors, policymakers, and ordinary people, in situations of choice, may be ambivalent

change code as a loss rather than a gain, or vice-versa. Consider a company that says “cash discount” rather than “credit card surcharge”; or a parent who says that for behavior X (rather than behavior Y) a child will be rewarded, as opposed to saying that for behavior Y (rather than for behavior X) a child will be punished;²² or familiar advertisements to the effect that “you cannot afford not to” use a certain product. In environmental regulation, it is possible to manipulate the reference point by insisting that policymakers are trying to “restore” water or air quality to its state at time X ; the restoration time matters a great deal to people’s choices.²³

For present purposes, the most important source of reference point is the law—where has the legal system placed the initial entitlement? Much research remains to be done on the effects of this initial allocation. It bears, for example, on the distinction between “subsidies” and “penalties” that has proved so crucial to the law governing unconstitutional conditions;²⁴ that distinction can be understood as responsive to the phenomenon of loss aversion, and framing effects very much affect different judgments about whether someone has been subsidized or instead penalized.²⁵

Loss aversion also raises serious questions about the goal of the tort system. Should damages measure the amount that would restore an injured party to the status quo ante, or should they reflect the amount that an injured party would demand to be subject to the injury before the fact? Juries appear to believe that the amount that would be demanded pre-injury is far greater than the amount that would restore the status quo ante.²⁶ The legal system appears

between a status quo option (stay home and study tonight, prescribe the ordinary course of treatment, do not depart from existing policy) and a single option; the introduction of a new alternative makes the status quo more appealing. See Shafir and Tversky, Choice Under Conflict: The Dynamics of Deferred Decision, 3 *Psych. Sci.* 358 (1992).

²² Personal experience suggests that this works!

²³ See Gregory et al., The Role of Past States in Determining Reference Points for Policy Decisions, 55 *Org. Behavior and Human Decision Processes* 195 (1993).

²⁴ See Stone et al., *Constitutional Law 1757-1764* (3d ed. 1996).

²⁵ See, e.g., *Harris v. McRae*, 448 US 297 (1980).

²⁶ See McCaffery, Spitzer, and Kahneman, Framing the Jury, 81 *Va L Rev* 1341 (1995).

generally to see the compensation question as the latter one, though it does not seem to have made this choice in any systematic way.

The disparity has large implications for the choice between liability rules and property rules. Property rules allow a taking only via “willingness to accept”; liability rules frame the question in terms of “willingness to pay.” The economic literature on the choice between the two generally does not recognize that the resulting valuations may be dramatically different.²⁷

2. *Extremeness aversion.*

People are averse to extremes. Whether an option is extreme depends on the stated alternatives. Extremeness aversion gives rise to *compromise effects*. As between given alternatives, people seek a compromise. In this as in other respects, the framing of choice matters; the introduction of (unchosen, apparently irrelevant) alternatives into the frame can alter the outcome. When, for example, people are choosing between some small radio *A* and a mid-size radio *B*, most may well choose *A*; but the introduction of a third, large radio *C* is likely to lead many people to choose *B* instead.²⁸ Thus the introduction of a third, unchosen (and in that sense irrelevant) option may produce a switch in choice as between two options. Almost everyone has had an experience of switching to (say) the second most expensive item on some menu of options, and of doing so partly because of the presence of the very most expensive item.²⁹

Extremeness aversion suggests that a simple axiom of conventional economic theory—involving the irrelevance of added, unchosen alternatives—is wrong.³⁰ It also has large consequences for legal advocacy and judgment, as well as for predictions about the effects of law. How can a preferred option best be framed as the “compromise” choice? When should a lawyer argue in the alterna-

²⁷See, e.g., Kaplow and Shavell, Property Rules and Liability Rules, 109 Harv L Rev 713 (1996).

²⁸ See Kelman, Rottenstreich, and Tversky, Context-Dependence in Legal Decisionmaking, 25 J. Legal Stud. 287 (1996).

²⁹ Compare the phenomenon of “tradeoff contrast”: the introduction of a third alternative may make some characteristic of the choice especially salient and thus affect judgment. See *id.*

³⁰See Amartya Sen, Internal Consistency of Choice, 61 Econometrica 495 (1993).

tive, and what kinds of alternative arguments are most effective? This should be a central question for advocates to answer. Juries and judges may will try to choose a compromise solution, and what “codes” as the compromise solution depends on what alternatives are made available. And in elections, medical interventions, and policy-making, compromise effects may matter a great deal.

3. Self-serving bias, unrealistic optimism, and overconfidence.

People’s judgments about fairness are self-serving, and people tend to be both unrealistically optimistic and overconfident about their judgments.³¹ In any random couple, it is highly likely that addition of answers to the question, “what percentage of the domestic work do you do?,” will produce a number greater than 100%. The point bears on the otherwise largely inexplicable phenomenon of bargaining impasses. Why don’t more cases settle? Why does the legal system spend so much on dispute settlement? Part of the answer lies in the fact that self-serving bias—a belief that one deserves more than other people tend to think—affects both parties to a negotiation, and this makes agreement very difficult.³²

Unrealistic optimism and self-serving bias also bear on individual risk-bearing, and hence on the role of the regulatory state, especially in the area of dangers to life and health. Even factually informed people tend to think that risks are less likely to materialize for themselves than for others. Thus there is systematic overconfidence in risk judgments, as the vast majority of people believe that they are less likely than other people to be subject to automobile accidents, infection from AIDS, heart attacks, asthma, and many other health risks.³³ In one survey, for example, 90% of automobile drivers considered themselves to be above-average drivers.³⁴ In another survey, students asked to envision their future said that they were far

³¹See Daniel Kahneman and Amos Tversky, Conflict Resolution: A Cognitive Perspective, in *Barriers to Conflict Resolution* (Kenneth Arrow et al. eds. 1995).

³² See Kahneman and Tversky, *supra* note, in *Barriers to Conflict Resolution*; Babcock & Lowenstein, Explaining Bargaining Impasse: The Role of Self-Serving Biases, 11 *J. Econ. Persp.* 109 (1997)

³³ See Weinstein, Optimistic Biases About Personal Risks, 246 *Science* 1232 (1989).

³⁴ S. Taylor, *Positive Illusions* 10-11(1990).

less likely than their classmates to be fired from a job, to have a heart attack or to get cancer, to be divorced after a few years of marriage, or to have a drinking problem.³⁵

Reflecting illusions about their own practices, gay men appear systematically to underestimate the chance that they will get AIDS, even though they do not lack information about AIDS risks in general.³⁶ Older people similarly underestimate the likelihood that they will be in a car accident or contract major diseases. Unrealistic optimism appears to characterize people in most social categories.³⁷ People systematically underestimate the extent to which they are at risk, and perceptions of relative invulnerability affect preventive health practices.³⁸ A random community-wide survey of attitudes toward health risks founded systematic belief of above-average immunity from risk.³⁹

Unrealistic optimistic and self-serving bias are relevant to the positive and prescriptive tasks of law. Efforts to educate people about risk may run afoul of unrealistic optimism; hence mere statistical knowledge may fail to produce adequate information. Moreover, efforts to increase consensual solutions must take account of self-serving bias; problems with negotiated rulemaking, one of the most popular new developments in administrative law, may have self-serving bias at their roots. Unrealistic optimism also creates a distinctive problem for conventional objections to paternalism in law. If people tend to believe that they are relatively free from risks, they may lack accurate information even if they know statistical facts. Moreover, such evidence much complicates the widespread view that people often overstate low-probability events. It is true that people may think that low probability events have higher probability than they in fact do. But many individual agents think that they are peculiarly immune from such events, which may mean that they err in the other direction.

³⁵ Id. at 33.

³⁶ Bauman and Siegel, Misperception Among Gay Men of the Risk for AIDS Associated With Their Sexual Behavior, 17 J Applied Social Psychology 329 (1987).

³⁷ Id.

³⁸ Bauman and Siegel at 330-331.

³⁹ See Weinstein, Unrealistic Optimism About Susceptibility to Health Problems, 10 J Behavioral Medicine 481 (1986).

4. *Decision utility vs. experience utility.*

In economics it is often assumed that the utility of experience is best measured by the anticipated utility shown by people's decisions. But a good deal of recent research⁴⁰ shows that *there may well be systematic differences between the utility expected at the time of decision and the utility actually experienced as a result of decision.* People's judgments about their experience at the time of decision can be mistaken, in the sense that they have a hard time assessing what the experience will actually be like.

There are many examples. From the phenomenon of loss aversion we can infer that people value goods more when they own them than when they do not. This effect—the endowment effect—has been observed in many settings.⁴¹ But in recent experiments, people have been unable to predict the endowment effect, and thus unable to predict their own tastes.⁴² This finding is paralleled by many studies showing that people do not accurately predict the consequences of (for example) winning the lottery and becoming paraplegic. (Winning the lottery produces much lower hedonic gains than expected, and people adjust to becoming paraplegic much more easily than expected.) An especially important example comes from studies dealing with HIV testing. People are quite terrified of their reaction if they find that they are HIV-positive; they predict a high degree of panic and depression. But a recent study suggests that people are able to adapt fairly well to the bad news, and their panic and depression are far less severe than they thought *ex ante*.⁴³ We might expect that people would therefore “undertest”; they are likely to be especially averse to undergoing a process of which they are very fearful. It might follow that regula-

⁴⁰ See Kahneman, New Challenges to the Rationality Assumption, in *The Rational Foundations of Economic Behavior* 203 (Arrow et al. eds. 1996); Loewenstein and Schkade, note 42 *infra*.

⁴¹ See Thaler, *supra* note 2.

⁴² See George Loewenstein and David Schkade. Wouldn't it be nice? Predicting tastes and feelings. To appear in E. Diener, N. Schwartz, & D. Kahneman (Eds.). *Hedonic Psychology: Scientific Approaches to Enjoyment, Suffering, and Well-being*. Russell Sage Foundation.

⁴³ See Elaine Sieff, Robyn Dawes, and George Loewenstein, Anticipated Versus Actual Reaction to HIV Test Results, forthcoming *Am. J. of Psych.* (1997).

tory approaches—education, persuasion, financial incentives, conceivably coercion—would make a good deal of sense.

Economists have urged that people have adequate information about the risks of smoking and that additional regulation is therefore inappropriate.⁴⁴ And it does seem that people know many of the basic “facts.” But a study of high school students suggests a problem.⁴⁵ About one-third of adolescent smokers believed that there was no risk from smoking a pack of cigarettes daily for the first years after starting to smoke. Young people who smoke believe that they are personally at below average risk from smoking. And 85% of high school teenagers who smoked occasionally believed that they would not be smoking in five years, whereas a follow-up study showed that only 58% had quit and 37% had actually increased their consumption. About 32% of those who smoked one pack believed that they would quit in five years, but only 13% did in fact.

When people’s decision mispredict their experience, a common argument against paternalism—to the effect that ordinary people choose what will promote their welfare—is no longer plausible. Perhaps it will ultimately be possible to be systematic about issues of this kind—to know when, exactly, people’s decisions produce bad experiences.

5. Cooperation, fairness, and the appearance of fairness.

Economists sometimes assume that people are self-interested. This may well be true, and often it is a useful simplifying assumption. But people also may want to act fairly and, equally important, they want to be seen to act fairly, especially but not only among nonstrangers. For purposes of understanding law, what is especially important is that people may sacrifice their economic self-interest in order to be, or to appear, fair.

Consider, for example, the ultimatum game.⁴⁶ The people who run the game give some money, on a provisional basis, to the first of two players. The first player is instructed to offer some part of the money to the second player. If the second player accepts that

⁴⁴See W. Kip Viscusi, *Smoking* (1993).

⁴⁵ See Paul Slovic, *What Does It Mean To Know A Risk?* (forthcoming).

⁴⁶See *The Handbook of Experimental Economics* 282-88 for general discussion.

amount, he can keep what is offered, and the first player gets to keep the rest. But if the second player rejects the offer, neither player gets anything. Both players are informed that these are the rules. No bargaining is allowed. Using standard assumptions about rationality, self-interest, and choice, economists predict that the first player should offer a penny and the second player should accept. But this is not what happens. Offers usually average between 30% and 40% of the total. Offers of less than 20% are often rejected. Often there is a 50-50 division. These results cut across the level of the stakes and also across diverse cultures.

The results of the ultimatum game are highly suggestive. Perhaps people will not violate norms of fairness, even when doing so is in their economic self-interest, at least if the norm-violations would be public. What offers are made in bankruptcy negotiations? Do companies always raise prices when circumstances create short-term scarcity? For example, are there social constraints on price increases for snow shovels after a snowstorm, or for umbrellas during a rainstorm? It may well be that contracting parties are reluctant to take advantage of the misfortunes of another, partly because of social constraints on self-interested behavior. Here there is much room for future work. Experimental work also shows a high degree of cooperation in prisoners' dilemma situations, especially when people are speaking with one another.⁴⁷

6. Heuristics and biases.

People make judgments about probability on the basis of heuristic devices, responsive perhaps to high costs of inquiry and decision, that may often work well in many cases but that tend also to lead to systematic errors.⁴⁸ This work bears on the demand for (and hence also the supply of) government services, including regulation. It also has implications for assessment of the jury system—suggesting that juries are likely to make many mistakes in terms of probability assessments and that correction of those mistakes is a large task of the legal system. Here is a very brief description of several heuristics of particular relevance to law.

⁴⁷ See *The Handbook of Experimental Economics* 111-173, for an overview.

⁴⁸ See *id.* at 590-616.

a. Availability.

People tend to think that risks are more serious when an incident is readily called to mind or “available.”⁴⁹ If pervasive, the availability heuristic will produce systematic errors. Assessments of risk will be pervasively biased, in the sense that people will think that some risks (of a nuclear accident, for example) are high, whereas others (of a stroke, for example) are relatively low. “Availability cascades” can produce a large demand for law, as in the familiar “pollutant of the month” syndrome in environmental law. We lack a firm understanding of how availability cascades occur and of how institutions might be designed to produce appropriate responses.⁵⁰

b. Anchoring.

Often people make probability judgments on the basis of an initial value, or “anchor,” for which they make insufficient adjustments.⁵¹ The initial value may have an arbitrary or irrational source. When this is so, the probability assessment may go badly wrong. This point bears on jury deliberations reconstructing the facts; it also suggests possible problems with damage determinations, for example in the case of punitive damages, where arbitrary anchors may loom large.

c. Representativeness.

Judgments about probability are in large part judgments about whether some process *A* will bring about some event *B*. Under what circumstances will driving produce significant increases in air pollution, or fatal accidents? When will airbags produce risks to children? Do disposable diapers cause pollution problems? In answering such questions, people ask about the extent to which *A* is representative of *B* in the sense that it *resembles B*. Thus people tend to be insensitive to sample size, misunderstand the phenomenon of regression to the mean, have excessive confidence in their own judgments, and misunderstand the effect on probability of base-rate frequency.⁵² As

⁴⁹See Kahneman & Tversky, *supra* note 5; W. Kip Viscusi, *Fatal Tradeoffs* (1992).

⁵⁰Timur Kuran and Cass R. Sunstein, *Availability Cascades and Risk Regulation* (work in progress), is an effort to deal with these issues.

⁵¹ See Kahneman & Tversky, *supra* note 5.

⁵² *Id.*

a result, people may systematically misunderstand risk levels. Risk regulation in general and in particular cases may go awry.

d. Case-based decision theory.

Heuristic devices are often used when the costs of deliberation are high; in such cases, second-order decisions, operating as default rules, can make particularized assessments less necessary. An important way of reducing decision costs is to make assessments on the basis of previous cases rather than through calculation of relevant costs and benefits.⁵³ In fact people often reason to calling to mind particular cases and seeing how the problem at hand compares with those cases; this can be an important method of reducing decision costs.⁵⁴ The emphasis on case-based decisions, as a way of minimizing decision costs while producing acceptably low error costs, has significant consequences for the understanding of law. Of course adjudication is a form of case-based reasoning, and we may be able better to understand its nature, and its vices and virtues, if we see it as an alternative both to expected utility theory and to rule-bound decision, and as emerging from the distinctive institutional characteristics of judicial institutions.⁵⁵

7. Probability-related "tastes."

Here we are dealing not with simple factual errors, but with "tastes" or preferences that lead people to favor certain approaches to risk. Probability-related tastes present harder questions for the policy analyst. These tastes matter to law insofar as they bear on the demand for legal regulation and insofar as they are highly likely to affect judgments of both juries and courts.

a. "All or nothing."

People do not weight probabilities in a linear fashion. Most important, they greatly prefer the elimination of a risk over the diminution of a risk. Thus it appears that people would much rather

⁵³ Gilboa and Schmeidler, Case-Based Decision Theory, 110 Q J Econ 605 (1995)

⁵⁴ See Gilboa and Schmeidler, Case-Based Decision Theory, 110 Q. J. Econ. 605 (1995).

⁵⁵ See Cass R. Sunstein, Legal Reasoning and Political Conflict (1996).

see a risk of .001 reduced to zero than a risk of .002 reduced to .001.⁵⁶ It is not clear whether this preference should be characterized as irrational. Perhaps people receive a great deal of peace of mind from an eliminated risk, and a risk of reduced probability still creates residual fear. The point appears to be reflected in law. Thus the Clean Air Act speaks in terms of ensuring safe levels of air quality, admittedly a highly misleading way to set up the problem.

b. Ambiguity aversion.

A closely related “taste” is the avoidance of ambiguity.⁵⁷ At least when they lack relevant knowledge, and know that they do, people prefer situations of uncertainty (in which probabilities can be assigned to outcomes) over situations of risk (in which probabilities cannot be assigned). Thus people are averse to situations of uncertain probability and try to avoid choices that place them in such situations. Often risk regulation is, of course, undertaken when probabilities cannot be assigned. If people are averse to ambiguities, they may produce an incoherent pattern of regulation, perhaps based on an illusory perception, related to all-or-nothing judgments, that some things are “safe” and others are “dangerous.”

c. Status quo bias.

As noted, people evaluate situations largely in accordance with their relation to a certain reference point; gains and losses from the reference point are crucial. An ordinary reference is the status quo, which produces status quo bias. The legal system is certainly responsive to this kind of bias.⁵⁸

8. Mental accounting.

A simple and apparently uncontroversial assumption of most economists is that money is fungible. But the assumption is false.⁵⁹ Money comes in compartments. People create “frames” that result in mental accounts through which losses and gains, including losses

⁵⁶ See Redelmeier et al., Understanding Patients’ Decisions, 270 JAMA 72, 73 (1993).

⁵⁷ See Fox and Tversky, Ambiguity Aversion and Comparative Ignorance, 110 Q J Ec 585 (1995).

⁵⁸ See Sunstein, *supra* note 20 for examples.

⁵⁹ See R. Thaler, in Quasi-Rational Economics, *supra* note 2; see also Viviana Zelizer, The Social Meaning of Money (1994).

and gains in simple monetary terms, are not fungible with each other. A glance at ordinary practice shows that people often organize decisions in terms of separate budgets and accounts. Thus some money is for retirement; some is for vacation; some is for college tuition; some is for mortgage or rental payments. Mental accounting is an important aspect of financial self-control.

The practice of mental accounting has a range of implications for law and policy. It suggests, for example, that government may be able to create certain mental accounts by creative policymaking. And it suggests that there may be a demand for publicly created mental accounts, perhaps as a self-control strategy, as for example with Social Security and other programs with an apparent paternalistic dimension. Some statutes that appear to prevent people from making choices as they wish may be best understood as responsive to the widespread desire to have separate mental accounts. Of course there are private mechanisms for accomplishing this goal; but lawyers will not understand those mechanisms well unless they see that money itself is not fungible.

9. The difficulty, outside of markets, of mapping normative judgments onto dollars.

Often the legal system requires judges or juries to make judgments of some kind and then to translate those judgments into dollar amounts. How does this translation take place? Can it be done well? Research suggests that in many contexts, normative judgments of a sort are both predictable and nonarbitrary.⁶⁰ With respect to bad behavior that might produce punitive damages, for example, people come up with relatively uniform judgments on a bounded numerical scale. Similar findings have been made for envi-

⁶⁰ See Kahneman & Ritov, Determinants of Stated Willingness to Pay For Public Goods, 9 J Risk and Uncertainty 5 (1995); Sunstein, Kahneman, and Schkade, Assessing Punitive Damages (with notes on cognition and valuation in law), forthcoming. The latter paper, based on 900 subjects, discusses computer construction of 120 million juries, including (for example) all-white juries, all-male juries, all-poor juries, all-female juries, all-Hispanic juries, well-educated juries, poorly-educated juries. It finds that these disparate juries reach similar conclusions about outrageousness and appropriate punishment on a bounded numerical scale of 1 to 6. The story is much more complex for an unbounded dollar scale; here there is much arbitrariness.

ronmental amenities in the context of contingent valuation.⁶¹ But the act of mapping those normative judgments onto an unbounded dollar scale produces considerable “noise” and arbitrariness. When people are asked how much they are willing to pay to protect 2,000 birds, or how much a defendant should be punished for reckless conduct leading to personal injury, the numbers they generate seem to be stabs in the dark. The legal system, however, frequently relies on just those stabs. Thus the awards of damages for libel, sexual harassment, and pain and suffering are infected by severe difficulties, as is the award of punitive damages in general. An understanding of those difficulties may well lead to concrete reform proposals. Perhaps the “mapping” can occur by a legislative or regulatory body that decides, in advance, how a normative judgment made by a bounded numerical scale can be translated into dollars.

This essay is at most a sketch. A large question involves the extent to which education can counteract cognitive and motivational distortions, so as to eliminate some of the effects described above.⁶² With all the recent advances, behavioral research remains in an early stage. There is much to learn. An understanding of its implications for questions of law and policy will take a long time. Let’s go to work.

⁶¹ See Kahneman and Ritov, *supra* note 60.

⁶²Some of these effects, such as a taste for fairness, should not be characterized as distortions; on the contrary, such tastes may help prevent prisoners’ dilemmas. See Robert Frank et al., Does Studying Economics Inhibit Cooperation?, 7 *J. Econ. Persp.* 159 (1993).

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