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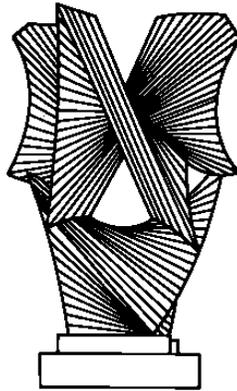
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Hazardous Heuristics

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**THE LAW SCHOOL
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Hazardous Heuristics

Cass R. Sunstein*

Abstract

*New work on heuristics and biases has explored the role of emotions and affect; the idea of “dual processing”; the place of heuristics and biases outside of the laboratory; and the implications of heuristics and biases for policy and law. This review-essay focuses on certain aspects of *Heuristics and Biases: The Psychology of Intuitive Judgment*, edited by Thomas Gilovich, Dale Griffin, and Daniel Kahneman. An understanding of heuristics and biases casts light on many issues in law, involving jury awards, risk regulation, and political economy in general. Some attention is given to the possibility of “moral heuristics”—rules of thumb, for purposes of morality, that generally work well but that also systematically misfire.*

In the early 1970s, Daniel Kahneman and Amos Tversky produced a series of pathbreaking papers about decisions under uncertainty.¹ Their basic claim was that in assessing probabilities, “people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations.”² Kahneman and Tversky did not argue that it is irrational for people to use the relevant heuristics. On the contrary, they claimed that as a general rule, the heuristics are quite valuable. The problem is that in some cases, their use leads “to severe and systematic errors.”³ It is worth emphasizing the word “systematic.” One of the most striking features of their argument was that the errors were not random -- that they could be described and even predicted.

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¹The key papers can be found in Daniel Kahneman, Paul Slovic, and Amos Tversky *Judgment Under Uncertainty: Heuristics and Biases* (1982). The heuristics-and-biases literature should be distinguished from the literature on prospect theory, which involves the nature of people’s utility functions under conditions of risk, not mental shortcuts under conditions of uncertainty. See Daniel Kahneman and Amos Tversky, *Choices, Values, and Frames* (2001).

²See Amos Tversky and Daniel Kahneman, *Judgment under Uncertainty: Heuristics and Biases*, in *id.* at 3.

³*Id.*

The resulting arguments have proved highly influential in many fields, including law,⁴ where the influence has stemmed from the effort to connect legal analysis to a realistic, rather than hypothetical, understanding of how human beings think and behave. If human beings use identifiable heuristics, and if they are prone to systematic errors, we might be able to have a better understanding of why law is as it is, and we might be able to generate better strategies for ensuring that law actually promotes social goals. Most provocatively, an understanding of heuristics and biases should improve our understanding of the legitimate role of paternalism in law. If people make systematic errors, perhaps government has, more often than antipaternalists think, good reason to override their choices.

The influence of the heuristics-and-biases literature also stemmed from its obvious connection with particular problems with which lawyers and policymakers are concerned, including risk regulation, litigation behavior, and discrimination. For example, the system of risk regulation has been said to show a combination of “paranoia and neglect.”⁵ An understanding of systematic errors might help show how and why this is so, and give a sense of what might be done by way of response. In fact the heuristics-and-biases literature cuts across many contemporary issues, including global warming, tobacco regulation, punitive damage reform, racial profiling, and responses to terrorism. Many other issues might also be illuminated. Do heuristics and biases account for the decision whether to bring suit at all? Might jury behavior, or even legislative and judicial behavior, be illuminated by a better understanding of intuitive judgment?

Kahneman and Tversky emphasized three general-purpose heuristics: representativeness, availability, and anchoring. The availability heuristic has probably become the most well-known in law.⁶ When people use this heuristic, they answer a question of probability by asking whether examples come readily to mind.⁷ How likely is a flood, an earthquake, an airplane crash, a traffic jam, a

⁴See, e.g., Roger Noll and James Krier, *Some Implications of Cognitive Psychology for Risk Regulation*, 19 *J. Legal Stud* 747 (1991); Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 *Stan L Rev* 1471, 1518-19 (2000); *Behavioral Law and Economics* (Cass R. Sunstein ed. 2000).

⁵John D. Graham, *Making Sense of Risk: An Agenda for Congress*, in *Risks, Benefits, and Lives Saved* 183, 183 (Robert Hahn ed. 1996).

⁶See Noll and Krier. A LEXIS search of law reviews found well over 200 references to the availability heuristic.

⁷See Amos Tversky and Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, in *Judgment Under Uncertainty: Heuristics and Biases*, *supra* note 7, at 3, 11-14.

terrorist attack, or a disaster at a nuclear power plant? Lacking statistical knowledge, people try to think of illustrations. Thus, “a class whose instances are easily retrieved will appear more numerous than a class of equal frequency whose instances are less retrievable.”⁸ This is a point about how familiarity can affect the availability of instances. But salience is important as well. “The impact of seeing a house burning on the subjective probability of such accidents is probably greater than the impact of reading about a fire in the local paper.”⁹ For people without statistical knowledge, it is far from irrational to use the availability heuristic; the problem is that this heuristic can lead to serious errors of fact, in the form of excessive fear of small risks and neglect of large ones.¹⁰ And undoubtedly the availability heuristic underlies much ethnic and racial discrimination. While such discrimination is frequently rational as a statistical matter, it is also undoubtedly true that some of the time, people overlook statistical reality, and rely on easily accessible incidents, in thinking that people of a certain racial or ethnic group are prone to certain behavior.

Kahneman and Tversky also suggested that in the face of uncertainty, estimates are often made from an initial value, or “anchor,” which is then adjusted to produce a final answer. The initial value seems to have undue influence. What percentage of African countries are in the United Nations? In one study, Kahneman and Tversky spun a wheel of fortune to obtain a number between 0 and 100, and asked subjects to say whether the number that emerged from the wheel was higher or lower than the relevant percentage. It turned out that the starting point, though clearly random, greatly affected people’s answers. If the starting point was 65, the median estimate was 45%; if the starting point was 10, the median estimate was 25%. The process of anchoring-and-adjustment has an obvious application to many legal issues, including the setting of damage awards.¹¹

When the representativeness heuristic is involved, people answer a question of probability or causation—for example, how likely is it that object A belongs to class B?—by asking about the extent to which A resembles B.

⁸Id. at 11.

⁹Id.

¹⁰See Roger Noll and James Krier, Some Implications of Cognitive Psychology for Risk Regulation, 19 J. Legal Stud 747 (1991); Timur Kuran and Cass R. Sunstein, Availability Cascades and Risk Regulation, 51 Stan L Rev 683, 703-05 (1999).

¹¹Chris Guthrie, Jeffrey Rachlinski, and Andrew Wistrich, Inside the Judicial Mind, 86 Corn. L. Rev. 778 (2001).

Suppose, for example, that the question is whether some person, Nick, is a librarian or a farmer. If Nick is described as shy and withdrawn, and as having a passion for detail, most people will think that he is likely to be a librarian—and to ignore the “base-rate,” that is, the fact that the population has far more farmers than librarians. It should be readily apparent that the representativeness heuristic will produce problems whenever people are ignoring base-rates, as they are prone to do. In one study, a majority of judges, in assessing probabilities, fell prey to the representativeness heuristic.¹² The representativeness heuristic also appears to underlie as serious misunderstanding of probability theory in the doctrine of *res ipsa loquitur*.¹³

Since the early discussions of heuristics and biases, there has been an explosion of further work, sometimes contesting the basic claims of Kahneman and Tversky,¹⁴ but usually offering more applications, an improved understanding of how the heuristics work, and a discovery of many other heuristics and biases. *Heuristics and Biases: The Psychology of Intuitive Judgment* offers a massive, state-of-the-art treatment of the literature, supplementing a similar book published two decades ago.¹⁵ The book, consisting of forty-two chapters, is divided into three parts. The first, called Theoretical and Empirical Extensions, elaborates on the three main heuristics and on several related heuristics and biases, including optimistic bias. The second part, called New Theoretical Directions, discusses the role of emotions and affect, support theory, and alternative perspectives on heuristics, including the view, set forth most prominently by Gerd Gigerenzer, that outside the laboratory, our “fast and frugal” heuristics work very well (p. 559). Part III, called Real-World Applications, offers a range of cases in which intuitive judgments goes wrong, including those of ordinary people (falsely believing, for example, in the “hot hand” phenomenon in basketball; p. 601) and those of experts (whose clinical judgments of dangerousness, for example, are far less accurate than actuarial judgments—a point with many legal applications¹⁶).

¹²Id.

¹³See *id.* Under that doctrine, a jury is permitted to infer that the defendant is negligent from the occurrence of an event that is “of a kind which ordinarily does not occur in the absence of negligence.” As Guthrie et al. explain, the appeal of this inference comes from the representativeness heuristic. But the inference is false: An event that does not ordinarily occur when negligence is absent may nonetheless be more likely to be the product of non-negligence than negligence.

¹⁴See Gerd Gigerenzer et al., *Simple Heuristics That Make Us Smart* (1999).

¹⁵See Kahneman, Slovic, and Tversky, *supra* note.

¹⁶See William Meadow and Cass R. Sunstein, *Statistics, Not Experts*, *Duke LJ* (2002).

This is an extremely impressive and important book, and it is full of implications for law and policy. The collection also covers an extraordinary range of problems. I will not be able to come close to doing justice to it here. Instead I have a much narrower purpose: to connect some of the recent research with a set of legal problems, and in particular the law relating to risk and litigation behavior. In that connection, two aspects of the book deserve emphasis. The first involves a shift from the strictly cognitive focus of the early work to an effort to see how emotions affect decision and judgment. The second is the emphasis, in several of the papers, on “dual process” approaches to human thinking. According to these approaches, people have two systems for making decisions. One of these is rapid, intuitive, but sometimes error-prone; the other is slower, reflective, and more statistical. One of the pervasive themes in this collection is that heuristics and biases can be connected with the intuitive system—and that the slower, more reflective system might be able to make corrections.¹⁷ This emphasis on correction raises the possibility of “debiasing,” on which several of the papers also focus.

¹⁷The papers do not discuss the nature of the brain, but suggestive research tends to be supportive of the dual-process idea. Some research suggests that the brain has special sectors for emotions, and that some types of emotions, including some fear-type reactions, can be triggered before the more cognitive sectors become involved at all. See Joseph LeDoux, *The Emotional Brain* 157–69, 172–73, 283–96 (1996). A small, almond-shaped region of the forebrain, the amygdala, appears to play a distinctive role in registering fear, with more reflective checks coming from the cerebral cortex. See *id.* at 172-73, suggesting that stimulation of the amygdala produces “a sense of foreboding danger, or fear,” and that “studies of humans with amygdala damage also suggest that it plays a special role in fear.” Those who hear sudden, unexplained noises are fearful before they are able to identify the source of the noise. R.B. Zajonc, *On the Primacy of Affect*, 39 *Am Psych* 117 (1984); R.B. Zajonc, *Feeling and Thinking: Preferences Need No Inferences*, 35 *Am Psych* 151 (1980). People who have been given intravenous injections of procaine, which stimulates the amygdala, report panic sensations. Servan-Schreiber and Perlstein, *Selective Limbic Activation and its Relevance to Emotional Disorders*, 12 *Cognition & Emotion* 331 (1998). In research with human beings, electrical stimulation of the amygdala leads to reported feelings of fear and foreboding, even without any reason for these things, leading people to say, for example, that they feel as if someone were chasing them. J. Panksepp, *Mood Changes*, in *Handbook of Clinical Neurology* (P.J. Vinken et al. eds. 1985).

Indeed, some “emotional responses can occur without the involvement of the higher processing systems of the brain, systems believed to be involved in thinking, reasoning, and consciousness.” Ledoux, *supra*, at 161. The sectors of the brain that “cannot make fine distinctions” also have a strong advantage in speed. *Id.* at 163. The thalamic pathway, involving the amygdala, “can provide a fast signal that warns that something dangerous may be there. It is a quick and dirty processing system.” *Id.* at 163. An especially interesting finding: A patient with amygdala damage was asked to detect emotional expression on faces, and she succeeded in identifying “most classes of expressions, except when the faces showed fear.” *Id.* at 173.

The essay comes in six parts. Part I discusses some real-world effects of availability and anchoring and brings that discussion to bear on a common criticism of the heuristics-and-biases literature: that heuristics and errors do not play a significant role outside of the laboratory. Part II examines one of the most important and interesting papers in the book, in which Daniel Kahneman and Shane Frederick offer a rethinking and generalization of the whole idea of heuristics. Part III explores the role of emotions and affect. Part IV investigates optimistic bias and its relationship to legal regulation. Part V goes beyond the book under review to offer some speculative remarks about the possibility of “normative heuristics” mental shortcuts that generally work well, but that lead to systematic errors in thinking about morality and law.

I. Parlor Games? The Real World of Availability and Anchoring

The early work on heuristics and biases raised a natural set of doubts¹⁸: Are these phenomena important in the real world? Are people really likely to make systematic errors? On one view, the mistakes, often made by undergraduate subjects, are a product of clever manipulations by psychologists, and in daily life, or in markets, people do much better.¹⁹ These issues receive some helpful attention in the introduction (pp. 7–15) and elsewhere, but they are not the book’s explicit focus. To answer them, it is important to emphasize that the goal of the heuristics-and-biases literature is emphatically not to show that people are fools, or that they are systematically irrational. On the contrary, Kahneman and Tversky emphasized that the relevant heuristics are efficient and generally work well.²⁰ But in the laboratory, at least, people who use the heuristics sometimes blunder, and it is the blundering that has attracted the most academic attention. Consider, for example, the fact that when asked how many words, on four pages of a novel, end in “ing,” people will give a larger number than when asked how many words have “n” as their second-to-last letter (p. 21) - a clear laboratory illustration of the availability heuristic. Several of the papers

¹⁸Richard A. Posner, *Rational Choice, Behavioral Economics, and the Law*, 50 *Stan. L. Rev.* 1551 (1998); Gerd Gigerenzer et al., *Simple Heuristics That Make Us Smart* (2000).

¹⁹For evidence that heuristics and biases operate in the real world, even when dollars are involved, see Werner Debondt and Richard Thaler, *Do Analysts Overreact?*, at pp. 666; Robert Shiller, *Irrational Exuberance* 136-147 (2000) (discussing anchoring and overconfidence in market behavior); Colin Camerer and Robin Hogarth, *The Effects of Financial Incentives in Experiments*, 19 *J. Risk and Uncertainty* 7 (1999), which finds that financial incentives have never eliminated anomalies or persistent irrationalities. Notably, however, one study finds that the effects of anchoring are decreased as a result of monetary payments. See *id.*

²⁰For this reason, Gigerenzer’s emphasis on the efficiency of certain heuristics, see p. 559, does not seem to me in any way compatible with the heuristics-and-biases program.

go well beyond the laboratory and demonstrate that heuristics lead to significant errors in the real world.

A. Availability and Risk

1. Availability, health, and safety. It is reasonable to expect that people's judgments about health and safety risks would be affected by the availability heuristic, and Baruch Fischhoff offers some striking illustrations (p. 730). Should women offer physical resistance in cases of assault? In popular publications, experts offer contradictory advice (p. 733). Those who claim that it is a serious mistake consist disproportionately of people from law enforcement sources, who mostly see bad outcomes from those who resisted physically. Hence police officers may well be victims of the availability heuristic, at least "if they remembered what they had seen and heard, but lacked an appreciation of what they were not seeing" (p. 733). More generally, Fischhoff discusses lay estimates of the frequency of forty-one causes of death in the United States. He finds that the errors in these estimates are consistent with the availability heuristic (and hence the errors were predicted before the data were seen; p. 737). Highly publicized causes of death, such as floods and tornadoes, are overestimated, whereas quieter killers, such as strokes and diabetes, are underestimated (p. 738). Other studies show a similar pattern.²¹

Apart from surveys, is actual behavior affected by the availability heuristic? There is evidence to believe that it is. Whether people will buy insurance for natural disasters is greatly affected by recent experiences.²² If floods have not occurred in the immediate past, people who live on flood plains are far less likely to purchase insurance.²³ In the aftermath of an earthquake, insurance for earthquakes rises sharply—but it declines steadily from that point, as vivid

²¹See W. Kip Viscusi, *Jurors, Judges, and the Mistreatment of Risk by the Courts*, 30 J Legal Stud 107 (2001). A possible criticism of these findings is that they might show the effect of anchoring. In the relevant surveys, people are typically given a starting number, such as the number of deaths from motor vehicle accidents each year (around 40,000). That starting number is necessary to ensure that numbers, for imperfectly informed respondents, will not be all over the lot. But the starting number, as an anchor, might also compress the range of answers, making high numbers lower and low numbers higher than they would otherwise be. It is possible that a general finding—that people overestimate low risks and underestimate high ones—is partly a product of this anchoring effect.

²²For a vivid demonstration in the context of catastrophes, see Jacob Gersen, *Strategy and Cognition: Regulatory Catastrophic Risk* (unpublished manuscript 2001). See also Paul Slovic, *The Perception of Risk* 40 (2000).

²³*Id.*

memories recede.²⁴ Notice that the use of the availability heuristic, in these contexts, strongly suggests that the heuristics operate even when the stakes are large. Insurance decisions involve significant amounts of money. And it is even possible that the use of the availability heuristic, in such contexts, is fully rational for people who lack statistical knowledge. Perhaps use of that heuristic is the best way of minimizing the sum of decision costs and error costs.²⁵ But it seems less useful to debate the rationality of the availability heuristic than simply to observe that it has a significant effect on behavior even when significant sums of money are involved.

2. The sources of availability. What, in particular, produces availability? An interesting essay attempts to test the effects of ease of imagery on perceived judgments of risk (p. 98). The study asked subjects to read about an illness (Hyposcemia-B) that “was becoming increasingly prevalent” (p. 99) on the local campus. In one condition, the symptoms were concrete and easy to imagine -- involving muscle aches, low energy, and frequent severe headaches. In another condition, the symptoms were vague and hard to imagine, involving an inflamed liver, a malfunctioning nervous system, and a vague sense of disorientation. Subjects in both conditions were asked both to imagine a three-week period in which they had the disease and to write a detailed description of what they imagined. After doing so, subjects were asked to assess, on a ten-point scale, their likelihood of contracting the disease. The basic finding was that likelihood judgments were very different in the two conditions, with easily-imagined symptoms making people far more inclined to believe that they were likely to get the disease.

The implications for law and policy should not be obscure. Consider positive issues first: Why is law as it is? The public demand for law will be much higher if people can easily imagine the harm in question; in such cases, the law might well reflect a kind of hysteria. But if the harm is difficult to imagine, we might well see a pattern of neglect.²⁶ We would therefore predict that easily

²⁴Id.

²⁵It is reasonable, however, to read Kahneman and Tversky as suggesting that the heuristics cannot entirely be defended in this way—that some of the time, at least, the heuristics operate even though a little thought would improve judgments. Consider the discussion of “ing” as possible to “n” as the next-to-last letter, above, and consider also the Linda problem, discussed below.

²⁶Compare the finding that teens’ rates of risk behaviors—smoking, driving after drinking, unsafe sex—can be reduced by addressing heuristics and biases, in part by explaining that the

imaginable harms would lead to relatively greater private precautions and relatively greater governmental concern.²⁷ Well-organized private groups should, and do, take advantage of this fact, attempting to publicize visible examples of harms to which they seek to draw attention.²⁸ The point has prescriptive implications for law as well, offering implications, for example, about the appropriate design of public informational campaigns. If government wants to encourage people to take protective steps, it should provide information about symptoms in a vivid rather than statistical way (p. 102), relying on examples that can later be brought to mind. (Terrorists appear to show a good intuitive understanding of the availability heuristic.) And there is a normative problem as well: If people use the availability heuristic, and if officials are subject to the public demand for law, it is to be expected that the law will impose stringent controls on some small risks, and weak controls on some serious ones.

But there is an interesting puzzle for those interested in the real-world uses of this heuristic: In many contexts, multiple images are literally “available.” Consider the problem of gun violence. It is not hard to find cases in which the presence of guns led to many deaths, and also cases in which the presence of guns allowed law-abiding citizens to protect themselves against criminals.²⁹ In the face of conflicting instances, which cases are especially available, and to whom? The same question can be raised in the environmental setting. We can find cases in which serious harm resulted from a failure to heed early warnings, suggesting the need for aggressive regulatory protection against risks that cannot yet be shown to be serious³⁰; but we can also find cases in which the government expended a great deal to reduce risks that turned out, on reflection, to be small or illusory.³¹ The former cases are available to some people and the latter to others. Why should one or another kind of case be available?

The behavior of the media, and of relevant interest groups, is undoubtedly important here. Many perceived “epidemics” are in reality no such thing, but

availability heuristic leads teens to overestimate the risk behavior of their peers. See Baruch Fischhoff, *Heuristics and Biases in Application*, in *id.* at 730, 747,

²⁷ See Noll and Krier, *supra* note; Kuran and Sunstein, *supra* note.

²⁸ See Kuran and Sunstein, *supra* note (discussing availability campaigns).

²⁹ See Donald Braman and Dan M. Kahan, *More Statistics, Less Persuasion: A Cultural Theory of Gun-Risk Perceptions* (unpublished manuscript 2002).

³⁰ *The Precautionary Principle in the 20th Century: Late Lessons from Early Warnings* (Poul Harremoes et al. eds. 2002).

³¹ For a catalogue, see Adam Wildavsky, *But Is It True?* (1996).

instead a product of media coverage of gripping, unrepresentative incidents.³² But this does not provide all of the picture. Beliefs and orientations are a product of availability, to be sure; but what is available is also a product of beliefs and orientations. In other words, availability may be endogenous to individual predispositions. Social processes are quite important here, for apparently representative anecdotes and gripping examples can move rapidly from one person to another.³³ Once several people start to take an example as probative, many people may come to be influenced by their opinion, giving rise of cascade effects.³⁴

In the domain of risks, “availability cascades” help to account for many social beliefs, and here local variations are likely, with different examples becoming salient in different communities. With respect to risks, religious, racial, and ethnic variations can be explained partly in this way, as different instances become available to diverse groups of like-minded people. Indeed, processes of

³² See Howard Kurtz, *The 'Crime Wave' Against Girls*, available at washingtonpost.com: “If you were watching cable yesterday, you know that two teenage girls were kidnapped at gunpoint in Lancaster, Calif. A frightening story, to be sure. Especially after all the hours of coverage, with police news conferences, grieving relatives, ex-detectives and FBI profilers. Most other news was obliterated (except for a brief interlude with John Ashcroft announcing the WorldCom arrests). There was even, like a recycled script, a white Bronco. By mid-afternoon, police rescued the teenagers and shot the suspect dead—just in time for the evening wrap-ups.

“Is it getting more dangerous out there for young girls? Ever since Chandra Levy and Elizabeth Smart, it seems that television is obsessing on some crime story involving girls. Could the saturation coverage be painting a distorted picture, like the great shark scare last summer? Northeastern University criminologist James Fox told us on CNN last weekend that ‘in a typical year, we have 50 to 100 kids who are abducted by strangers and murdered. This year's no different. . . . There's no epidemic. . . . Your child's chance of being killed by an abductor and by a stranger is significantly less than the chance that they'll, for example, die by falling off their bicycle and hitting their head.’

“But that's not the impression left by the media machine these days. . . [T]ake these much-hyped abductions, add in the half dozen other cases mentioned by the national media since the first of the year . . . [it] still doesn't qualify as a new crime wave.”

³³ Chip Heath et al., *Emotional Selection in Memes: The Case of Urban Legends*, *Journal of Personality and Social Psychology* (2001); Chip Heath, *Do People Prefer to Pass Along Good or Bad News? Valence and Relevance as Predictors of Transmission Propensity*, 68 *Organizational Behavior and Human Decision Processes* (1996).

³⁴ See Shiller, *supra* note, at 148-68; Sushil Biikhchandani et al., *Learning from the Behavior of Others*, *J. Econ. Persp.*, Summer 1998, at 151; Lisa Anderson and Charles Holt, *Information Cascades in the Laboratory*, 87 *Am. Econ. Rev.* 847 (1997); David Hirshleifer, *The Blind Leading the Blind*, in *The New Economics of Human Behavior* 188, 190-95 (Marianno Tommasi and Kathryn Ierulli eds., 1995); Timur Kuran and Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 *Stan L Rev* 683, 691-703 (1999).

deliberation typically lead like-minded people to accept a more extreme version of their original views,³⁵ making it likely that the effects of certain available examples will become greatly amplified through group discussion. And undoubtedly different cultural orientations play a large role in determining what turns out to be available.³⁶ People are often predisposed to take one or another case as an illustration of a general phenomenon, and predispositions matter a great deal in determining what is available. A great deal of work, normative and empirical, remains to be done on this topic.

B. Anchors and Damages

The original studies of anchoring-and-adjustment were memorable in part because they were so amusing. They suggested that when people lack information about an appropriate value, they are highly suggestible, even by apparently irrelevant numbers.³⁷ But the original studies left open many questions about the necessary conditions for anchoring, and also about the role of anchoring outside of the laboratory.³⁸

Gretchen Chapman and Eric Johnson offer a great deal of help in answering these questions (p. 120). Their most general lesson is that anchors, even irrelevant and extreme ones, have large effects. Chapman and Johnson show that for an anchor to have an effect, people need not be aware of its influence (p. 125); that an anchor is often operating even when people think that it is not (id.); that anchors have effects even when people believe, and say they believe, that the anchor is uninformative; and that making people aware of an anchor's effect does not reduce anchoring (id.). It follows that "debiasing" is very difficult in this context. Very extreme or ludicrously implausible anchors also seem to have an effect: Estimates of the year that Albert Einstein first visited the United States are greatly affected by asking people to begin by considering anchors of 1215 or 1992 (p. 124). Chapman and Johnson also show that that economic incentives do not eliminate the effects of anchors (p. 125); hence anchoring is not a result of casualness about the underlying task.

Anchors have major effects on legal outcomes. The plaintiff's demand influences jury verdicts, in terms of both liability judgments and amounts

³⁵See Cass R. Sunstein, *Deliberative Trouble? Why Groups Go To Extremes*, Yale LJ (2000).

³⁶See Braman and Kahan, *supra* note.

³⁷See Tversky and Kahneman, *supra* note, at 14–16.

³⁸For discussion of market behavior and anchoring, see Shiller, *supra* note, at 135–42.

awarded (p. 137). In one study, a request for \$500,000 produced a median mock jury award of \$300,000, whereas a request of \$100,000, in the identical case, produced a median award of \$90,000.³⁹ Even implausibly low and implausibly high demands operate as anchors (id.) Opening offers in negotiation have a significant influence on settlements. An ingenious study finds that anchors affect judges too. Judges were asked to come up with appropriate awards in a personal injury case.⁴⁰ The study involved two conditions. The “no anchor” condition involved a simple statement of the facts. The “anchor” condition was the same as the first, but with one critical difference: The defendant filed an obviously meritless motion to dismiss the case on the ground that the \$75,000 jurisdictional minimum had not been met. Almost all of the judges denied the motion, which nonetheless served as an anchor, with large effects on ultimate judgments. In the no anchor condition, the average award was \$1.24 million, while it was \$882,000 in the anchor condition.⁴¹

Anchors also play a role in “contingent valuation” studies, an influential method of valuing regulatory goods, such as increased safety and environmental protection.⁴² Initially stated values, in studies of people’s willingness to pay to save offshore birds, have a large effect on people’s answers (p. 137). Perhaps the most striking, and in a way hilarious, evidence to this effect comes from a study of willingness to pay to reduce annual risks of death and injury in motor vehicles.⁴³ The authors attempted to elicit both maximum and minimum willingness to pay for safety improvements. People were presented with a risk and an initial amount, and asked whether they were definitely willing or definitely unwilling to pay that amount to eliminate the risk, or “not sure.” If they were definitely willing, the amount displayed was increased until they said that they were definitely unwilling; if they were unsure, the number was moved up and down until people could identify the minimum and maximum.

³⁹See XX.

⁴⁰See Guthrie et al., *supra* note.

⁴¹*Id.* at. There is a possible response to the authors’ claim to have shown the effects of anchoring: Perhaps the motion to dismiss suggested that the injury was less serious than was apparent. Why would a lawyer file a totally frivolous motion to dismiss? But the abundant evidence of effects from anchors suggests that this is unlikely to explain all or even much of the authors’ finding. See also W. Kip Viscusi, *Corporate Risk Analysis: A Reckless Act?*, *Stan L Rev* (finding an anchoring effect from monetary value of life on jury awards, so much so that companies that placed a high value on human life ended up paying higher punitive awards!).

⁴²See, e.g., George Tolley et al., *Valuing Health For Policy* (1995); *Valuing Environmental Preferences* (Ian Bateman & K. G. Willis eds., 1999).

⁴³See Michael Jones-Lee and Graham Loomes, *Private Values and Public Policy*, in *Conflict and Tradeoffs in Decision Making* 205, 210–12 (Elke Weber et al. eds. 2000).

The authors were not attempting to test the effects of anchors; on the contrary, they were alert to anchoring only because they “had been warned” of a possible problem with their procedure, in which people “might be unduly influenced by the first amount of money that they saw displayed.”⁴⁴ To solve that problem, the authors allocated people randomly to two subsamples, one with an initial display of 25 pounds, the other with an initial display of 75 pounds. The authors hoped that the anchoring effect would be small, with no significant consequences for minimum and maximum values. But their hope was dashed. For every level of risk, the minimum willingness to pay was higher, with the 75 pound starting point, than the maximum willingness to pay with the 25 pound starting point!⁴⁵ For example, a reduction in the annual risk of death by 4 in 100,000 produced a maximum willingness to pay of 149 pounds, with the 25 pound starting value, but a minimum willingness to pay of 232 pounds, with the 75 pound starting value (and a maximum, in that case, of 350 pounds).⁴⁶

The most sensible conclusion is that whenever people are uncertain about appropriate values, anchors have a significant effect, and sometimes a startlingly large one. Clever negotiators, lawyers, and policymakers should be able to exploit those effects, sometimes even by providing an outlandish or apparently irrelevant anchor. There is a real opportunity for legal reform here, in part because anchors might well produce results that are not easy to defend, and in part because different anchors will ensure that similarly situated people are not treated similarly. Perhaps lawyers should not be permitted to inform jurors of potentially effective anchors, such as the annual profits of the firm or even the plaintiff’s demand, at least in cases involving punitive awards or hard-to-monetize compensatory awards. Or perhaps judges should be asked to review jury awards carefully and by reference to comparison cases, so as to weaken the effect of arbitrary anchors. In any case we now know that the effects of anchoring are hardly limited to the laboratory.

This point raises a related one: Are groups able to avoid the judgment errors made by individuals? The evidence is mixed.⁴⁷ In general, groups tend to polarize: They tend up in a more extreme position in line with their

⁴⁴Id. at 210.

⁴⁵Id. at 211.

⁴⁶Id.

⁴⁷See Norbert Kerr et al., Bias in Judgment: Comparing Individuals and Groups, 103 Psych. Rev. 687 (1996).

predeliberation tendencies.⁴⁸ At the same time, groups have been found to make better decisions than individuals with respect to certain statistical problems.⁴⁹ There is some evidence that groups are slightly better at avoiding the problems created by use of the availability heuristic.⁵⁰ On the other hand, some evidence suggests that the use of the representativeness heuristic is actually amplified in groups.⁵¹ It seems clear that group processes do not eliminate the use of heuristics, and it remains to be found whether and when they reduce or increase the resulting errors.

II. Two Systems

What, exactly, is a heuristic? When will a heuristic be overridden by cognitive processes that produce a more accurate understanding of the problem in question? In a highlight of this collection, Daniel Kahneman and Shane Frederick make real progress on these questions (p. 49). Their narrow goal is to revisit the representativeness heuristic, but they also have a broader ambition—to rethink and to generalize the whole idea of heuristics and biases. Their discussion is packed with new material, and I touch here only on the points of particular relevance for policy and law.

A. Dual Processing and Attribute Substitution

Much of their argument turns on drawing a connection between heuristics and dual-process theories.⁵² Recall that those theories distinguish between two families of cognitive operations, sometimes labeled System 1 and System II. System I is intuitive; it is rapid, automatic, and effortless. System II, by contrast, is reflective; it is slower, self-aware, and deductive. Kahneman and Frederick are careful to disclaim the views that the two systems operate as “autonomous homunculi,” but represent “collections of processes that are distinguished by their speed, controllability, and the contents on which they operate” (p. 51). They suggest that System 1 proposes quick answers to problems of judgment, and that

⁴⁸See Cass R. Sunstein, *Deliberative Trouble? Why Groups Go To Extremes*, Yale LJ (2000).

⁴⁹Alan Blinder and John Morgan, *Are Two Heads Better Than One? An Experimental Analysis of Group Vs. Individual Decisionmaking*, NBER Working Paper 7909 (2000).

⁵⁰Kerr et al., *supra* note, at 692.

⁵¹*Id.*

⁵²For an overview, see Shelly Chaiken and Yaacov Trope, *Dual-Process Theories in Social Psychology* (1999).

System 2 operates as a monitor, confirming or overriding those judgments.⁵³ Consider, for example, someone who is flying from Chicago to New York in the month after an airplane crash. This person might make a rapid, barely conscious judgment, rooted in System I, that the flight is quite risky, but there might well be a System II override, bringing a more realistic assessment to bear. Or consider someone, bitten by a German Shepherd dog as a child, who encounters a German Shepherd at a neighbor's house. The immediate intuitive reaction might be fear, but System II might well provide a corrective. In making a distinction between System 1 and System II, Kahneman and Frederick announce a theme that plays a significant role in this book.⁵⁴

Kahneman and Frederick also offer a general claim about the nature of heuristics: That they operate through a process of attribute substitution (p. 53). In this process, people are interested in assessing a "target attribute," and they do so by substituting a "heuristic attribute" of the object, which is easier to handle. Consider the question whether more people die from suicides or homicides. Lacking statistical information, people might respond by asking whether it is easier to recall cases in either class (the availability heuristic). As it happens, this is how most people proceed, and as a result they tend to give the incorrect answer that more people die from homicides.⁵⁵ But it is easy to see that much of the time, the process of attribute substitution will lead in the right directions, or at least toward the best possible answer for people who lack specialized knowledge.

B. Amending the Theory (with a simple lesson for law)

With an understanding of heuristics as attribute substitution, Kahneman and Frederick offer some significant amendments to the original presentation by Kahneman and Tversky. They suggest that anchoring should not be seen as a heuristic at all; anchoring operates not by substituting an attribute, but by making a particular value seem more plausible (p. 56). They also argue that the third general-purpose heuristic, to replace anchoring, is the affect heuristic (id). I discuss the affect heuristic in more detail below. For the moment, note that Kahneman and Frederick urge that punitive damage awards are mediated by an outrage heuristic (p. 63), which we might see as an example of the affect heuristic

⁵³Do Systems I and II have physical locations in the human brain? There is some evidence that they do. See note supra.

⁵⁴See, e.g., Steven Sloman, *Two Systems of Reasoning*, p. 379; Paul Slovic et al., *The Affect Heuristic*, . 397; Robyn Dawes et al., *Clinical Versus Actuarial Judgment*, p. 716.

⁵⁵See Paul Slovic, supra note X.

in action. Jurors do not have a good sense of how to set punitive damage awards (a hard question), and they begin the process by asking about the outrageousness of the defendant's conduct (an easier question).⁵⁶ Something like an outrage heuristic undoubtedly plays a role in punishment judgments of many different kinds; there is a large research agenda here.

Now turn to the authors' focus, the representativeness heuristic, which has led to some large controversies.⁵⁷ The most famous of these involves questions about the likely career of a hypothetical woman named Linda (p. 62), described as follows: "Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice and also participated in antinuclear demonstrations." Subjects were asked to rank, in order of probability, eight possible futures for Linda. Six of these were fillers (psychiatric social worker, elementary school teacher); the two crucial ones were "bank teller" and "bank teller and active in the feminist movement." Most people said that Linda was less likely to be a bank teller than to be a bank teller and active in the feminist movement. This is an obvious logical mistake, called a conjunction error, in which characteristics A and B are thought to be more likely than characteristic A alone. The error stems from the representativeness heuristic: Linda's description seems to match "bank teller and active in the feminist movement" far better than "bank teller." To the great surprise of Kahneman and Tversky, 80% of undergraduates made a conjunction error when asked directly, without fillers, whether Linda is more likely to be a "bank teller" or "bank teller and active in the feminist movement" (p. 66).

As Kahneman and Frederick note, people's answers to the Linda problem have been explained on numerous grounds (p. 67), with critics arguing that the structure of the problem increased or perhaps even generated logical mistakes. Indeed, the Linda problem can be redescribed in ways that will prevent people from erring. Kahneman and Frederick urge that this point should be taken not as a challenge to the claim that people use the representativeness heuristic, but as evidence that under certain circumstances, people will overcome the errors produced by that heuristic (including the conjunction fallacy and neglect of base-

⁵⁶Here Kahneman and Frederick draw on work on which I have been involved, see, e.g., Daniel Kahneman et al., *Shared Outrage and Erratic Awards: The Psychology of Punitive Damages*, *J Risk & Uncertainty*; Cass R. Sunstein et al., *Predictably Incoherent Judgments*, *Stan L Rev* (2002).

⁵⁷For a treatment of the representativeness heuristic and investment behavior, see Schiller, *supra* note, at 144.

rates). Kahneman and Frederick suggest that when these problems are overcome, it is often because of the operations of System II, which works as a kind of supervisor or monitor. Hence intelligent people, and those with statistical sophistication, are less likely to err (p. 68); for such people, System II is especially active.⁵⁸

For law and policy, the general lesson is simple: Whenever possible, institutionalize System II, at least when questions of fact are involved. Frequently the legal system disregards this advice, relying on juries and hence on ordinary intuitions about probability and causation. The twentieth century movement toward greater reliance on technical expertise, and actual data, might well be seen as an implicit recognition of the unreliability of ordinary intuitions. Indeed, there is reason to think that experts themselves are vulnerable to heuristics, and that reliance on actuarial data could lead to substantial improvements in accuracy.⁵⁹ In the domain of regulation, quantitative risk analysis is the most straightforward way of overcoming the errors that sometimes accompany heuristics. Consider the controversy over regulation of arsenic in drinking water.⁶⁰ The availability and representativeness heuristics ensure that many people will be quite frightened of arsenic, even in extremely low doses. Quantitative risk analysis can work as a kind of System II check on potential errors.

C. Generalizing Representativeness

Kahneman and Tversky also suggest that judgment heuristics, understood as attribute substitution, operate not only to answer questions about uncertain events, but also in a diverse class of judgments. In making judgments of fact and value, we often substitute a simple question for a hard one. (In asking about the meaning of the Constitution in a difficult case, we might think that the best approach is simply to investigate the view of people with whom we generally agree; we ask not, “what does the Constitution mean here?” but instead “what does Judge X or Professor Y think the Constitution means here?”) Indeed availability, representativeness, and affect might be seen as “general purpose” heuristics in the sense that they are not limited to issues of probability. People seem to be more convinced, for example, by messages with many arguments

⁵⁸With respect to intelligence, there is a nice qualification: When the problem is very hard for everyone, intelligent respondents are most likely to err, because they “are more likely to agree on a plausible error than to respond randomly” (p. 68).

⁵⁹See Robyn Dawes et al., *Clinical versus Actuarial Judgment*, p. 716.

⁶⁰See Cass R. Sunstein, *The Arithmetic of Arsenic*, Geo. L.J. (2002).

(rather than few), by arguments that are relatively long, and by messages with statistics or supported by credible experts; these patterns seem to show the representativeness heuristic in action.⁶¹ And it is easy to see how affect might be a kind of all-purpose heuristic for assessments of objects and their attributes—a point suggesting the likely importance of initial reactions, by judges and juries alike, to cases presented to them. Kahneman and Frederick go so far as to urge that a modest generalization of the representativeness heuristic helps to explain strikingly similar biases in economic valuations of public goods and retrospective evaluations of past events. In particular, Kahneman and Tversky emphasize the crucial role of prototypes, or representative exemplars, in making complex judgments.

How much are people willing to pay to save animals? It turns out that people are highly sensitive to the prototypes involved and highly insensitive to the numbers of animals at stake. A program that involves members of a popular species will produce a much higher willingness to pay than a program that involves members of an unpopular species (p. 71). At the same time, people's willingness to pay does not differ greatly with large variations in the numbers involved; their willingness to pay is about the same to save 2,000, 20,000, and 200,000 birds (p. 75). There is a clear parallel here to people's neglect of base-rates in using the representativeness heuristic to make probability judgments. Kahneman and Frederick also show that in evaluating past experiences, such as exposure to unpleasant noises, painful medical procedures, or horrific film clips, people show duration neglect (p. 77). In one experiment, for example, people's evaluations of horrific movies were largely unaffected by substantial variations in their length (id.). In another experiments, people's evaluations of colonoscopies were greatly influenced by the highest level of pain involved and also by the level of pain at the end, but not much by significant variations in the duration of the procedure (from 4 to 69 minutes). Here too Kahneman and Frederick urge that the prototype, captured in the Peak Affect and the End Affect, dominates evaluation. The finding seems in light with more casual empiricism: People's retrospective judgments, of very good times and very bad times, seem to have little to do with the duration of those times, and a great deal to do with Peak and End.

With respect to law and policy, an intriguing implication here is that people's use of prototypes will crowd out variables that, on reflection, have clear importance. There is a serious problem with contingent valuation studies if

⁶¹See Shelly Chaiken, The Heuristic Model of Persuasion, in *Social Influence: The Ontario Symposium*, vol. 5 10-11 (Mark Zanna et al. eds. 1987).

people's judgments do not attend to the number of animals at stake. And indeed, some of the pathologies in regulatory policy do seem connected with this problem. Evidence suggests, for example, that people "worry more about the proportion of risk reduced than about the number of people helped."⁶² A striking study of this effect finds that people pervasively neglect absolute numbers, and that this neglect maps onto regulatory policy.⁶³ In a similar vein, Christopher Hsee and Yuval Rottenstreich have shown that when emotions are involved, people neglect two numbers that should plainly be relevant: the probability of harm and the extent of harm.⁶⁴ This finding is closely connected with several papers in this volume, to which I now turn.

III. Emotions, Contagion, and Affect

How are judgments, especially judgments about the likelihood of risk or benefit, influenced by emotions and affect? Let us begin with two papers that draw on the representativeness heuristic.

A. False Contagions and Phony Cures

Paul Rozin and Carol Nemeroff explore "sympathetic magical thinking," including the beliefs that some objects have special contagious properties and that causes resemble their effects.⁶⁵ Consider some findings about disgust and fear. Many educated Americans will not eat food touched by a sterilized cockroach (p. 202). They refuse chocolates that have been shaped into realistic-looking dog feces (id.). They are reluctant to use sugar from a bottle labeled "Sodium Cyanide, Poison," even if they are assured, and believe, that the bottle really contains sugar and never contained cyanide (id.)—and indeed even if they themselves placed the label, arbitrarily, on that particular bottle (p. 205)! In fact people are reluctant to eat sugar labeled, "Not Sodium Cyanide," apparently because the very words "Sodium Cyanide" automatically bring up negative

⁶²See Jonathan Baron, *Thinking and Deciding* 500–502 (Cambridge: Cambridge University Press, 3d ed. 2000).

⁶³See T.L. McDaniels, *Comparing Expressed and Revealed Preferences for Risk Reduction*, 8 *Risk Analysis* 593 (1988).

⁶⁴See Yuval Rottenstreich and Christopher Hsee, *Money, Kisses, and Electric Shocks: On the Affective Psychology of Risk*, 12 *Psych. Science* 185, 186–188 (2001); Christopher Hsee and Yuval Rottenstreich, *Music, Pandas, and Muggers: On the Affective Psychology of Value* (University of Chicago, June 26, 2002).

⁶⁵Paul Rozin and Carol Nemeroff, *Sympathetic Magical Thinking: The Contagion and Similarity "Heuristics,"* id at 201.

associations.⁶⁶ People are reluctant to wear a sweater than has been worn for five minutes by a person with AIDS (p. 207). In this case, as in other cases involving contagion, people are relatively insensitive to dose. A sweater worn for five minutes by someone with AIDS, and then washed, is not much more undesirable than a sweater used by someone with AIDS for a full year. According to most respondents, a single live AIDS virus that enters the human body is as likely to infect someone with the virus as 10,000 or even 1,000,000 viruses (p. 207). Note in this regard that disgust and fear tend to “travel”; in both experimental and real-world settings, people are especially likely to spread “urban legends” that involve risks of contamination.⁶⁷

In some of these cases, the intuitive fear or revulsion can be easily overridden, as reflection reveals that there is no real hazard. Here we seem to have good evidence of the relationship between System I and System II. System I gives rise to an immediate sense of alarm or revulsion, but System II will usually provide a corrective (even if System I continues to squawk). But not always. Paul Slovic has found that most people accept a kind of “intuitive toxicology,” showing agreement with the suggestion that “there is no safe level of exposure to a cancer-causing agent” and that “if you are exposed to a carcinogen, then you are likely to get cancer.”⁶⁸ Apparently some intuitions about fear are part of everyday thinking, even reflective thinking, about social risks.

Thomas Gilovich and Kenneth Savitsky use the idea that “like goes with like” to unpack the structure of a wide range of false beliefs, both ancient and modern.⁶⁹ Many primitive beliefs about medicine reflect the belief that the symptoms of a disease are likely to resemble both its cause and its cure. According to ancient Chinese medicine, for example, those with vision problems should eat ground bats, on the theory that bats have especially good vision, which might be transferred to people (p. 619). Homeopathy, which remains quite popular, depends in part on the idea that if a substance creates disease symptoms in a healthy person, it will have a healthy effect on someone who

⁶⁶There is a lesson here about rhetoric in law and politics: Disclaimers, or statements distinguishing one’s position for an unpopular position that might be confused with it (“I’m not angry, but” or “To say this is not to say that I am favoring a tax increase”), might well be ineffective.

⁶⁷See Heath et al., *supra* note, at 1032-1039.

⁶⁸Paul Slovic, *supra* note, at 291.

⁶⁹Thomas Gilovich and Kenneth Savitsky, *Like Goes With Like: The Role of Representativeness in Erroneous and Pseudo-Scientific Beliefs*, in *id.* at 617. Some of these themes are illuminatingly addressed in Thomas Gilovich, *How We Know What Isn’t So* (1995).

currently suffers from those symptoms (p. 620). The idea has some valid applications, but often the symptoms of a disease do not resemble it cause or its cure; consider sanitation and antibiotics (p. 620). Alternative medicines, including New Age therapies, reflect many absurd examples of the representativeness heuristic (p. 620). I believe that the immense popularity of organic foods owes a great deal to heuristic-driven thinking, above all with the view that there is an association between the natural and the healthy, and between chemical and danger.⁷⁰ To the extent that people are suspicious of professionalized medicine, and trust scientifically dubious substitutes, it is often because they are neglecting base-rates, making selective use of the availability heuristic, and misperceiving the effects of randomness, which inevitably produces apparent patterns.⁷¹

B. The Affect Heuristic

Beliefs about contagion are emotionally laden; disgust and revulsion, whether or not grounded in fact, play a strong role. In emphasizing the affect heuristic, Kahneman and Tversky refer to the chapter of that title by Paul Slovic and several coauthors.⁷² This chapter is one of the most interesting and suggestive in the volume. It also creates numerous puzzles, many of them involving law and policy.⁷³

People often have a rapid, largely affective response to objects and situations, including job applicants, consumer products, athletes, animals, risks, cars, plaintiffs, defendants, and causes of action. A jury might have an immediate negative reaction to a plaintiff in a personal injury case; a judge might have a positive intuitive reaction to an equal protection claim; an employer might instantly like, or dislike, someone who has applied for a job.⁷⁴ But what does it mean to say that affect is a “heuristic”? Slovic et al. urge that our affective responses occur rapidly and automatically, and that people use their feelings as a kind of substitute for a more systematic, all-things-considered judgment. It is in this sense that attribute substitution, in the sense meant by Kahneman and Frederick, may be at work; affect toward an object substitutes for a more

⁷⁰For criticism of that association, see Pandora’s Picnic Basket; Naturally Dangerous.

⁷¹See Gilovich, *supra* note; Nassim Taleb, *Foiled by Randomness* (2001).

⁷²Paul Slovic et al., *The Affect Heuristic*, p. 397.

⁷³I have elsewhere discussed an earlier and less elaborate version of Slovic’s work on affect, and I draw on that discussion here. See Cass R. Sunstein, *The Laws of Fear*, *Harv L Rev* (2002).

⁷⁴See Timothy Wilson et al., *Mental Contamination and the Debiasing Problem*, at 185, 198–99.

reflective assessment of the object. But there is an obvious sense in which it is unhelpful to treat “affect” as an explanation for someone’s attitude toward objects. In some settings, affect represents, or is, that very attitude, and therefore cannot explain or account for it. (Would it be helpful to explain Tom’s romantic attraction to Anne by saying that Anne produces a favorable affect in Tom?) Slovic et al. must be urging that sometimes affect works in the same way as availability and representativeness: In many contexts, people’s emotional reactions are substituting for a more careful inquiry into the (factual?) issues at stake.

The simplest way to establish this would be to proceed as Kahneman and Tversky originally did, by showing, for example, that people assess questions of probability by reference to affect, and that this method leads to predictable errors. What is the probability of death from smoking, driving, flying, or eating pesticides? If people’s affect toward these activities matched their probability judgments, producing systematic error, it would certainly be plausible to speak of an affect heuristic. Slovic et al. do not have data of this sort. But they do have some closely related evidence, highly suggestive of an affect heuristic in the domain of risk (pp. 410-413). When asked to assess the risks and benefits associated with certain items, people tend to say that risky activities contain low benefits, and that beneficial activities contain low risks. It is rare that they will see an activity as *both* highly beneficial and quite dangerous, or as both benefit-free and danger-free. Because risk and benefit are distinct concepts, this finding seems to suggest that “affect” comes first, and helps to “direct” judgments of both risk and benefit.

Two studies fortify this hypothesis (pp. 411–12). The first of these tests whether new information about the risks associated with some item alters people’s judgments about the benefits associated with the item—and whether new information about benefits alters people’s judgments about risks. The motivation for this study is simple. If people’s judgments were analytical and calculative, information about the great benefits of (say) food preservatives should not produce a judgment that the risks are low—just as information about the great risks of (say) natural gas should not make people think that the benefits are low. Strikingly, however, information about benefits alters judgments about risks, and that information about risks alters judgments about benefits. When people learn about the low risks of an item, they are moved to think that the benefits are high—and when they learn about the high benefits of an item, they are moved to think that the risks are low. The conclusion is that people assess products and activities through affect—and that information that improves

people's affective response will improve their judgments of all dimensions of those products and activities. A closely related experiment shows that when people are inadequately informed, they tend to think that stocks that are "good" have both high return and low risk, whereas stocks that are "bad" are judged to have low return and high risk (p. 413). In the presence of a high level of information, analysts distinguish perceived risk and return, and their judgments are not produced by a global attitude (id.).

The second study asked people to make decisions under time pressure (p. 412). The motivating claim is that the affect heuristic is more efficient than analytic processing in the sense that it permits especially rapid assessments. Under time pressure, Slovic et al. hypothesize that there would be an unusually strong inverse correlation between judged risk and judged benefit, because affect will be the determinant of assessment, and people will have less time to undertake the kind of analysis that could begin to pull the two apart (p. 412). In other words, System I is most important when time is scarce, and in such circumstances, System II will be a less effective monitor. The hypothesis is confirmed: Under time pressure, the inverse correlation is even stronger than without time pressure.

The affect heuristic casts a number of facts in a new light. Background mood, for example, influences decisions and reactions in many domains.⁷⁵ Consider the remarkable fact that stock prices increase significantly on sunny days, a fact that is hard to explain in terms that do not rely on affect.⁷⁶ One study urges that people are more vulnerable to the use of simple cues when their emotions are aroused and particularly when they are under conditions of stress; in such circumstances, intense indoctrination, in which people do not process systematically, is especially likely.⁷⁷ A related study suggests that when people are anxious and fearful, they are less likely to engage in systematic processing,

⁷⁵See Alice Isen, Positive Affect and Decision Making, in *Research on Judgment and Decision Making* 509 (William Goldstein and Robin Hogarth eds. 1997). Isen notes that "a growing body of research indicates that even mild and even positive affective states can markedly influence everyday thought processes, and do so regularly." Id. But the evidence is inconclusive on whether positive affect increases or decrease the use of heuristics or instead more systematic forms of reasoning. Id. at 526–27.

⁷⁶See David Hirschleifer and Tyler Shumway, *Good Day Sunshine: Stock Returns and the Weather*, available at <http://papers.ssrn.com/sol3/results.cfm>.

⁷⁷See Robert Baron, Arousal, Capacity, and Intense Indoctrination, 4 *Personality and Social Psych. Review* 238, 243–44 (2000).

and hence System II is especially unreliable.⁷⁸ Note here that there is an evident relationship between social influences and the emotions: if emotions weaken systematic processing, they simultaneously increase susceptibility to the apparent views of others.⁷⁹ Fear itself is likely to make people susceptible to the acceptance of faulty logic and to pressure to conform.⁸⁰ As a vivid example, consider the widespread panic, involving millions of people, caused by the radio broadcast of “Invaders From Mars” in 1938; a study suggests that people do have a critical ability that protects against panic, but that the ability can be “overpowered either by an individual’s own susceptible personality or by emotions generated in him by an unusual listening situation.”⁸¹ Social interactions, spreading the news of the invasion, played a crucial role here.⁸² Fear of an invasion by Martians is an exotic case from which general lessons perhaps cannot be drawn, but the example might well be seen as an extreme illustration of a common process by which affect, alongside and fueled by social interactions, can induce widespread fear.

If the affect heuristic seriously influences people’s judgments, it should be possible to manipulate those judgments simply by altering affect, and by associating the altered affect with a commodity, person, or experience.⁸³ Background music in movies, smiling faces in mail order catalogues, name changes by entertainers, and advertisements that link smoking to rugged cowboys and lush waterfalls make a good deal of sense in this light (pp. 417-18). In the case of smoking, the authors think that the possibility of manipulation through “affective tags” creates serious problems. In their view, people who start smoking, especially when young, may have some understanding of the associated risks,⁸⁴ but their behavior is governed by “the affective impulses of the

⁷⁸See Chaiken, *supra* note, at 19–20. Chaiken notes that “people who are anxious about or vulnerable to a health threat, or otherwise experiencing stress may engage in less careful or less extensive processing of health-relevant information.” *Id.* at 20.

⁷⁹Baron, *supra* note, at 244–46.

⁸⁰*Id.* at 244–46.

⁸¹See Joseph Bulgatz, *Ponzi Schemes, Invaders from Mars, and More Extraordinary Popular Delusions and the Madness of Crowds* 134 (1992).

⁸²*Id.* at 128-36.

⁸³Note that the alteration of affect might come through information alone. In the risk experiments mentioned above, information about risks altered affect, as did information about benefits. I do not discuss the relationship between emotions and cognition here, and simply note that on any view of emotions, cognition plays a large role, at least most of the time. See Ledoux, *supra* note; Martha Nussbaum, *Upheavals of Thought* (2002); Jon Elster, *Alchemies of the Mind* (2001).

⁸⁴See W. Kip Viscusi, *Smoke-Filled Rooms* (2002).

moment, enjoying smoking as something new and exciting, a way to have fun with their friends” (p. 418). The authors think that smoking decisions reflect a failure of rationality, producing by a failure of the experiential system; this is a case in which the affect heuristic misfires. The point very much bears on public education campaigns decided to reduce smoking,⁸⁵ and also on the question whether government has sufficient reason, in this context, for paternalism.

The authors emphasize another point with important implications for risk regulation: When an outcome is accompanied by strong emotions, variations in probability have surprisingly little weight on people’s decisions.⁸⁶ What matters are the images associated with the result. The point has received empirical confirmation in a study of people’s willingness to pay to avoid electric shocks, or to be able to kiss favorite movie stars.⁸⁷ In one study, people’s willingness to pay to avoid an electric shock varied little, depending on whether its probability was 1% or 99%!⁸⁸ This point helps explain “why societal concerns about hazards such as nuclear power and exposure to extremely small amounts of toxic chemicals fail to recede in response to information about the very small probabilities of the feared consequences from such hazards” (p. xxx). With respect to hope, those who operate gambling casinos and state lotteries are well-aware of the underlying mechanisms. They play on people’s emotions in the particular sense that they conjure up palpable pictures of victory and easy living. With respect to risks, insurance companies and environmental groups do exactly the same.⁸⁹

⁸⁵Of special interest is a project, run by high-school students in Illinois, designed to prevent young people from smoking. Their extremely successful advertising campaign was designed not to focus on the health risks associated with smoking, but to portray, in very vivid terms, the stupidity and self-destructiveness of smokers, not least in romantic settings. An unanticipated effect of the campaign was to lead smokers to quit, not merely to prevent them from starting. Christi Parsons, State dashes teens' edgy anti-smoking ad campaign, *Chicago Tribune*, June 25, 2002, p.1. Their motto: “Smoking Makes You Look Dumb.” For general information, see <http://www.idecide4me.com/>

⁸⁶I discuss some implications of this point in Cass R. Sunstein, *Probability Neglect: Emotions, Worst Cases, and the Law*, *Yale LJ* (forthcoming 2002).

⁸⁷Yuval Rottenstreich and Christopher Hsee, *Money, Kisses, and Electric Shocks: On the Affective Psychology of Probability Weighting*, *supra*, at 176–88.

⁸⁸See *id.* at 188, showing a willingness to pay \$7 to avoid a 1% risk and \$10 to avoid a 99% risk. Note that there was a large spread, on the basis of probability, for the less “affect-rich” loss of \$20, where the median willingness to pay was \$1 for a 1% chance of loss and \$18 for a 99% of loss. *Id.* at 188

⁸⁹Slovic notes that with respect to products of all kinds, advertisers try to produce a good affect to steer consumers into a certain direction, often through the use of appealing celebrities, through cheerful scenes, or through the creation of an association between the product and the consumer’s preferred self-image. See Slovic, *The Affect Heuristic*, *supra*.

It follows that if government is seeking to encourage people to avoid large risks, and to worry less over small risks, it might well attempt to appeal to their emotions, perhaps by emphasizing the worst-case scenario. With respect to a cigarette smoking, abuse of alcohol, reckless driving, and abuse of drugs, this is exactly what government occasionally attempts to do. It should be no surprise that some of the most effective efforts to control cigarette smoking appeal to people's emotions, by making them feel that if they smoke, they will be dupes of the tobacco companies or imposing harms on innocent third parties.⁹⁰ There is also an opportunity here to try to activate System II, by promoting critical scrutiny of reactions that are based on "affective ties" in cases in which people are neglecting serious risks or exaggerating them. Note here that "the latent anxieties conducive to panic may nevertheless be minimized if the critical abilities of people can be increased," and that education is "one of the greatest preventives of panic behavior."⁹¹

IV. Are People Unrealistically Optimistic?

Thus far I have emphasized heuristics, which can lead to predictable errors, and which have accompanying biases. "Availability bias" exists, for example, when recall of examples makes people toward unrealistically high and unrealistically low assessments of risks. But the heuristics-and-biases literature also explores "pure" biases, in the form of tendencies to err that do not involve attribute substitution. An example is self-serving bias: People care about fairness, but their judgments about fairness are systematically biased in their own direction—a finding that helps to explain litigation behavior, including failures to settle.⁹² One of the most intriguing and complex biases involves optimism.⁹³ With respect to most of the hazards of life, people appear to be unrealistically optimistic. This claim is closely related to the suggestive, with prominent advocates in economics, that people may attempt to reduce cognitive dissonance by thinking that the risks they face are lower than they are in fact.⁹⁴ If people systematically understate risks, there is a serious problem for law and policy,

⁹⁰See note supra; Lisa Goldman and Stanton Glantz, Evaluation of Antismoking Advertising Campaigns, 279 *Journal of the American Medical Association* 772 (1998).

⁹¹Hadley Cantril, *The Invasion From Mars: A Study in the Psychology of Panic* 204 (2d ed. 1966).

⁹²See Linda Babcock and George Loewenstein, Explaining Bargaining Impasse: The Role of Self-Serving Biases, 11 *J Econ Persp* 109 (1997).

⁹³See Shelley Taylor, *Positive Illusions* (1989).

⁹⁴See George Akerlof, The Economic Consequences of Cognitive Dissonance, in *An Economic Theorist's Book of Tales* (19XX).

and a serious problem too for those who accept the rational actor model in the social sciences. At a minimum, efforts should be able to increase information, so that when people run risks, they do so with knowledge of what they are doing. And if such efforts are unsuccessful, and if optimistic bias is intransigent, perhaps people should be blocked from running certain risks entirely.

A. Evidence

The most well-documented findings of optimism involve relative (as opposed to absolute) risk. About 90% of drivers think that they are safer than the average driver and less likely to be involved in a serious accident.⁹⁵ People generally think that they are less likely than other people to be divorced, to have heart disease, to be fired from a job, to be divorced, and much more.⁹⁶ At first glance, a belief in relative immunity from risk seems disturbing, but by itself this finding does not establish that people underestimate the risks that they actually face. Perhaps people have an accurate understanding of their own statistical risks even if they believe, wrongly, that other people are more vulnerable than they are. The “above average” effect might well coexist with largely accurate assessments of abilities and susceptibilities.⁹⁷ With respect to absolute risk, the evidence for unrealistic optimism is less clear, as Daniel Armor and Shelley Taylor show in their contribution to this collection. For significant and personally relevant events, including unwanted pregnancy, people show an accurate understanding of their susceptibility (p. 335). With respect to some low-probability events, including life-threatening risks such as AIDS, people actually tend to overestimate their own susceptibility, and in that sense seem to show pessimistic bias (*id.*).⁹⁸ One survey finds general overestimates of personal risk levels for such hazards as breast cancer (where women rate their actual risk as 40%, with the actual risk being roughly 10%); prostate cancer (where men rank their actual risk as 40%, with the actual risk again being roughly 10%); lung

⁹⁵See Shelley Taylor, *Positive Illusions* 10 (1989).

⁹⁶See Neil D. Weinstein, *Unrealistic Optimism About Future Life Events*, 39 *J Personality & Soc. Psychol.* 806 (1980); Neil D. Weinstein, *Unrealistic Optimism About Susceptibility to Health Problems*, 10 *J. Behav. Med.* 481 (1987); Christine Jolls, *Behavioral Economic Analysis of Redistributive Legal Rules*, in *Behavioral Law and Economics* 288, 291 (Cass R. Sunstein ed. 2000).

⁹⁷See W. Kip Viscusi, *Smoke-Filled Rooms* 162–66 (2002).

⁹⁸Armor and Taylor doubt this conclusion, suggesting that “these estimates may simply reflect difficulties interpreting and reporting extreme possibilities” (p, 335).

cancer (estimated at 35%, compared to an actual risk of under 20%); and stroke (estimated at 45%, compared to an actual risk of roughly 20%).⁹⁹

But in many domains, people do underestimate their statistical risk. For example, professional financial experts consistently overestimate likely earnings, and business school students overestimate their likely starting salary and the number of offers that they will receive (pp. 334-35). People also underestimate their own likelihood of being involved in a serious automobile accident,¹⁰⁰ and their own failure to buy insurance for floods and earthquakes is at least consistent with the view that people are excessively optimistic.¹⁰¹ The evidence of optimistic bias, both relative and absolute, is sufficient to raise questions about informational and regulatory interventions.

B. Debiasing?

Neil Weinstein and William Klein explore a variety of apparently promising strategies to reduce optimistic bias with respect to relative risk.¹⁰² The punch line? None of these strategies worked, not even a little. One study, for example, asked people to generate their own list of personal “factors” that might either increase or decrease their risk of developing a weight problem or a drinking problem. The authors hypothesized that an identification of factors would decrease optimistic bias in many cases; but no such effect was observed. Nor was optimistic bias reduced by asking participants to read about major risk factors for certain hazards, to report their standing with respect to these factors, and to offer an overall risk estimate after responding to the list of factors. The authors conclude that “health campaigns emphasizing high-risk targets (such as smoking interventions that show unattractive pictures of smokers) and campaigns conveying information about undesirable actions (as with pamphlets listing factors that raise the risk for a particular health problem) may unwittingly worsen the very biases they are designed to reduce” (p. 323).

As the authors note, one intervention has been found to reduce optimistic bias: Giving people information about their own standing on risk factors or about their peers’ standing on risk factors. But they observe, sensibly enough,

⁹⁹See Humphrey Taylor, *Perceptions of Risks*, available at http://www.harrisinteractive.com/harris_poll/index.asp?PID=44.

¹⁰⁰Jolls, *supra* note, at 291.

¹⁰¹*Id.*

¹⁰²Neil D. Weinstein and William Klein, *Resistance of Personal Risk Perceptions to Debiasing Intervention*, p. 313.

that it is not easy to adapt this information to media campaigns designed to improve human health. This is a valuable paper, in part because it adds to still-emerging literature on the possibility of debiasing (or the activation of System II). But because the focus is on the “above average” effect, the findings do not offer clear guidance about campaigns designed to give people a better sense of the statistical reality. It would be valuable to learn much more about that topic.

C. Optimistic Fools?

In their extremely illuminating paper, David Armour and Shelley Taylor are concerned with some obvious puzzles: If people are excessively optimistic, why don't they pursue ambitious goals recklessly, and blunder? Why don't alert people—psychologists? entrepreneurs?—take systematic advantage of human optimism? This is what Armour and Taylor see as the “dilemma of unrealistic optimism”—the likelihood that if real, this bias would produce extremely serious harmful effects. Perhaps unrealistic optimism does lead to real-world harms.¹⁰³ But if optimism were as widespread as some research, we should probably see far more recklessness and failure than we generally observe.

The authors resolve the dilemma by giving a more refined sense of the nature of optimistic bias. In their view, people are not indiscriminately or blindly optimistic. Their predictions are usually within reasonable bounds (p. 346). People are less likely to be optimistic when the consequences of error are severe (p. 339)—suggesting that people may not, because of optimistic bias, risk their lives and their health. In addition, optimism decreases if the outcome will be known in the near future; when performance will occur and be evaluated quickly, people's predictions become more accurate (id.). Optimism also decreases when people are in a predecisional state of deliberation. When people are choosing among goals, or among possible courses of action, the bias is attenuated, and it increases again only after people have selected goals and begin to implement their plans (p. 340). There is also evidence that optimistic bias, when it exists, can be adaptive,¹⁰⁴ leading to (almost) self-fulfilling policies, increasing the likelihood of success (p. 341).

¹⁰³For a suggestion to this effect in an interesting context, see Robert Frank and Philip Cook, *The Winner-Take-All Society* (1995). On excessive optimism among entrepreneurs, see Avshalom Tor, *The Fable of the Bees*, *Michigan Law Review* (forthcoming 2002).

¹⁰⁴A general treatment is Shelley Taylor, *Positive Illusions* (1995).

These claims very much bear on the role of law, and provide good reason to question the view that optimistic bias provides a good reason for paternalistic interventions. To be sure, we know enough about optimistic bias to give serious consideration to informational campaigns to ensure that people will not have an inflated belief in their own immunity. In the context of smoking, statistical knowledge of risks¹⁰⁵ might be inadequate if people believe themselves relatively immune.¹⁰⁶ But in view of the arguments by Armor and Taylor, the idea that paternalism is generally justified by optimistic bias must be regarded as an unproven speculation. If people are not excessively optimistic when the consequences of error are severe, if the bias is small or nonexistent when decisions are actually being made, and if people overstate low-probability risks, there may be no problem for the law to correct.

V. Moral Heuristics?

The chapters in this book are almost entirely concerned with how people resolve questions of fact. This should not be surprising. The heuristics-and-biases literature was originally focused on issues of probability, and while many of the chapters go beyond that topic, they do not much deal with normative question—with the role of heuristics in informing judgments about morality and politics.¹⁰⁷ It is natural to wonder whether the rules of morality also have heuristics (isn't that inevitable?), and whether the normative judgments involved in law and politics are also prone to heuristics, or to rapid System I assessments and to possible System II override.

We can imagine some very ambitious claims here. On one view, much of everyday morality, nominally concerned with fairness, should be seen a set of heuristics for the real issue, which is how to promote utility.¹⁰⁸ Armed with psychological findings, utilitarians might be tempted to claim that ordinary moral commitments are a set of mental shortcuts that generally work well, but

¹⁰⁵See Viscusi, *supra* note.

¹⁰⁶See J.Z. Ayanian and P.D. Cleary, *Perceived Risks of Heart Disease and Cancer Among Cigarette Smokers*, 281 JAMA 1019, 1020–21 (1999) (finding that most smokers think that their risks are average or below average). Optimistic bias is raised in this context in Paul Slovic, *Smoking*; but see Viscusi, *supra* note.

¹⁰⁷An exception is the suggestive discussion by Philip Tetlock, who urges that many people believe in “taboo tradeoffs,” and that we might see such people not as defective intuitive economists, but as defenders of sacred values. See Philip Tetlock, *Intuitive Politicians, Theologians, and Prosecutors*, 582, 596–98.

¹⁰⁸See Jonathan Baron, *Judgment Misguided: Intuition and Error in Public Decision Making* (1998).

that also produce severe and systematic errors. (Is retribution a cognitive error? Is Kantianism?) For their part, deontologists could easily turn the tables. Deontologists might well claim that the rules recommended by utilitarians are consistent, much of the time, with what morality requires -- but also that utilitarianism, taken seriously, produces bad mistakes in some cases. And indeed, many debates about deontologists and utilitarians involve claims, by one or another side, that the opposing view leads to results that are inconsistent with widespread intuitions and should be rejected for that reason. Unfortunately, these large debates are unlikely to be tractable, simply because utilitarians and deontologists are most likely to be unconvinced by the suggestion that their defining commitments are biases or mere heuristics. But in some particular cases, we might be able to make some progress by entertaining the hypothesis that some widely accepted rules of morality are heuristics. Consider, for example, the idea that one should “never lie” or “never steal” — good rules of thumb, certainly, but injunctions that badly misfire when the lie, or the theft, is needed to protect the deaths of innocent people.¹⁰⁹ I deal here with several possibilities that relate directly to law.

1. Pointless punishment. People’s intuitions about punishment seem quite disconnected with the consequences of punishment, in a way that suggests a moral heuristic may well be at work. Consider, for example, an intriguing study of people’s judgments about penalties in cases involving harms from vaccines and birth control pills.¹¹⁰ In one case, subjects were told that the result of a higher penalty would be to make companies try harder to make safer products. In an adjacent case, subjects were told that the consequence of a higher penalty would be to make the company more likely to stop making the product, with the result that less safe products would be on the market. Most subjects, including a group of judges, gave the same penalties in both cases. Can this outcome be defended in principle? Perhaps it can, but I think it is far more sensible to think that people are operating under a heuristic, to the effect that penalties should be a

¹⁰⁹Note rule-utilitarian defense of these ideas: They might misfire in particular cases, but it might be best for people to treat them as firm rules, because a case-by-case inquiry would prove even more errors. If people ask whether the circumstances warrant an exception to the prohibition on lying or stealing, there might well be excessive or self-serving lying and stealing. The strong voice of conscience—calling for adherence to what I am calling moral heuristics even in cases in which they badly misfire—probably serves some valuable social functions. For human beings, a decision to go right to the issue of consequences, without firm moral rules of thumb, would likely produce serious problems.

¹¹⁰Jonathan Baron and Ilana Ritov, *Intuitions About Penalties and Compensation in the Context of Tort Law*, 7 *J Risk and Uncertainty* 17 (1993)

proportional response to the outrageousness of the act, and should not be based on consequential considerations.

If this claim seems too adventurous, consider a similar test of punishment judgments, which asked subjects, including judges and legislators, to choose penalties for dumping hazardous waste.¹¹¹ In one case, the penalty would make companies try harder to avoid waste. In another, the penalty would lead companies to cease making a beneficial product. Most people did not penalize companies differently in the two cases. Perhaps most strikingly, people preferred to require companies to clean up their own waste, even if the waste did not threaten anyone, instead of spending the same amount to clean up far more dangerous waste produced by another, now-defunct company. It is at least plausible to think that in thinking about punishment, people use a simple heuristic, the now-familiar outrage heuristic. This heuristic produces reasonable results in most circumstances, but in some cases, it seems to me to lead to systematic errors.

2. Aversion to cost-benefit analysis. An automobile company is deciding whether to take certain safety precautions for its cars. In deciding whether to do so, it conducts a cost-benefit analysis, in which it concludes that certain precautions are not justified—because, say, they would cost \$100 million and save only four lives, and because the company has a “ceiling” of \$10 million per lives saved (a ceiling that is, by the way, significantly higher than the amount the Environmental Protection Agency uses for a statistical life). How will ordinary people react to this decision? The answer is that they will not react favorably.¹¹² In fact they tend to punish companies that base their decisions on cost-benefit analysis, even if a high valuation is placed on human life. By contrast, they do not much punish companies that are willing to impose a “risk” on people.¹¹³ What underlies these moral judgments?

A careful look raises the possibility that when people disapprove of trading money for risks, they are generalizing from a set of moral principles that are generally sound, and even useful, but that work poorly in some cases. Consider the following moral principle: Do not knowingly cause a human death.

¹¹¹Jonathan Baron et al., Attitudes Toward Managing Hazardous Waste, 13 Risk Analysis 183 (1993).

¹¹²See W. Kip Viscusi, Corporate Risk Analysis: A Reckless Act?, Stan L Rev (2000).

¹¹³See id. See also See Philip Tetlock, Coping With Tradeoffs, in Elements of Reason: Cognition, Choice, and the Bounds of Rationality 239, Arthur Lupia et al. eds. (Cambridge: Cambridge University Press, 2000)

People disapprove of companies that fail to improve safety when they are fully aware that deaths will result—whereas people do not disapprove of those who fail to improve safety while appearing not to know, for certain, that deaths will ensue. When people object to risky action taken after cost-benefit analysis, it seems to be partly because that very analysis puts the number of expected deaths squarely “on screen.”¹¹⁴ Companies that fail to do such analysis, but that are aware that a “risk” exists, do not make clear, to themselves or to jurors, that they caused deaths with full knowledge that this was what they were going to do. People disapprove, above all, of companies that cause death knowingly.

I suggest, then, that a genuine heuristic is at work, one that imposes moral condemnation on those who knowingly engage in acts that will result in human deaths. The problem is that it is not always unacceptable to cause death knowingly, at least if the deaths are relatively few and an unintended byproduct of generally desirable activity. If government allows new highways to be built, it will know that people will die on those highways; if government allows new power plants to be built, it will know that some people will die from the resulting pollution; if companies produce tobacco products, and if government does not ban those products, hundreds of thousands of people will die; the same is true for alcohol. Much of what is done, by both industry and government, is likely to result in one or more deaths. Of course it would make sense, in most or all of these domains, to take extra steps to reduce risks. But that proposition does not support the implausible claim that we should disapprove, from the moral point of view, of any action taken when deaths are foreseeable.

I do believe that it is impossible to vindicate, in principle, the widespread social antipathy to cost-benefit balancing. But to adapt a claim about the representativeness heuristic by Stephen Jay Gould (p. 68), “a little homunculus in my head continues to jump up and down, shouting at me” that corporate cost-benefit analysis, trading dollars for a known number of deaths, is morally unacceptable. The voice of the homunculus, I am suggesting, is not the result of conscience, but instead of a crude but quite tenacious moral heuristic.

3. Acts and omissions. There has been much discussion of whether and why the distinction between acts and omissions might matter for law and policy. In one case, for example, a patient might ask a doctor not to provide life-

¹¹⁴It is also the case that explicit trading of money for lives is strongly disfavored, see Tetlock, *supra* note. I am hypothesizing that some of this effect, and possibly a great deal of it, comes from the fact that someone has knowingly engaged in action that will result in deaths.

sustaining equipment, thus ensuring the patient's death. In another case, a patient might ask a doctor to inject a substance that will immediately end the patient's life. People seem to have a strong moral intuition that the failure to provide life-sustaining equipment, and even the withdrawal of such equipment, is acceptable and legitimate -- but that the injection is morally abhorrent. And indeed constitutional law reflects judgments to this effect.¹¹⁵ But what is the morally relevant difference?

It is worth considering the possibility that the action-omission distinction operates as a heuristic for the more complex and difficult assessment of the moral issues at stake. From the moral point of view, harmful acts are generally worse than harmful omissions, in terms of both the state of mind of the wrongdoer and the likely consequences of the wrong. But harmful acts are not always worse than harmful omissions, and the moral puzzles arise when life, or a clever interlocutor, comes up with a case in which there is no morally relevant distinction between acts and omissions, but when moral intuitions strongly suggest that there must be such a difference. In such cases, we might hypothesize that moral intuitions reflect an overgeneralization of principles that usually make sense—but that fail to make sense in the particular case.¹¹⁶ In other words, moral intuitions reflect System I and they need to be corrected by System II. I believe that the persistent acceptance of withdrawal of life-saving equipment, alongside persistent doubts about euthanasia, is a demonstration of the point.

Consider in this regard the dispute over two well-known problems in moral philosophy.¹¹⁷ The first, called the trolley problem, asks people to suppose that a runaway trolley is headed for five people, who will be killed if the trolley continues on its current course. The question is whether you would throw a switch that would move the trolley onto another set of tracks, killing one person rather than five. Most people would throw the switch. The second, called the footbridge problem, is the same as that just given, but with one difference: the only way to save the five is to throw a stranger, now on a footbridge that spans the tracks, into the path of the trolley, killing that stranger but preventing the trolley from reaching the others. Most people will not kill the stranger. But what is the difference between the two cases, if any? A great deal of philosophical work has been done on this question, much of it trying to suggest that our firm

¹¹⁵See *Washington v. Glucksberg*.

¹¹⁶See Jonathan Baron, *Nonconsequentialist Decisions*, in *17 Behavioral and Brain Sciences* 1 (1994).

¹¹⁷See Joshua Greene et al., *An fMRI Investigation of Emotional Engagement in Moral Judgment*, 293 *Science* 2105 (2001).

intuitions can indeed be defended in principle. Let me suggest a simpler answer. As a matter of principle, there is no difference between the two cases. People's different reactions are based on moral heuristics which condemn the throwing of the stranger but support the throwing of the switch. These heuristics generally point in the right direction. But they misfire in drawing a distinction between the two cases. In this sense, the action-omission distinction leads to systematic errors.

Is there anything to be said to those who believe that their moral judgments, distinguishing the trolley and footbridge problems, are entirely reflective, and reflect no heuristic at all? Consider an intriguing experiment, designed to see how the human brain responds to the two problems. The authors do not attempt to answer the moral questions in principle, but they find "that there are systematic variations in the engagement of emotions in moral judgment,"¹¹⁸ and that brain areas associated with emotion are far more active in contemplating the footbridge problem than in contemplating the trolley problem.¹¹⁹ As in the case of fear, where an identifiable region of the brain makes helpfully immediate but not entirely reliable judgments,¹²⁰ and where other, also identifiable regions can supply correctives, so too, perhaps, in the context of morality and law.

4. Betrayals. To say the least, people do not like to be betrayed. A betrayal of trust is likely to produce a great deal of outrage. If a babysitter neglects a child, or if a security guard steals from his employer, people will be angrier than if the identical acts were performed by someone in whom trust has not been reposed. So far, perhaps, so good. And it should not be surprising that people will favor greater punishment for betrayals than for otherwise identical crimes.¹²¹ Perhaps the disparity could be justified on the ground that the betrayal of trust is an independent harm, one that warrants greater deterrence and retribution—a point that draws strength from the fact that trust, once lost, is not easily regained. But consider a finding that is harder to explain: People are especially averse to risks of death that come from products designed to promote safety, so much so that people have been found to prefer a greater chance of dying, as a result of accidents from a crash, to a significantly lower chance of dying in a crash as a result of a malfunctioning air bag.¹²² Indeed, "most people are willing to double

¹¹⁸Id. at 2106,

¹¹⁹Id.

¹²⁰See Ledoux, *supra* note.

¹²¹See Jonathan Koehler and Andrew Gershoff, *Betrayal Aversion* (2000).

¹²²Id.

their chance of dying to avoid incurring a very small chance of dying via betrayal.”¹²³

What explains this seemingly bizarre and self-destructive preference? I suggest that a heuristic is at work: Punish, and never reward, betrayals of trust. The heuristic generally works well. But it misfires in some cases, as when those who deploy it end up increasing the risks they themselves face. An air bag is not a security guard or a babysitter, endangering those whom they have been hired to protect. It is a product, to be chosen if it decreases aggregate risks. If an air bag makes people safer on balance, it should be used, even if in a tiny percentage of cases it will create a risk that would not otherwise exist. To reject air bags on grounds of betrayal is irrational—irrational but understandable, the sort of mistake to which heuristics often lead human beings. The distinctive feature of the anti-betrayal heuristic is that it involves moral and legal judgments rather than judgments of fact.

These are speculative remarks on some complex subjects. But if heuristics play a role in factual judgments, and sometimes lead people to make systematic errors, there is every reason to believe that heuristics also help produce normative judgments, both moral and legal, and sometimes produce errors there as well. If this is harder to demonstrate, it is largely because we are able to agree, in the relevant cases, about what constitutes error in the domain of facts, and often less able to agree about what constitutes error in the domain of values. I have suggested here that an understanding of heuristics and biases has many implications for legal problems, and I believe that Heuristics and Biases: The Psychology of Intuitive Judgment will illuminate problems of law and policy for many years to come. But we should not be surprised if the ideas of attribute substitution, and of the correction of rapid, intuitive assessments by more reflective processes, have analogues in moral and legal intuitions as well.

¹²³ Id.

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