TAKING BEHAVIORALISM SERIOUSLY: THE PROBLEM OF MARKET MANIPULATION

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In recent years, legal scholars dissatisfied with the behavioral assumptions of the rational actor model have increasingly turned to the findings of cognitive psychologists and decision theorists to enhance the accuracy of efficiency analysis. Jon Hanson and Douglas Kysar review those findings in this Article, concluding that scholars have been well justified in incorporating the behavioralist account of human behavior into law and economics. Nevertheless, Hanson and Kysar argue that those scholars simultaneously have failed to take the findings of behavioral research to their logical conclusion. Using the scholarly application of behavioralist insights to products liability theory as an example, the authors demonstrate that legal scholars thus far have treated cognitive anomalies as relatively fixed and independent influences on individual decisionmaking. Rather than such an exogenous analysis, Hanson and Kysar advocate an endogenous examination of behavioralist findings that allows for internal, dynamic effects of cognitive biases within the decisionmaking model. By recognizing that cognitive anomalies influence not only the behavior of biased decisionmakers but also the incentives of other economic actors, Hanson and Kysar reveal the possibility of market manipulationthat is, the possibility that market outcomes can be influenced, if not determined, by the ability of one actor to control the format of information, the framing and presentation of choices, and, more generally, the setting within which market transactions occur. Again using the field of products liability theory as an example, the authors argue that such market manipulation will come to characterize consumer product markets; powerful economic incentives will drive manufacturers to engage in practices that, whether consciously or not, utilize non-rational consumer tendencies to influence consumer preferences and perceptions for gain. The authors conclude by previewing the evidence from their companion article that demonstrates the seriousness of the problem of market manipulation and the need for corrective legal devices such as enterprise liability.

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INTRODUCTION

Do we move ourselves, or are moved by an unseen hand . . . ? —Tennyson¹

For the past few decades, cognitive psychologists and behavioral researchers have been steadily uncovering evidence that human decisionmaking processes are prone to nonrational, yet systematic, tendencies.² These researchers claim not merely that we sometimes fail to abide by rules of logic, but that we fail to do so in predictable ways. In the words of Daniel Kahneman and the late Amos Tversky, two pioneering researchers in the field, we are susceptible to illusions of the mind which are "'neither rational, nor capricious.'"³ These cognitive illusions—sometimes referred to as biases⁴—are not limited to the uneducated or unintelligent,⁵ and they are not readily capable of being unlearned.⁶ Instead, they affect us all with uncanny consistency and unflappable persistence.

With a few notable exceptions,⁷ implications of this research for legal institutions were slow in reaching the academic literature.

³ Massimo Piattelli-Palmarini, Probability Blindness: Neither Rational nor Capricious, Bostonia, Mar.-Apr. 1991, at 28, 28 (quoting Amos Tversky and Daniel Kahneman).

⁴ See generally Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases, in Judgment Under Uncertainty: Heuristics and Biases 3 (Daniel Kahneman, Paul Slovic, & Amos Tversky eds., 1982) [hereinafter Judgment Under Uncertainty] (enumerating biases in assessment of probabilities and prediction of values).

⁵ See id. at 7-8 (reviewing evidence of erroneous belief in "law of small numbers" among experienced research psychologists). This article also appears in Judgment and Decision Making 38 (Hal R. Arkes & Kenneth R. Hammond eds., 1986).

⁶ See Amos Tversky & Daniel Kahneman, Rational Choice and the Framing of Decisions, in Rational Choice: The Contrast Between Economics and Psychology 67, 90-91 (Robin M. Hogarth & Melvin W. Reder eds., 1987) [hereinafter Rational Choice].

⁷ Important early works include Robert C. Ellickson, Bringing Culture and Human Frailty to Rational Actors: A Critique of Classical Law and Economics, 65 Chi.-Kent L. Rev. 23, 35-55 (1989) (describing potential contribution of psychology and sociology to economic analysis); Ward Edwards & Detlof von Winterfeldt, Cognitive Illusions and Their Implications for the Law, 59 S. Cal. L. Rev. 225, 269-76 (1986) (speculating on relevance of error analysis to legal practitioners); Elizabeth Hoffman & Matthew L. Spitzer, Willingness to Pay vs. Willingness to Accept: Legal and Economic Implications, 71 Wash.

¹ Alfred Tennyson, Maud 13 (1874).

² This is a wide, interdisciplinary area of research which could be (and has been) given a variety of names. Following recent commentators, we will refer primarily to behavioral research. See Christine Jolls, Cass R. Sunstein, & Richard Thaler, A Behavioral Approach to Law and Economics, 50 Stan. L. Rev. 1471, 1473 (1998) (approaching economic analysis through conception of choice that reflects improved understanding of human behavior); Cass R. Sunstein, Behavioral Analysis of Law, 64 U. Chi. L. Rev. 1175, 1175 (1997) (theorizing that future of economic analysis depends upon new understandings of decisionmaking developed through behavioral research). We note, however, that although the term "behavioralism" or "behavioral economics" seems destined to become dominant in the legal academic literature, economists must share credit for the project with cognitive psychologists and statisticians, among others.

Within the last few years, however, we have seen an outpouring of scholarship addressing the impact of behavioral research over a wide range of legal topics.⁸ Indeed, one might predict that the current behavioral movement eventually will have an influence on legal scholarship matched only by its predecessor, the law and economics movement. Ultimately, any legal concept that relies in some sense on a notion of reasonableness or that is premised on the existence of a reasonable or rational decisionmaker will need to be reassessed in

⁸ See, e.g., Gary L. Blasi, What Lawyers Know: Lawyering Expertise, Cognitive Science, and the Functions of Theory, 45 J. Legal Educ. 313, 329-54 (1995) (arguing that advances in cognitive psychology have made possible more systematic and precise study of legal decisionmaking and problem solving than decisionmaking paradigm); Melvin Aron Eisenberg, The Limits of Cognition and the Limits of Contract, 47 Stan. L. Rev. 211, 211-13 (1995) (arguing that understanding of psychological constraints on decisionmaking ability should influence development of contract law); Christine Jolls, Contracts as Bilateral Commitments: A New Perspective on Contract Modification, 26 J. Legal Stud. 203, 219-24 (1987) (discussing impact of intertemporal preference biases on contract modifications); Christine Jolls, Hands-Tying and the Age Discrimination in Employment Act, 74 Tex. L. Rev. 1813, 1826-28, 1840-45 (1996) (arguing that similar temporal biases justify age discrimination laws in employment as "hands-tying" strategy); Russell Korobkin & Chris Guthrie, Psychology, Economics, and Settlement: A New Look at the Role of the Lawyer, 76 Tex. L. Rev. 77, 113-21 (1997) (uncovering evidence that lawyers as class can aid clients in overcoming effect of heuristics and biases in litigation settlement negotiations); Linda Hamilton Krieger, The Content of Our Categories: A Cognitive Bias Approach to Discrimination and Equal Employment Opportunity, 47 Stan. L. Rev. 1161, 1216-17 (1995) (arguing that discriminatory impact often can result from unintentional cognitive biases rather than from discriminatory motive or intent); Donald C. Langevoort, Selling Hope, Selling Risk: Some Lessons for Law from Behavioral Economics About Stockbrokers and Sophisticated Customers, 84 Cal. L. Rev. 627, 669-91 (1996) (utilizing behavioral economics research to provide model of consumer-broker securities sales transactions); Edward J. McCaffery, Daniel J. Kahneman, & Matthew L. Spitzer, Framing the Jury: Cognitive Perspectives on Pain and Suffering Awards, 81 Va. L. Rev. 1341, 1354-73 (1995) (using experimental model to assess impact of cognitive psychology research on framing of jury instructions and ensuing pain and suffering damages awards); Jason Ross Penzer, Note, Grading the Report Card: Lessons from Cognitive Psychology, Marketing, and the Law of Information Disclosure for Quality Assessment in Health Care Reform, 12 Yale J. on Reg. 207, 233-54 (1995) (questioning effectiveness of consumer-directed health care information disclosures in light of consumer cognitive heuristics and biases). For an overview of the "diffusion" of behavioral research into legal scholarship over the past twenty years, see Donald C. Langevoort, Behavioral Theories of Judgment and Decision Making in Legal Scholarship: A Literature Review, 51 Vand. L. Rev. 1499 (1998).

U. L.Q. 59, 98-114 (1993) (describing divergence between willingness to accept and willingness to pay as applied to law and economics analysis); Howard A. Latin, "Good" Warnings, Bad Products, and Cognitive Limitations, 41 UCLA L. Rev. 1193, 1194-95 (1994) [hereinafter Latin, "Good" Warnings] (examining numerous informational processing and decisionmaking problems that reduce efficacy of disclosure requirements); Howard A. Latin, Problem-Solving Behavior and Theories of Tort Liability, 73 Cal. L. Rev. 677, 745-46 (1985) (using psychological and economic analysis to challenge rational maximizing behavior assumption of tort liability and proposing situational analysis that accounts for actor characteristics, category of risk, and corresponding legal rules).

light of the mounting evidence that a human is "a reasoning rather than a reasonable animal."⁹

This Article contributes to that reassessment by focusing on the problem of manipulability. Our central contention is that the presence of unyielding cognitive biases makes individual decisionmakers susceptible to manipulation by those able to influence the context in which decisions are made. More particularly, we believe that market outcomes frequently will be heavily influenced, if not determined, by the ability of one actor to control the format of information, the presentation of choices, and, in general, the setting within which market transactions occur. Once one accepts that individuals systematically behave in nonrational ways, it follows from an economic perspective that others will exploit those tendencies for gain.

That possibility of manipulation has a variety of implications for legal policy analysis that have heretofore gone unrecognized. We suspect that the failure of scholars to recognize this risk of manipulation stems from at least two factors. First, the primary researchers in the field have devoted little attention to the possibility of market manipulation simply because theirs is a descriptive project. Researchers such as Kahneman and Tversky have devoted most of their work to identifying the existence and causes of cognitive anomalies, not to spelling out the implications of their findings for other disciplines.¹⁰ Second, legal scholars who have examined the behavioral research have done so with an eye toward incorporating the findings into the classical law and economics model, and in so doing they have remained somewhat wedded to that classical model. For instance, Professors Jolls, Sunstein, and Thaler, in their recent and important blueprint for behavioral economic analysis of law, are explicit in that approach: "The unifying idea in our analysis is that behavioral economics allows us to model and predict behavior relevant to law with the tools of traditional economic analysis, but with more accurate assumptions about human behavior, and more accurate predictions and prescriptions about law."11

One important result of this sympathy to the classical economic model is that commentators tend to view cognitive biases as *exogenous* influences on individual behavior; that is, legal scholars typically assume that the biases will have a fixed influence on behavior, unaffected by other factors within the model. This supposed stability of influence allows those scholars to utilize the classical model of eco-

⁹ Alexander Hamilton, quoted in Laurence J. Peter, Peter's Quotations: Ideas for Our Time 315 (1977).

¹⁰ For a discussion of some exceptions, see infra Part III.C.

¹¹ Jolls et al., supra note 2, at 1474 (emphasis added).

nomic behavior with only the (fixed) additional input of a particular cognitive bias. Below we review the work of several scholars who implicitly assume that consumers' risk perceptions are independent of manufacturers' and marketers' efforts to influence them. And even the most sophisticated analyses of the implications of behavioralism for legal rulemaking dramatically understate the extent to which consumers' risk perceptions are endogenous-that is, determined or altered by the market contexts being analyzed. For example, Jolls, Sunstein, and Thaler discuss the shortcomings of information disclosure, a common regulatory solution to market failures.¹² The authors note, for example, that with respect to product hazard warnings, individuals will often perceive risks differently depending on the manner in which risk information is presented.¹³ They also note that "[product manufacturers] will often have an interest in providing the least scary, most pallid version of the information possible."14 To circumvent such perceptual variances, the authors recommend that regulators utilize a variety of bias-specific procedures such as "framing consequences in terms of losses rather than gains,"15 "tak[ing] account of the fact that vivid and personal information will often be more effective than statistical evidence,"¹⁶ and "[a]void[ing] the pitfalls of overoptimism."¹⁷ Although Jolls, Sunstein, and Thaler recognize manufacturers' incentives to downplay risks, theirs is still mostly an exogenous application of behavioral findings: Because individuals display certain fixed and identifiable cognitive features, regulators need only alter hazard warning requirements to suit those features and, consequently, overcome the cognitive limitations of individual actors. Of course, such an approach is a welcome improvement over classical economic analysis of law, which would have failed to acknowledge that different formats for presenting information could have varying degrees of success, much less attempt to identify which formats would be most likely to succeed.

Nevertheless, in our view, the full significance of the behavioral research can only be seen when limitations on decisionmaking abilities are treated as *endogenous* to the economic model—that is, when it is recognized that not only are cognitive biases influencing the behavior of individuals, but other factors within the model are influencing the presence and force of cognitive biases. This possibility arises from the

¹² See id. at 1533-37.

¹³ See id. at 1534.

¹⁴ Id. at 1535.

¹⁵ Id. at 1536.

¹⁶ Id. at 1537.

¹⁷ Id. (emphasis removed).

very same aspect of cognitive biases that has made other legal scholars quick to incorporate them into the classical model: They are "systematic and can be modeled."¹⁸ Just as the predictability of biases makes them easy to assimilate into economic models, it also makes them easy to exploit by those who seek to influence the behavior of economic actors. Thus, while Jolls, Sunstein, and Thaler recognize that individuals react differently to product risk information depending on the manner in which it is presented, they do not fully explore the implications of that anomaly for the market behavior of *other* actors, namely product manufacturers. Given that it is possible for government regulators "to shape people's behavior in desired directions,"¹⁹ it is inevitable that product manufacturers will attempt to alter consumer risk perceptions. The key difference is that they will attempt to elicit lower than accurate perceptions of risk rather than accurate ones.

It is not simply that manufacturers would prefer "the least scary, most pallid version" of a product warning when and if it is required by the government. Rather, it is that manufacturers have incentives to utilize cognitive biases actively to shape consumer perceptions throughout the product purchasing context and independently of government requirements. Advertising, promotion, and price setting all become means of altering consumer risk perceptions, regardless of mandated hazard warnings. This is what we mean by manipulation the utilization of cognitive biases to influence peoples' perceptions and, in turn, behavior. Again, the reluctance of earlier scholars to acknowledge this possibility of manipulation appears to stem from their allegiance to the classical model and desire to remain constructive with respect to it, even when the behavioral research indicates that a more drastic restructuring is required.

The problem of market manipulation has implications for a broad range of legal issues. For at least three reasons, however, we will focus in this Article primarily on the field of products liability law. First, products liability scholarship is dominated by law and economics theory,²⁰ which is premised on a rational actor model of human behavior.²¹ If behavioral economics represents an improvement on classical

²¹ See Bailey Kulkin, The Gaps Between the Fingers of the Invisible Hand, 58 Brook. L. Rev. 835, 837-39 (1992) (describing importance of assumptions of rationality to classical

¹⁸ Id. at 1475.

¹⁹ Id. at 1536.

²⁰ See George L. Priest, The Inevitability of Tort Reform, 26 Val. U. L. Rev. 701, 704-05 (1992):

[[]T]here are few articles within the last ten years and no articles of importance within the last five years written about modern tort law that have not addressed, either as the principal thesis or as the subject to which the thesis of the article is responding, the functional economic analysis [of tort law].

law and economics theory, as many commentators claim,²² then products liability scholarship will need to be reexamined accordingly. Second, the issue of whether, and to what extent, consumers are able to acquire and comprehend product risk information has assumed a position of utmost importance to products liability theory.²³ Because the behavioral findings pertain largely to the manner in which individuals process information, application of those findings to the issue of consumer risk perception has the potential to make significant advances in the products liability literature. Finally, because consumer product purchases generally are the most frequent and familiar market transactions that any of us experience, an examination of the consumer product context provides a relevant, immediate, and accessible way to explore our more general thesis about market manipulation. Indeed, when reviewing the behavioral research findings summarized in this Article, we invite the reader to draw from her experience as a consumer and consider how such cognitive phenomena might play out in the typical product context.

The Article is organized as follows: Part I utilizes the behavioral research to outline a new model of the human decisionmaker, one susceptible to a range of nonrational tendencies. Although other surveys of the behavioral research are available,²⁴ we have attempted to organize the findings in a manner that departs significantly from the now standard law review summary of the literature. That is, we seek to do more than merely catalogue a set of observed behavioral quirks. By reviewing new sets of literature that begin to unravel the motivations and impulses lying *behind* such behavioral phenomena, we hope to provide a decisionmaker model that is relevant to a broader and more realistic range of behavioral contexts than the traditional economic actor, or even the newly enhanced economic actor (with biases) offered by Jolls, Sunstein, and Thaler.

 22 See, e.g., Jolls et al., supra note 2, at 1473 ("Our goal in this article is to advance an approach to the economic analysis of law that is informed by a more accurate conception of choice, one that reflects a better understanding of human behavior and its well-springs."); Sunstein, supra note 2, at 1175 ("The future of economic analysis of law lies in new and better understandings of decision and choice.").

²³ See, e.g., Enterprise Responsibility for Personal Injury, 1 A.L.I. 230 (1991) ("The principle assumption in the literature supporting a role for legal liability is that consumers underestimate product defect risks and, as a consequence, put insufficient market pressure on firms to produce safety.").

²⁴ See, e.g., Jolls et al., supra note 2, at 1473-75; Latin, "Good" Warnings, supra note 7, at 1220-57; Sunstein, supra note 2, at 1177-79. A particularly helpful summary can be found in Matthew Rabin, Psychology and Economics, 36 J. Econ. Lit. 11, 11-13 (1998).

law and economics); W. Kip Viscusi, Individual Rationality, Hazard Warnings, and the Foundations of Tort Law, 48 Rutgers L. Rev. 625, 636 (1996) (noting that "foundation of economic analysis of choice is based on the rationality of individual decision making").

Moreover, because we shed some light on the psychological processes that actually drive observed behavior, our literature survey helps illuminate the endogenous nature of risk perceptions: that is, an analysis that takes account of the dynamic effects that multiple actors can exert upon each other within the decisionmaking context. Indeed, the framework we employ in our review of behavioral literature enables us to generate predictions about the way in which manufacturers and consumers will behave in the product context. In short, our review of behavioral research describes many findings from the literature that previously have received little or no attention from legal scholars and presents them in a manner that yields new insight into products liability and other legal questions.

Part II then examines the ways in which products liability scholars have thus far viewed the behavioral research and its impact on consumer risk perception. More specifically, we note that commentators tend to fall into one of two camps: those who find in the behavioral literature evidence that consumers generally overestimate risk, and those who find evidence that consumers generally underestimate risk. We also review in Part II the ALI Reporters' Study on Enterprise Liability and Personal Injury. The ALI Study provides an important first attempt at organizing the behavioral research into a form capable of yielding tort law policy implications. Nevertheless, we argue that the Study relies on a non-representative sample of behavioral research and that much of the excluded evidence casts doubt on the Study's policy conclusions. Moreover, we argue that even the evidence relied upon in the Study fails to support its policy conclusions.

We turn in Part III to our own view of the significance of behavioral research. We argue that previous commentators have focused unwarranted attention on the largely unanswerable question of whether consumers, before they interact with market forces, tend to systematically over- or underestimate product risks. In our view, the question is only a small part of the story, because whatever their risk perceptions might be independent of market influences, consumers will be susceptible to manipulation by manufacturers within the market context. Thus, scholars attempting to categorize the relevant product risks as ones that would be over- or underestimated ignore the more fundamental message of the cognitive bias literature that perceptions are manipulable. It is on this manipulability of consumer perceptions and on the strong market forces that will lead manufacturers to manipulate that we focus in this Article.

We conclude by previewing two other articles that are part of this project: Taking Behavioralism Seriously: Some Evidence of Market Manipulation,²⁵ and Taking Behavioralism Seriously: A Potential Response to Market Manipulation.²⁶ In those articles, we will offer empirical support for our thesis that manufacturers manipulate consumer perceptions of products, and we will argue that a products liability standard of enterprise liability may provide the best response to this problem of market manipulation.

I

A BRIEF OVERVIEW OF BEHAVIORAL RESEARCH

During the last three decades, while law faculties across the nation were succumbing to the brilliant simplicity of the Coase theorem and the analytical force of the law and economics movement,²⁷ social scientists in other departments were discovering evidence that should have given pause to even the most ardent legal economic positivist. Those scientists—cognitive psychologists, behavioral researchers, probability theorists, and others—were discovering powerful evidence that the rational actor model, upon which the law and economics project depends, is significantly flawed. In place of the rational actor model, those scientists were developing a human decisionmaker model replete with heuristics and biases, unwarranted self-confidence, a notable ineptitude for probability, and a host of other nonrational cognitive features.

A. Expected Utility Theory and the Origins of Behavioral Research

In 1944, mathematician John von Neumann and economist Oskar Morgenstern published a book entitled *Theory of Games and Economic Behavior*.²⁸ The importance of this work can hardly be overstated. In addition to launching the entire field of game theory,²⁹ it has also been credited with reviving the notion of utility and

²⁵ Jon D. Hanson & Douglas A. Kysar, Taking Behavioralism Seriously: Some Evidence of Market Manipulation, 112 Harv. L. Rev. 1420 (1999) [hereinafter TBS II].

²⁶ Jon D. Hanson & Douglas A. Kysar, Taking Behavioralism Seriously: A Potential Response to Market Manipulation, 6 Roger Williams L. Rev. (forthcoming Fall 2000) [hereinafter TBS III].

²⁷ See Ellickson, supra note 7, at 26-30 (describing historical growth of law and economics movement in American legal academia).

²⁸ John von Neumann & Oskar Morgenstern, Theory of Games and Economic Behavior 555-86 (1944) (applying mathematical game theory to economic problems).

²⁹ See William M. Goldstein & Robin M. Hogarth, Judgment and Decision Research: Some Historical Context, in Research on Judgment and Decision Making 4 (William M. Goldstein & Robin M. Hogarth eds., 1997). At least one commentator has speculated that the awarding of Nobel Prizes to three game theorists in 1994—the fiftieth anniversary of the publication of von Neumann and Morgenstern's seminal book—was more than mere coincidence. See The Games Economists Play, Economist, Oct. 15, 1994, at 96. For a useful introduction to game theory, see generally Ian Ayres, Playing Games with the Law,

"ma[king] subjectivity respectable again in economics."³⁰ Those accomplishments were related for von Neumann and Morgenstern: In order to develop a theory of optimal economic decisionmaking under situations of imperfect information, the authors needed a concept of utility that was not woodenly restricted to monetary values over single states of being. Von Neumann and Morgenstern therefore posited a theory of decisionmaking according to a principle of maximizing expected utility. A somewhat oversimplified example helps make their insight clear: If someone faces a 10% chance of winning \$100, her expected utility is .10 * \$100 = \$10. Using this concept, von Neumann and Morgenstern were able to talk meaningfully about optimal economic decisionmaking under situations of uncertainty. For instance, when faced with a choice between a 25% chance of winning \$100 and a 10% chance of winning \$1000, an individual should ordinarily select the latter option to maximize expected utility (because .10 * \$1000 = 100 while .25 * 100 = 25.31

Much of von Neumann and Morgenstern's work then was devoted to deriving rules of optimal decisionmaking in similar, though far more complicated, problem settings. That work, and the work of other game theorists, led to the following sorts of decisionmaking principles or axioms that rational actors could be expected to honor:³²

(i) Ordering. Between two objects, a person must either prefer one to the other or be indifferent to both. In other words, under expected utility theory, apples and oranges are entirely susceptible to comparison. Similarly, all preferences are transitive, such that if

³¹ It should be noted that von Neumann and Morgenstern did not strictly equate maximum expected utility with maximum monetary payoffs. See Robyn M. Dawes, Rational Choice in an Uncertain World 11 (1988) (reviewing modern origins of rationality theory). Thus, for instance, someone down on her luck and simply in need of money to eat may prefer a 25% chance of winning some amount of money to a 10% chance of winning a greater amount. One would say that .25 times her expected utility for \$100 is greater than .10 times her expected utility for \$1000. "The catch is that by specifying the theory in terms of utility rather than monetary value, it is almost always possible to *assume* that some sort of maximization principles work and then define utilities accordingly." Id. at 13 (emphasis in original). Perhaps in order to avoid this tautology (and provide a more quantifiable framework), legal economists often equate utility maximization with monetary wealth maximization.

³² This list of "crucial axioms" is derived from Colin Camerer, Individual Decision Making, in The Handbook of Experimental Economics 587, 618 (John H. Kagel & Alvin E. Roth eds., 1995) [hereinafter Handbook of Experimental Economics]. There have been several different formulations of these axioms and much debate over their precise content. One widely used summary is provided in R. Duncan Luce & Howard Raiffa, Games and Decisions: Introduction and Critical Survey 25-31 (1957).

 ⁴² Stan. L. Rev. 1291 (1990); Stephen W. Salant & Theodore S. Sims, Game Theory and the Law: Ready for Prime Time?, 94 Mich. L. Rev. 1839, 1840-46 (1996) (book review).
³⁰ Detlof Von Winterfeldt & Ward Edwards, Decision Analysis and Behavioral Research 561 (1986).

one prefers A to B, and B to C, we would expect her to prefer A to C as well.³³

(ii) Continuity. Every prize B is indifferent to some lottery involving just A and C. For instance, suppose a person prefers A to B, and B to C. If there is a lottery in which the probability of winning A is p and the probability of winning C is 1-p, there must be some value for p in which the person is indifferent between the lottery and B.³⁴ In other words, if the odds are right, a person will always gamble.

(iii) Independence. A person's preferences between two objects should remain unchanged when the objects are substituted into identical lotteries. Thus, if one prefers A to B when the objects are viewed alone, she should prefer a fifty-fifty chance at winning A to a fifty-fifty chance at winning B. Similarly, if one is indifferent between A and B, she should also be indifferent between two lotteries offering A and B on identical terms—"the other possible alternatives [to the lotteries] must be irrelevant to the decision that they are indifferent."³⁵

(*iv*) Invariance. Kahneman and Tversky have identified a final axiom so basic that it is often tacitly assumed by decision theorists rather than explicitly offered as a testable axiom. This principle, invariance, refers to the requirement that "different representations of the same choice problem should yield the same preference."³⁶ Thus, where alternative descriptions of the same outcome are formulated, players should express the same preferences regardless of which description is presented.

The ultimate conclusion to be derived from these axioms of decisionmaking is that players will act in the manner that maximizes their expected utility. For behavioral research, the significance of *Theory* of *Games and Economic Behavior* lies less with this theoretical proposition than with the fact that economists began to assume its *descriptive* validity. Rational behavior came to be synonymous with expected-utility-maximizing behavior. Broad economic contexts, such as capital and labor markets, were empirically shown to operate in a manner consistent with the new rationality. Policy choices began to be made on the assumption that humans, whether individually or through

 $^{^{33}}$ Similarly, if she were indifferent between A and B, and B and C, she should be indifferent between A and C as well.

³⁴ To see this, note that if p is 1, then the lottery is equivalent to A, in which case the lottery will be preferred to B. If p is 0, then the lottery is equivalent to C, in which case B is preferred to the lottery. At some point in between, therefore, the person must be indifferent between B and the lottery.

³⁵ Luce & Raiffa, supra note 32, at 27.

³⁶ Tversky & Kahneman, supra note 6, at 69.

groups, behaved according to the principle of expected utility maximization.³⁷ Robert Ellickson's terse summary of economic modeling reveals the wide influence of von Neumann and Morgenstern's theoretical work:

This powerful conception of rationality, largely accepted as both a normative and empirical matter by the economic community,³⁹ prompted a far different reaction among psychologists: "A (seemingly) defensible theory of rational behavior was too intriguing to resist, and empirical tests . . . were soon conducted to see if people actually behaved in the manner prescribed by expected utility theory."⁴⁰ Because the axioms of decisionmaking described above were said to lead to a rational strategy of maximizing expected utility, an obvious research strategy for psychologists was to test whether people actually behaved according to the required axioms. In that challenge, the field of behavioral research was born.⁴¹

B. A Review of the Behavioral Literature

In a well known experiment, Amos Tversky and Daniel Kahneman asked subjects to imagine that they must select between alternative vaccine programs to combat an unusual disease that will

⁴⁰ Id. at 5.

³⁷ See Goldstein & Hogarth, supra note 29, at 11 ("Economics, and significant parts of political science and sociology, largely accepted utility theory as normatively binding and descriptively valid and took it as a cornerstone of the theoretical edifice." (citations omitted)).

³⁸ Ellickson, supra note 7, at 23.

³⁹ This should not be overstated. Some of the most important early criticisms of expected utility theory, involving decision problem "paradoxes" which consistently elicited behavior at odds with expected utility predictions, came from economists. See Goldstein and Hogarth, supra note 29, at 12 (describing Allais and Ellsberg paradoxes).

⁴¹ See Robin M. Hogarth & Melvin W. Reder, Introduction: Perspectives from Economics and Psychology, in Rational Choice, supra note 6, at 1, 5 ("[A]lthough decision making has become an increasingly important topic in psychology in recent years, this interest is fairly recent, dating from the 1950s, when psychologists first began systematic investigations of human choice behavior, investigations that, incidentally, were originally stimulated by economic models." (citation omitted)).

kill 600 people if nothing is done.⁴² The first group of subjects was presented with these choices:

If program A is adopted, 200 people will be saved.

If program B is adopted, there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that none of the 600 people will be saved.

The second group was asked to select from these choices:

If program C is adopted, 400 people will die.

If program D is adopted, there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die.

Under von Neumann and Morgenstern's expected utility theory, one might predict that the subjects would be indifferent between all four programs because each presented the same expected result: 200 people will live and 400 will die. One might even attempt to enrich the model by, say, predicting a higher utility for those programs which present a possibility of escaping with zero lives lost.43 Thus, one might expect that the subjects would prefer programs B and D, respectively. The way Kahneman and Tversky's subjects actually responded, however, could not have been predicted with expected utility theory, at least not without violating its most basic axioms. In the first scenario, seventy-two percent of subjects chose program A; in the second scenario, seventy-eight percent chose program D.44 Yet, programs A and C are logically *identical*, as are programs B and D; they both present the same consequences but inspire vastly different reactions. Put differently, the options offered to each group of subjects were identical, yet the subjects' choice between the two options appears to depend largely on how the options were described. Such inconsistency calls into question the central principle of expected utility theory-that individuals seek to maximize their expected utility. If individuals behave differently when presented with identical possible consequences, then they must be operating under some other influence.

Kahneman and Tversky's study provides an example of what cognitive psychologists call *framing effects*.⁴⁵ People prefer program A

⁴⁴ See Kahneman & Tversky, supra note 42, at 343.

⁴⁵ See generally Amos Tversky & Daniel Kahneman, The Framing of Decisions and the Psychology of Choice, 211 Science 453 (1981) (finding significant changes in preferences based on seemingly inconsequential changes in formulation of choice problems).

⁴² See Daniel Kahneman & Amos Tversky, Choices, Values, and Frames, 39 Am. Psychologist 341, 343 (1984).

 $^{^{43}}$ This would be based on a prediction that the subjects' utility for avoiding all casualties was not strictly linear with avoiding some positive number of casualties; that is, subjects would experience a utility far greater in proportion from saving all 600 lives than simply saving 200. Again, von Neumann and Morgenstern's conception of expected utility allowed for such variations. See von Neumann & Morgenstern, supra note 28, at 30.

because it is framed in terms of guaranteed lives saved; people reject program C because it is framed in terms of guaranteed lives lost. Framing effects are representative of the type of phenomena that behavioral researchers encountered when they began testing the veracity of economic predictions about human behavior. Similar nonrational mental processes and representations have steadily been identified over the past two decades such that recent commentators can now cite "a whole range of systematic errors and biases."46 Largely because of the nature of the biases, the discoveries have been slow in coming and subject to considerable challenge.⁴⁷ At this point, however, as two of the pioneers in the field of cognitive biases have concluded, "the deviations of actual behavior from the normative model are too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system."48 These discoveries have not only found their way into the law review literature, they have given rise to a cascade of articles and to what might well turn out to be the most significant conceptual development in legal theory since the emergence of law and economics.

This Section will review those deviations and cognitive illusions, dividing them into two rough categories: those affecting the way in which individuals attempt to make "scientific" and probabilistic judgments and those affecting the way in which individuals determine and exhibit their preferences.⁴⁹ We will discuss some important examples of both, bearing in mind that "[behavioral] research is moving rapidly, and it is a daunting task to comprehend its scope."⁵⁰

1. Manipulability of Scientific and Probabilistic Judgments

In this subsection, we will review a series of cognitive biases that impact the way in which individuals make scientific and probabilistic judgments. As will be shown, these biases do not merely represent erroneous or imprecise applications of reasoning—they do not represent reasoning in the classical sense at all. Instead, these biases reveal

⁴⁶ J. St B.T. Evans, Bias and Rationality, in Rationality: Psychological and Philosophical Perspectives 6, 6 (K.I. Manktelow & D.E. Over eds., 1993) (discussing paradox of individual rationality and bias).

⁴⁷ Cf. Piattelli-Palmarini, supra note 3, at 31-32:

[[]W]e are intimately persuaded that we are able to cope with uncertainty, at least in the main. In hindsight, given the pervasiveness and insidiousness of these cognitive illusions, it is hardly surprising that it took so long to discover them, and that even today these stunning discoveries do not attract the public attention they deserve.

⁴⁸ Amos Tversky & Daniel Kahneman, Rational Choice and the Framing of Decisions, 59 J. Bus. S251, S252 (1986).

⁴⁹ See Goldstein & Hogarth, supra note 29, at 11-26 (adopting this division).

⁵⁰ Id. at 35.

a deep misunderstanding of the nature of scientific judgment and a series of mental crutches awkwardly constructed to take up the slack. Their cumulative effect is to impair our appreciation of risk and uncertainty so severely that one commentator has termed the condition *probability blindness.*⁵¹ Whether blind or just impaired, people's sense of scientific and probabilistic judgment is inarguably of doubtful acuity.

a. The Formation and Influence of Personal Hypotheses. Considerable research indicates that individuals act, in effect, as lay scientists, adopting and testing hypotheses, or explanations for understanding the world. People have a strong tendency to construct "theories" to account for events or relationships that they find salient.⁵² Such theories enable individuals to organize and, perhaps, understand the world around them. Unfortunately, however, lay scientists, much like professionals, often fail to practice "good science." Put differently, people's constructed theories often can be a source of confusion and misestimation rather than clarification and understanding.

i. Belief Perseverance. One of our most basic flaws as lay scientists, for example, is that after constructing a hypothesis or explanation, we tend to disregard evidence that contradicts that hypothesis and exaggerate evidence that confirms it. There is, in other words, strong support for the common-sense view that first impressions carry disproportionate weight. One of the better known experiments demonstrating this tendency was a 1964 study in which subjects were shown blurred pictures that were gradually brought into focus.⁵³ Different subjects were introduced to the photos at different stages of sharpened focus, but the pace of the sharpening process and the final degree of focus was identical for all subjects. Interestingly, the more

⁵¹ See Piattelli-Palmarini, supra note 3, at 28 (describing common cognitive traps).

⁵² See generally Harold H. Kelley, The Processes of Causal Attribution, 28 Am. Psychologist 107 (1973). By "theories" we do not necessarily mean full-blown scientific causal accounts. Rather, we mean informal social theories that merely attempt to explain, to the satisfaction of the thinker, a relationship between two or more observations. These theories may have their origins in a variety of places: "Some theories or beliefs about particular relationships may thus be based at least partially on data. Others may be based on deductions from broader beliefs about the world, conventional folk wisdom, semantic associations, or persuasive communications by family, friends, or the mass media." Dennis L. Jennings, Teresa M. Amabile, & Lee Ross, Informal Covariation Assessment: Data-Based Versus Theory-Based Judgments, in Judgment Under Uncertainty, supra note 4, at 211, 227.

⁵³ See Jerome S. Bruner & Mary C. Potter, Interference in Visual Recognition, 144 Sci. 424 (1964).

of the sharpening process that subjects viewed, the less likely they were to be able to identify the object in the photograph. That is, if a subject began looking at the photo when it was severely blurred, that subject had a more difficult time identifying the object than a subject who began viewing the photo when it was less severely blurred. As the researchers concluded, "[I]nterference may be accounted for partly by the difficulty of rejecting incorrect hypotheses based on substandard cues."⁵⁴ Put differently, if individuals construct their initial hypothesis at a time when their basis for, or ability to, make such a judgment is particularly weak, they may be unable to interpret correctly subsequent better information that is inconsistent with that hypothesis.⁵⁵

ii. Confirmatory Bias. Our inadequacies as scientists run deeper than mere cognitive stubbornness. As Matthew Rabin recently expressed the point, "[p]sychological evidence reveals a stronger and more provocative phenomenon: People tend to misread evidence as additional support for initial hypotheses."56 Numerous experiments have demonstrated, for example, that the same ambiguous information can further polarize people who already hold differing beliefs on certain topics. In one such experiment, researchers asked forty-eight undergraduate students to review evidence on the deterrent effect of capital punishment.57 Half of those students had indicated in an earlier questionnaire that they supported capital punishment and believed that it had a deterrent effect and that research supported their view; half indicated that they opposed capital punishment and believed that it had little or no deterrent effect and that research supported their view. The subjects were then exposed to randomly selected studies on the deterrent effect of capital punishment and asked to assess both whether a given study supported or discredited their views and whether the study had affected their views in any

⁵⁴ Id. at 424.

⁵⁵ As will become clear from the examples provided below, this sort of perseverance bias goes well beyond theories regarding optical uncertainties.

⁵⁶ Rabin, supra note 24, at 26 (discussing people's reluctance to adapt beliefs to new information).

⁵⁷ See Charles G. Lord, Lee Ross, & Mark R. Lepper, Biased Assimilation and Attitude Polarization: The Effects of Prior Theories on Subsequently Considered Evidence, 37 J. Personality & Soc. Psychol. 2098, 2099-2100 (1979); see also John M. Darley & Paget H. Gross, A Hypothesis-Confirming Bias in Labeling Effects, 44 J. Personality & Soc. Psychol. 20, 22-25 (1983) (demonstrating similarly striking polarization effect in study regarding assessment of students' skill levels); S. Plous, Biases in the Assimilation of Technological Breakdowns: Do Accidents Make Us Safer?, 21 J. Applied Soc. Psychol. 1058, 1078-80 (1991) (replicating result in study regarding judgment about safety of nuclear technology).

way.⁵⁸ The researchers found that the subjects' attitudes were polarized at high confidence levels; that is, proponents of capital punishment became more in favor of it and believed more in its deterrent effect, while opponents of capital punishment became less in favor of it and believed less in its deterrent effect.⁵⁹

Research of this sort also suggests that the strength of the confirmatory bias may depend in part on the *type* of evidence an individual views. The more ambiguous and complex the evidence, the more that evidence seems to be susceptible to the confirmatory bias.⁶⁰ As the authors of the experiment regarding capital punishment put it: "With confirming evidence, we suspect that both lay and professional scientists rapidly reduce the complexity of the information and remember only a few well-chosen supportive impressions."⁶¹ With disconfirming evidence, they continue to reflect upon any information that suggests less damaging "alternative interpretations."⁶² Indeed, lay scientists may even view ambiguities or conceptual weaknesses in data *opposing* their theory as somehow supporting their theory's fundamental veracity (rather than simply serving to discredit any other theories that would have relied on the flawed data).⁶³

In a slightly different study of the effects of confirming and disconfirming data, Nancy Pennington and Reid Hastie found that mock jurors remember different facts depending upon the stories that they construct to decide their verdicts.⁶⁴ Not only do they forget facts that are incongruent with their stories, they "remember" facts that were

⁵⁸ See Lord et al., supra note 57, at 2100-01.

⁵⁹ See id. at 2101-02.

⁶⁰ See, e.g., Dale Griffin & Amos Tversky, The Weighing of Evidence and the Determinants of Confidence, 24 Cognitive Psychol. 411, 426-29 (1992) (describing "difficulty effect" whereby subjects exhibit more pronounced overconfidence when presented with more difficult judgment tasks); Gideon Keren, Facing Uncertainty in the Game of Bridge: A Calibration Study, 39 Organizational Behav. & Hum. Decision Processes 98, 113 (1987) (finding that amateur bridge players exhibit significant overconfidence in predicting game outcomes and proposing that "extremely complex" nature of bridge helps explain overconfidence); Gideon Keren, On the Ability of Monitoring Non-Veridical Perceptions and Uncertain Knowledge: Some Calibration Studies, 67 Acta Psychologica 95, 115-17 (1988) (concluding that visual evidence is not particularly subject to bias and that bias may be significant only where some abstraction and some need for interpretation exists); Rabin, supra note 24, at 28 (noting that "[a]mbiguity of evidence is widely recognized to be an important mediating factor in . . . confirmatory bias" (citations omitted)).

⁶¹ Lord et al., supra note 57, at 2099.

⁶² Id.

⁶³ See id.

⁶⁴ See Nancy Pennington & Reid Hastie, Evidence Evaluation in Complex Decision Making, 51 J. Personality & Soc. Psychol. 242, 251 (1986) (concluding that "jurors who choose different verdicts have different interpretations of the evidence, that is, different stories"); Nancy Pennington & Reid Hastie, Explanation-Based Decision Making: Effects of Memory Structure on Judgment, 14 J. Experimental Psychol.: Learning, Memory and

not in evidence. This type of "self-serving bias"65 may be just as pronounced among the litigants themselves. Consider, for example, several studies involving an actual Texas tort case in which subjects were randomly allocated the role of plaintiff or defendant in settlement negotiations.⁶⁶ The subjects received a case summary along with twentyseven pages of materials from the trial and were told that a judge had awarded an amount between \$0 and \$100,000.67 Prior to the settlement exercise, the subjects were asked to guess the amount that the judge awarded and to state what they believed was a "fair" amount for the plaintiff to receive in settlement.⁶⁸ For the judge's award, plaintiffs guessed an average \$14,527 higher than defendants; for the fair settlement amount, plaintiffs stated an average \$17,709 higher than defendants.⁶⁹ Thus, not only do individuals selectively recall evidence to suit a particular story that they have constructed, but they weigh the merits of an entire body of evidence wildly differently depending on something as simple as which side they have been assigned in a role-playing exercise.⁷⁰

Finally, according to behavioralists, one of the most significant effects of the confirmatory bias is the tendency to exaggerate a correlation when doing so confirms one's hypothesis or to underestimate a correlation when one does not subscribe to a hypothesis or theory that might explain the correlation.⁷¹ As an initial matter, Loren J. Chapman and Jean P. Chapman's seminal work on illusory correlations demonstrated that clinicians and laypersons often perceive correlations between variables based on their preconceived notions of the relationship that "should" exist, rather than any actual correlations between the variables.⁷² Later researchers extended this concept to

⁷⁰ See id. at 1504.

 71 See, e.g., Jennings et al., supra note 52, at 227-30 (noting "an actor's beliefs or expectations can constitute a self-fulfilling prophecy" because of need for data to be consistent with actor's theories).

⁷² For instance, clinicians were shown to perceive illusory correlations between drawings and the personality traits of those who drew them. See Loren J. Chapman, Illusory Correlation in Observational Report, 6 J. Verbal Learning & Verbal Behav. 151, 151-52 (1967) (noting that four studies failed to confirm clinicians' observation that paranoid patients drew figures with particularly elaborate eyes); Loren J. Chapman & Jean P. Chap-

Cognition, 521, 523-28 (1988) (describing how jurors considered facts confirming their version of story to be stronger and more believable than facts opposing their version of story).

⁶⁵ See Jolls et al., supra note 2, at 1501.

⁶⁶ See id. at 1503-04.

⁶⁷ See id at 1503.

^{68 &#}x27;See id.

⁶⁹ See id. at 1503 (citing Linda Babcock, George Loewenstein, Samuel Issacharoff, & Colin Camerer, Biased Judgments of Fairness in Bargaining, 85 Am. Econ. Rev. 1337 (1995), and George Loewenstein, Samuel Issacharoff, Colin Camerer, & Linda Babcock, Self-Serving Assessments of Fairness and Pretrial Bargaining, 22 J. Legal Stud. 135 (1993)).

cases in which the individual has no preconceived notion or "theory" to explain observed data, and in which the individual does have a theory but the data itself is imprecise or nonexistent.⁷³ These researchers found that individuals underestimate correlation when they have no theory to explain it, and imagine or exaggerate correlation when they do have a preconceived theory to explain it.⁷⁴ In short, the lay scientist appears to be driven by theory rather than data when making judgments and decisions—an approach dramatically at odds with the classical scientific model.

iii. Hypothesis-Based Filtering. There is a related type of confirmatory bias, which Matthew Rabin has dubbed "hypothesis-based filtering."⁷⁵ As Rabin explains, although it may be "sensible to interpret ambiguous data according to current hypotheses, people tend to use the consequent 'filtered' evidence as further evidence for these hypotheses."⁷⁶ Put differently, the confirmatory bias seems to have a self-reinforcing and escalating quality: An individual interprets ambiguous evidence as consistent with her initial hypothesis and then views that evidence, as interpreted, as further confirmation of her hypothesis. That confirmation in turn strengthens her faith in the initial hypothesis and makes her even more willing to interpret future ambiguous evidence as consistent with it. This process continues in circular fashion, further solidifying the initial "theories" or beliefs of the lay scientist.

iv. Entity Effect. Finally, perhaps the most striking finding is that people's hypotheses often take on a life of their own—that is, they persevere even when the evidence that initially gave rise to them is thoroughly and completely discredited. For example, it seems that people's impressions of their own abilities (or the abilities of their peers) often survive even after the evidence upon which the initial

⁷³ See Jennings et al., supra note 52, at 224 ("The theories we hold apparently lead us to expect and predict stronger empirical relationships than actually exist; and many of the empirical relationships that do exist, even ones of consequential magnitude, are apt to go undetected unless we already expected to find them.").

⁷⁴ See id.

⁷⁵ Rabin, supra note 24, at 28 (emphasis removed).

man, Genesis of Popular but Erroneous Psychodiagnostic Observations, 72 J. Abnormal Psychol. 193, 198-200 (1967) (observing significant tendency among clinicians to make illusory correlations between personality traits and physical body parts typically associated with them); Loren J. Chapman & Jean P. Chapman, Illusory Correlation as an Obstacle to the Use of Valid Psychodiagnostic Signs, 74 J. Abnormal Psychol. 271, 274 (1969) (suggesting that clinicians' correlation of traits with homosexuality is determined primarily by strength of verbal associative connection with trait rather than by objective reality).

⁷⁶ Id.

impression is based is invalidated. In one study, subjects, who had been told that their social sensitivity and empathetic ability were being assessed, received fabricated feedback indicating their ability to distinguish authentic from inauthentic suicide notes.⁷⁷ Subjects were then thoroughly "debriefed" in a way that made very clear that the feedback they had received had been bogus. Subjects' subsequent predictions of future task success and ratings of their own abilities were nevertheless heavily influenced by the earlier (but discredited) feedback.⁷⁸ The same sort of perseverance effects were observable in the predictions of observers who witnessed the subjects' original feedback and debriefings.⁷⁹

More recent studies have continued to demonstrate the same phenomenon and, furthermore, have begun to shed light on the way in which individuals' causal theories can take on their own momentum. In one pair of experiments, for instance, subjects were provided a small amount of evidence to suggest that either a positive or negative empirical relationship existed between a trainee's preference for risk—as measured by a paper and pencil test—and his or her subsequent success as a firefighter.⁸⁰ The fictitious evidence consisted of background information, such as age, marital status, and hobbies, of one successful firefighter and one unsuccessful firefighter along with each firefighter's scores on the risk-preference test. Some of the subjects were asked to provide an explanation for any relationship that they discovered when reviewing that evidence.⁸¹ Then, as with the previous study, some subjects were "debriefed"—that is, they were

⁷⁸ See id. at 883-84 ("[E]ven after debriefing procedures . . . subjects continued to assess their performances and abilities as if these test results still possessed some validity.").

⁷⁹ See id. at 885-88. For additional evidence and discussion of this sort of phenomenon, see Lee Ross & Craig A. Anderson, Shortcomings in the Attribution Process: On the Origins and Maintenance of Erroneous Social Assessments, in Judgment Under Uncertainty, supra note 4, at 129, 144-51 (observing that beliefs are "remarkably resilient in the face of empirical challenges that seem logically devastating"); Lee Ross, Mark Lepper, Fritz Strack, & Julia Steinmetz, Social Explanation and Social Expectation: Effects of Real and Hypothetical Explanations on Subjective Likelihood, 35 J. Personality & Soc. Psychol. 817, 817 (1977) (noting that false feedback continued to influence actors' self-perceptions even after that feedback was totally discredited through extensive debriefing procedure).

⁸⁰ See Craig A. Anderson, Mark R. Lepper, & Lee Ross, Perseverance of Social Theories: The Role of Explanation in the Persistence of Discredited Information, 39 J. Personality & Soc. Psychol. 1037, 1039-40 (1980).

⁸¹ By prompting deliberation in this manner, researchers may have tapped into the false-confidence effect that individuals sometimes experience when they go through a process of reasoning. See infra text accompanying notes 128-32 (describing unwarranted confidence that often results from reasoning).

⁷⁷ See Lee Ross, Mark R. Lepper, & Michael Hubbard, Perseverance in Self-Perception and Social Perception: Biased Attributional Processes in the Debriefing Paradigm, 32 J. Personality & Soc. Psychol. 880, 882-83 (1975).

informed that the evidence they were shown suggesting a relationship between risk preferences and success as a firefighter was fictitious and of absolutely no probative value. The researchers then examined whether the subjects would continue after the debriefings to be influenced by the theories they constructed before the debriefings. The results were striking:

[A]lthough the "data" to which subjects had been initially exposed were objectively quite weak (consisting of only two cases) and in a domain of little personal relevance, this initial ostensible evidence clearly exerted a strong effect on subjects' theories about the true relationship between the two variables. Thus, in the no-debriefing conditions, subjects exposed to a positive relationship saw risky responses as highly diagnostic of later success, whereas subjects exposed to an apparent negative relationship believed the opposite to be true. . . . [T]he total discrediting of the evidence on which subjects' initial theories had been based had only a minimal impact on subjects' beliefs concerning the relationship between risk preference and firefighting ability. Within the debriefing conditions, subjects initially exposed to data indicative of a positive relationship continued to believe that a positive relationship existed, whereas subjects in the negative relationship condition continued to believe in a negative relationship In fact, the slight decrease in the strength of subjects' beliefs following debriefing . . . was not statistically significant⁸²

The authors concluded that the studies provide support for three general conclusions.⁸³ First, the studies provide further evidence for the basic hypothesis that individuals persist in their beliefs even when such persistence is neither normatively nor logically warranted. Second, the studies illustrate that earlier research may have underestimated the tenacity of belief perseverance: "[I]nitial beliefs may persevere in the face of a subsequent invalidation of the evidence on which they are based, even when this initial evidence is itself as weak and inconclusive as a single pair of dubiously representative cases."⁸⁴ Finally, the studies provide support for the hypothesis that belief perseverance is exacerbated when an individual generates her own causal

⁸² Anderson et al., supra note 80, at 1041-42.

⁸³ See id. at 1045.

⁸⁴ Id. at 1045 (emphasis added). "That subjects will persevere in beliefs with such weak empirical grounding in the face of a complete refutation of the formative evidence for those beliefs seems eloquent testimony to the pervasiveness of our propensity to resist changing our attitudes or beliefs." Id. at 1046. Notably, "[i]n everyday experience our intuitive theories and beliefs are sometimes based on just such inconclusive data, but challenges to such beliefs and the formative data for those beliefs are rarely as decisive as the discrediting procedures employed in this study." Id. at 1042.

explanations or scenarios to imply the correctness of her initial beliefs, even if the original data underlying those beliefs is later discredited.⁸⁵

It bears noting that the subjects in this experiment seemed to understand the debriefing procedure that thoroughly discredited the original evidence. Nevertheless, subjects also seemed to believe that their hypotheses were independent of the invalidated evidence and were worthy of independent deference. As the authors of the study explained, subjects "simply felt that the relationship they had examined-whether positive or negative-appeared to be the correct one and that the discrediting of the evidential value of the initial cases was largely irrelevant to their personal beliefs concerning the 'true' relationship existing between these variables."86 If these studies provide an accurate indicator, then clearly the perseverance bias is powerful and pervasive; attitudes and beliefs do not change easily. New data or the refutation of old data does not necessarily influence our beliefs because the hypotheses that we begin with are "largely autonomous" and they "remain available and continue to imply the existence of particular relationships or outcomes even if the data on which they were initially based subsequently prove to be completely devoid of evidential value."87

v. Motivated Reasoning. Belief perseverance, the confirmatory bias, hypothesis-based filtering, and the entity effect may all be understood as examples of a more general phenomenon known as *motivated reasoning.*⁸⁸ This refers to the tendency for individuals to utilize a variety of cognitive mechanisms to arrive, through a process of apparently unbiased reasoning, at the conclusion they privately desired to arrive at all along. As Ziva Kunda has noted, "when one wants to draw a particular conclusion, one feels obligated to construct a justification for that conclusion that would be plausible to a dispassionate observer."⁸⁹ In order to ensure that those justifications still reach the

⁸⁹ Id. at 493.

⁸⁵ The subjects who were "explicitly induced to explain the evidence [that] they ha[d] been shown" exhibited this final result. See id. at 1047. The authors attribute this phenomenon to two features of explanatory accounts: "First, such explanations are, by definition, selectively constructed to fit the evidence or outcome observed. Second, once created, such explanations become largely autonomous of the initial data that led to their postulation." Id.

⁸⁶ Id. at 1045.

⁸⁷ Id. at 1047.

⁸⁸ See Ziva Kunda, The Case for Motivated Reasoning, 108 Psychol. Bull. 480, 480 (1990) ("[M]otivation may affect reasoning through reliance on a biased set of cognitive processes: strategies for accessing, construing, and evaluating beliefs....[M]otivation can be construed as affecting the process of reasoning: forming impressions, determining one's beliefs and attitudes, evaluating evidence, and making decisions.").

desired conclusion, "one accesses only a biased subset of the relevant beliefs and rules."⁹⁰ Thus, not only does the lay scientist perceive and interpret evidence in a manner designed to confirm initial hypotheses, but she constructs the initial hypotheses themselves through biased cognitive processes designed to "reason" toward a desired conclusion.

This selective belief construction can have unfortunate consequences. As Kunda points out:

[P]eople who play down the seriousness of early symptoms of severe diseases such as skin cancer and people who see only weaknesses in research pointing to the dangers of drugs such as caffeine or of behaviors such as drunken driving may literally pay with their lives for their motivated reasoning.⁹¹

Despite the possibility for such regrettable consequences, the practice of motivated reasoning appears to be a universal and, perhaps, immutable characteristic of human nature.

b. False Self-Confidence. The next set of biases, which involve individuals' own self-assessments, are often treated by scholars as independent from the biases described above. Whether or not they are in fact independent, they can be usefully understood simply as manifestations of the motivated reasoning biases. To see how, imagine that individuals begin with the following hypotheses about themselves: "I'm more talented, intelligent, and agile than most; I'm a more competent lay scientist than most; and I'm less likely to be injured than most."⁹² With that sort of self-confidence or theory of the self, the following can be viewed as the perseverance and confirmatory biases, among others, at work in those people's assessment of the risks that they themselves face. This section will summarize evidence that people are indeed overoptimistic or overconfident regarding their own susceptibility to risks.

i. Optimistic Bias.⁹³ An old saying defines a pessimist as "an informed optimist." Behavioral researchers might change that defini-

⁹⁰ Id.

⁹¹ Id. at 496.

⁹² As Massimo Piattelli-Palmarini describes: "What is so worrisome is that we are vastly overconfident in these intuitive judgments. We do not know, but we *think we know*. We are ready to bet, not just money, but in certain cases our life, or the lives of others." Piattelli-Palmarini, supra note 3, at 31.

⁹³ This bias is sometimes referred to as "overconfidence" or "unrealistic optimism." In another article, one of us (with Kyle D. Logue) dubbed a closely related phenomenon the "third-person effect"—the tendency for people to regard others as more susceptible to exogenous risks than they themselves are. See Jon D. Hanson & Kyle D. Logue, The Costs of Cigarettes: The Economic Case for Ex Post Incentive-Based Regulation, 107 Yale L.J. 1163, 1186-88 (1998). Overoptimism might also be called the Lake Wobegon effect

tion to "a debiased optimist," for there is growing evidence that we are naively and stubbornly optimistic at heart, regardless of how well informed we are. For instance, respondents in one study, although correctly estimating that fifty percent of American couples end up in divorce, estimated their own chance of divorce at zero.⁹⁴ Similarly, college students are six times more likely to think they will have above average job satisfaction than below average.95 They are also about six times more likely to think they will own their own homes, two times more likely to think they will have a mentally gifted child, seven times less likely to think they will have drinking problems, and nine and one-half times less likely to think they will divorce soon after marriage.⁹⁶ Overoptimism such as this is present not just among freshman and honeymooners: it exists even in the world of professionals.97 More generally, it is not limited to any particular age, sex, education level, or occupational group.⁹⁸ In short, it appears that most people are overconfident with regard to future life events, even when they understand the actuarial probabilities of such events.99

⁹⁵ See Neil D. Weinstein, Unrealistic Optimism about Future Life Events, 39 J. Personality & Soc. Psychol. 806, 810 (1980).

96 See id.

⁹⁷ See Larry T. Garvin, Adequate Assurance of Performance: Of Risk, Duress, and Cognition, 69 U. Colo. L. Rev. 71, 149 (1998) (summarizing study results and literature); see also Colin F. Camerer & Howard Kunreuther, Decision Processes for Low Probability Events: Policy Implications, 8 J. Pol'y Analysis & Mgmt. 565, 569 (1989) (summarizing empirical evidence).

⁹⁸ See Neil D. Weinstein, Optimistic Biases About Personal Risks, 246 Science 1232, 1232 (1989) [hereinafter Weinstein, Optimistic Biases] ("[Optimistic bias] is robust and widespread. It appears with diverse hazards and samples and with different questions used to elicit the personal risks ratings.... Pessimistic biases are ... rare."); Neil D. Weinstein, Unrealistic Optimism About Susceptibility to Health Problems: Conclusions from a Community-Wide Sample, 10 J. Behav. Med. 481, 494-96 (1987) [hereinafter Weinstein, Conclusions from a Community-Wide Sample] (determining from demographically diverse sample that "optimistic biases are largely unrelated to age, sex, level of education, or occupational prestige").

⁹⁹ Research also indicates that those people who are not overconfident in their ability to make assessments in general are nevertheless often overconfident in specific cases. See Rabin, supra note 24, at 31 (citing Griffin & Tversky, supra note 60, and Andrea O. Baumann, Raisa B. Deber, & Gail G. Thompson, Overconfidence Among Physicians and Nurses: The "Micro-Certainty, Macro-Uncertainty" Phenomenon, 32 Soc. Sci. & Med. 167 (1991)). "Even if people learn the relevant statistical truths of their environment, they may continue to make errors in their judgments and decision making in every single case."

^{(&}quot;where the women are strong, the men are good looking, and all of the children are above average").

⁹⁴ See Lynn A. Baker & Robert E. Emery, When Every Relationship is Above Average: Perceptions and Expectations of Divorce at the Time of Marriage, 17 Law & Hum. Behav. 439, 443 (1993). Similarly, respondents were overly optimistic about likely results if their marriage did fail. See id. (providing further evidence of such optimism with respect to issues such as alimony and child custody in event of divorce).

One particular manifestation of this bias is the tendency of people to underestimate their own chance of suffering some adverse outcome even when they accurately state or even overstate everyone else's chance of suffering that same outcome. In other words, we tend to exhibit the "it can't happen to me" syndrome or, more properly, the "it's less likely to happen to me than the average person" syndrome. As a result, ninety percent of drivers consider themselves to be above-average drivers,¹⁰⁰ and ninety-seven percent of consumers believe that they are average or above average in their ability to avoid bicycle or power-mower accidents.¹⁰¹ Similarly, more people than is logically possible perceive themselves to be less likely than average to suffer negative experiences such as disease,¹⁰² divorce,¹⁰³ criminal victimization,¹⁰⁴ or unemployment.¹⁰⁵

¹⁰⁰ See Ola Svenson, Are We All Less Risky and More Skillful Than Our Fellow Drivers?, 47 Acta Psychologica 143, 146 (1981).

¹⁰¹ See W. Kip Viscusi & Wesley A. Magat, Learning About Risk: Consumer and Worker Responses to Hazard Information 95 (1987).

¹⁰² See James A. Kulik & Heike I.M. Mahler, Health Status, Perceptions of Risk, and Prevention Interest for Health and Nonhealth Problems, 6 Health Psychol. 15, 24 (1987); Arthur G. Miller, W.A. Ashton, J.W. McHoskey, & Joel Gimbel, What Price Attractiveness? Stereotype and Risk Factors in Suntanning Behavior, 20 J. Applied Soc. Psychol. 1272, 1298 (1990); Weinstein, Conclusions from a Community-Wide Sample, supra note 98, at 486; Neil D. Weinstein, Unrealistic Optimism About Susceptibility to Health Problems, 5 J. Behav. Med. 441, 447 (1982) [hereinafter Weinstein, Unrealistic Optimism]; Neil D. Weinstein, Why It Won't Happen to Me: Perceptions of Risk Factors and Susceptibility, 3 Health Psychol. 431, 436 (1984) [hereinafter Weinstein, Why It Won't Happen to Me].

¹⁰³ See Baker & Emery, supra note 94, at 446-48.

¹⁰⁴ See Weinstein, supra note 95, at 810; Weinstein, Why It Won't Happen to Me, supra note 102, at 436.

¹⁰⁵ See Weinstein, supra note 95, at 810. Perhaps the area most focused on by social scientists studying this type of optimistic bias has been individual perceptions of the health hazards of smoking. See, e.g., Ralf Schwarzer, Optimism, Vulnerability, and Self-Beliefs as Health-Related Cognitions: A Systematic Overview, 9 Psychol. & Health 161, 162-63 (1994) (noting that "social comparison bias" can give rise to such flawed beliefs as, "My fellow smokers might get lung cancer one day, but it is less likely that this would happen to me"); Joop Van Der Pligt, Risk Perception and Self-Protective Behavior, 1 Eur. Psycholo-

Rabin, supra note 24, at 31. Kahneman and Tversky call such mistakes "errors of application." Id. (emphasis removed).

It bears noting that such naive optimism may have its advantages: "[T]he only group that seems consistently to get it right—to get subjective probabilities to mirror objective probabilities—is the clinically depressed." See Garvin, supra note 97, at 149 (citing Lauren B. Alloy & Lyn Y. Abramson, Judgment of Contingency in Depressed and Nondepressed Students: Sadder but Wiser?, 108 J. Experimental Psychol. 441 (1979), and Benjamin M. Dykman, Lyn Y. Abramson, & Jeanne S. Albright, Effects of Ascending and Descending Patterns of Success upon Dysphoric and Nondysphoric Subjects' Encoding, Recall, and Predictions of Future Success, 15 Cognitive Therapy & Res. 179 (1991)); see also Weinstein, Optimistic Biases, supra note 98, at 1232 (summarizing studies suggesting that optimism may be associated with less depression, greater willingness to work hard to make optimism self-fulfilling, and increased physical health).

Overoptimism stems from a general tendency to use past experience to estimate future susceptibility. As a result, the risks most likely to cause naive optimism are those in which the individual believes that if the problem has not happened yet, it will not happen at all.¹⁰⁶ Other factors strongly correlated with the operation of the optimistic bias include the perception that a risk is preventable by individual action,¹⁰⁷ the perception that a risk is of low frequency,¹⁰³ and the lack of personal experience with a risk.¹⁰⁹ For policymakers, a final important feature of the optimistic bias is that it is largely resistant to "debiasing interventions."¹¹⁰ In a study of the effects of the provision of risk-factor information, Neil Weinstein and William Klein concluded that "[f]our studies testing a variety of approaches and using a variety of health hazards were unsuccessful in reducing optimistic biases about familiar health hazards."111 In short, it seems that the optimistic bias is an indiscriminate and indefatigable cognitive feature, causing individuals to underestimate the extent to which a threat ap-

gist 34, 36 (1996) (same); see also Hanson & Kysar, TBS II, supra note 25, at 1511-16 (providing detailed review of studies demonstrating optimism among smokers).

¹⁰⁶ See Weinstein, Conclusions from a Community-Wide Sample, supra note 98, at 496 ("For many hazards, an optimistic bias is introduced into comparative risk judgments when people extrapolate from their past experience (not having experienced a problem) to conclude that their future vulnerability is relatively low.").

¹⁰⁷ The perception need not have any basis in truth. For instance, when researchers asked gay men to rate the riskiness of their own sexual conduct for contracting AIDS, most who engaged in high-risk activity did not rate their own risk as high. Their optimism was apparently based on the false confidence they placed in their own risk-countering practices, such as inspecting their sexual partners for lesions or showering after sex. See Laurie J. Bauman & Karolynn Siegel, Misperception Among Gay Men of the Risk for AIDS Associated with Their Sexual Behavior, 17 J. Applied Soc. Psychol. 329, 344-45 (1987).

¹⁰⁸ See id. at 331.

¹⁰⁹ See id. Another explanation for the optimism bias is, as noted above, that people want to maintain a self-conception of being above average. See supra text accompanying notes 100-05. As Weinstein states, "[a]dmitting that peers are less susceptible to harm can threaten our feelings of competence and self-worth." Weinstein, Optimistic Biases, supra note 98, at 1232. And such threats are likely particularly strong in circumstances where a risk is preventable or controllable, which explains the "strong optimism-controllability correlation that exists." Id.; see also Kunda, supra note 88, at 483 (stating that people are motivated to believe that their conduct is not harmful in order to preserve their own selfesteem, but also that "people will come to believe what they want to believe only to the extent that reason permits"); Shelley E. Taylor, Positive Illusions: Creative Self-Deception and the Healthy Mind 243 (1989) ("[T]he idea that positive illusions are in the service of self-esteem virtually requires that they stay in check. If one develops substantially unrealistic expectations regarding the future that greatly exceed what one is actually able to accomplish, then one is set up for failure and disappointment, leading to lower self-esteem."); infra text accompanying notes 114-21 (describing "illusion of control" bias).

¹¹⁰ Neil D. Weinstein & William M. Klein, Resistance of Personal Risk Perceptions to Debiasing Interventions, 14 Health Psychol. 132, 132 (1995).

111 Id. at 138.

plies to them even when they can recognize the severity it poses to others.

ii. Cognitive Dissonance. In addition to identifying countless manifestations of overconfidence such as those discussed above, behavioralists have attempted to explain the phenomenon using the concept of cognitive dissonance. One aspect of this concept is the tendency to reject or downplay information that contradicts other, more favorable views about oneself. In light of this tendency, it is perhaps easy to understand the basic source of people's optimistic bias: People prefer to believe that they are intelligent and are not subjecting themselves to a substantial risk. In the face of a known risk, therefore, individuals come readily to the opinion that they themselves—unlike the average person—are relatively immune,¹¹² and they hold onto these optimistic assessments tenaciously.¹¹³

iii. The Illusion of Control. Scholars have also identified a bias known as the *illusion of control*,¹¹⁴ referring to the human tendency to "treat chance events as if they involve skill and hence are controllable."¹¹⁵ A simple example of this tendency can be seen as gamblers throw dice harder when they need high numbers and softer when they need low numbers. The tendency was even more evident in a series of experiments conducted by Ellen Langer to test the subjective values people placed on lottery tickets.¹¹⁶ The experiment involved a lottery in which each participant was given a card containing the name and picture of a National Football League player; an identical card was

¹¹² See Weinstein, Unrealistic Optimism, supra note 102, at 456-57 (explaining that "optimism arises because people give themselves credit for factors in their favor... and believe that their self-protective actions are more extensive or effective than actions taken by others"); Schwarzer, supra note 105, at 163 (describing "optimistic bias" that causes people to believe that while their peers are at risk of falling victim to negative event, such event will not happen to them); see also George A. Akerlof & William T. Dickens, The Economic Consequences of Cognitive Dissonance, 72 Am. Econ. Rev. 307, 308-09 (1982):

In practice most cognitive dissonance reactions stem from peoples' view of themselves as "smart, nice people." Information that conflicts with this image tends to be ignored, rejected, or accommodated by changes in other beliefs.... Cognitive dissonance theory would suggest that persons in dangerous jobs must decide between two conflicting cognitions. According to one cognition, ego is a smart person who would not choose to work in an unsafe place. If the worker continues to work in the dangerous job, he will try to reject the cognition that the job is dangerous.

¹¹³ See Weinstein & Klein, supra note 110, at 138-39.

¹¹⁴ See Ellen J. Langer, The Illusion of Control, 32 J. Personality & Soc. Psychol. 311, 311 (1975) (defining illusion of control as expectation of personal success that is inappropriately higher than objective probability of success).

¹¹⁵ Dawes, supra note 31, at 256 (discussing how individuals respond to uncertainty). ¹¹⁶ See Langer, supra note 114, at 316.

placed in a bag and the person whose card was chosen from the bag won the lottery. In one trial, cards were randomly allocated while in another subjects were allowed to select their cards. Prior to the drawing, subjects were offered a chance to sell their cards to an experimental collaborator. Subjects who had selected their own player cards demanded *more than four times as much* money to sell their cards as did those with randomly allocated cards.¹¹⁷

In another experiment, Yale undergraduates were convinced that they were better or worse than the average person at predicting the outcome of coin tosses.¹¹⁸ By giving subjects feedback on their predictions that was rigged to show either much greater or much less than 50% accuracy, researchers led subjects to view themselves, not as lucky or unlucky coin-toss predictors, but as good or bad predictors. Indeed, a significant portion of the subjects reported that their performance would be hampered by distraction and that they would improve with practice!¹¹⁹ Finally, Amos Tversky and Ward Edwards uncovered a similar overconfidence in subjects' tactics for predicting the results of random selections from a bag in which 70% of chips were blue and 30% were red.¹²⁰ The maximizing strategy is to predict blue every time, leading to an eventual success rate of 70%. Tversky and Edwards' subjects, however, attempted to match probabilitiesthey predicted blue only 70% of the time in hopes of hitting 100% of the results. That strategy, however, only leads to a 58% success rate $((.70 \times .70) + (.30 \times .30) = .58)$. Despite being paid for the accuracy of their predictions and despite receiving feedback through thousands of trials, most subjects refused to adopt the maximizing strategy of always predicting blue-the strategy which, of course, admits that skill and control are irrelevant to the task.¹²¹

iv. Hindsight Bias. In circumstances in which individuals are confronted with unambiguous evidence of a past outcome, they often construct a hypothesis from which they claim that they could have and would have predicted (and perhaps did predict) that outcome. In essence, most of us believe ourselves to be better than average at predicting outcomes and we use known outcomes as our means of confirming our own "scientific" acumen. This widely recognized and

¹¹⁷ See id.

¹¹⁸ See Ellen J. Langer & Jane Roth, Heads I Win, Tails It's Chance: The Illusion of Control as a Function of the Sequence of Outcomes in a Purely Chance Task, 32 J. Personality & Soc. Psychol. 951 (1975).

¹¹⁹ See id. at 954.

¹²⁰ See Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases, 185 Science 1124, 1129 (1974).

¹²¹ See id.

researched cognitive tendency is known as the *hindsight bias*.¹²² In 1975, one of the founders of the cognitive-bias literature, Baruch Fischhoff, observed that "[r]eporting an outcome's occurrence increases its perceived probability of occurrence; and . . . people who have received outcome knowledge are largely unaware of its having changed their perceptions "123 Apparently, the mere fact that a probabilistic outcome eventuates alters our perception of how probabilistic it was. Indeed, subjects even tend to overestimate the accuracy of their own estimations. That is, not only do subjects overestimate the likelihood of an event after learning of its occurrence, but they also incorrectly recall their own earlier predictions as being more accurate than they actually turned out to be.¹²⁴ This tendency to exaggerate the extent to which our beliefs before an event would have been our beliefs (and that others' beliefs before the event should have been their beliefs¹²⁵) is widely acknowledged even outside of the scholarly literature; hence, the expressions "20/20 hindsight" and "Monday-morning quarterbacking."¹²⁶ That we may be aware of the bias seems not to eliminate it.127

v. The Surprising Effect of Reasoning. It is sometimes suggested that individuals become more realistic when they have experience with a certain risk. To be sure, it is generally the case that some experts have a reasonably correct sense of the accuracy of their own predictions. But that tends to be the case primarily in the limited circumstances in which "feedback takes the form of unambiguous statis-

 126 The legal system has also recognized this bias in some ways—consider, for example, one of the rationales for corporate law's "business judgment rule." See, e.g., Ski Roundtop, Inc. v. Hall, 658 P.2d 1071, 1083 (Mont. 1983) (Morrison, J., dissenting) ("The 'business judgment rule' is employed to immunize corporate officers and directors where they act in good faith, but, as a matter of hindsight, it can be determined that they did not take the course of action which hindsight shows to have been the best selection.").

¹²⁷ For more recent and thorough discussions of the hindsight bias, see Hawkins & Hastie, supra note 125 (reviewing empirical research concerning hindsight phenomena); Jay J.J. Christensen-Szalanski & Cynthia Fobian Willham, The Hindsight Bias: A Meta-Analysis, 48 Org. Behav. & Hum. Decision Processes 147 (1991) (reviewing 122 studies revealing hindsight bias and noting moderation of its effect depending on subject's familiarity with task and type of outcome information presented).

¹²² See, e.g., Hal R. Arkes, Thomas J. Guilmette, David Faust, & Kathleen Hart, Eliminating the Hindsight Bias, 73 J. Applied Psychol. 305 (1988).

¹²³ Baruch Fischhoff, Hindsight \neq Foresight: The Effect of Outcome Knowledge on Judgment Under Uncertainty, 1 J. Experimental Psychol.: Hum. Perception & Performance 288, 288 (1975).

¹²⁴ See Dawes, supra note 31, at 119-20 (discussing "hindsight bias").

¹²⁵ See Scott A. Hawkins & Reid Hastie, Hindsight: Biased Judgments of Past Events After the Outcomes Are Known, 107 Psychol. Bull. 311, 319 (1990); Rabin, supra note 24, at 30 n.25 (noting that "the evidence suggests that we have a tendency to think that other people 'should have known'").

tical evidence."¹²⁸ In contrast, when the pertinent events are not easily predictable and the feedback is not unambiguous, experts tend to be even more overconfident than laypersons. The explanation sometimes offered for that finding is closely related to the "entity effect" of causal theories described above.¹²⁹ Specifically, because experts tend to develop elaborate causal theories with which to generate predictions, the independent weight of those theories can yield especially robust overconfidence. As Griffin and Tversky explain,

If the future state of a mental patient, the Russian economy, or the stock market cannot be predicted from present data, then experts who have rich models of the system in question are more likely to exhibit overconfidence than lay people who have a very limited understanding of these systems. Studies of clinical psychologists . . . and stock market analysts . . . are consistent with this hypothesis.¹³⁰

The counterintuitive lesson is this: Elaborate theories and careful reasoning may foster, rather than mitigate, overconfidence.

It should be noted that this phenomenon, although most pronounced in experts, is not limited to them. Several studies of laypersons have demonstrated that the quality of decisionmaking sometimes declines when individuals are prompted to deliberate and offer reasons for their decision.¹³¹ Because the individuals' confidence levels do not similarly decline, the result is an overconfidence fostered by deliberation.

Timothy Wilson and Suzanne LaFleur recently conducted an experiment that illustrates this false-confidence-building effect of reasoning.¹³² In this experiment, members of six sororities at the University of Virginia were asked to predict whether they would engage in each of six different behaviors toward fellow sorority members during the upcoming semester. Randomly, some subjects were asked to list reasons why they might or might not perform each of the behaviors. At the end of the semester, subjects were asked whether they

¹³² See Timothy D. Wilson & Suzanne J. LaFleur, Knowing What You'll Do: Effects of Analyzing Reasons on Self-Prediction, 68 J. Personality & Soc. Psychol. 21 (1995).

¹²⁸ Rabin, supra note 24, at 32.

¹²⁹ See supra notes 77-87 and accompanying text.

¹³⁰ Griffin & Tversky, supra note 60, at 430 (citing Stuart Oskamp, Overconfidence in Case-Study Judgments, 29 J. Consulting Psychol. 261 (1965), and Frank J. Yates, Judgment and Decision Making (1990)).

¹³¹ For instance, in a study of undergraduate students, Timothy D. Wilson and Jonathan W. Schooler demonstrated that student assessments of the overall quality of strawberry jams comported far less with the assessments of trained sensory experts when the students were asked to provide reasons for their judgments than when they were left to their own devices. See Timothy D. Wilson & Jonathan W. Schooler, Thinking Too Much: Introspection Can Reduce the Quality of Preferences and Decisions, 60 J. Personality & Soc. Psychol. 181 (1991).

had performed each of the six behaviors. While both groups of subjects—those who reasoned about their predictions and those who did not—had stated roughly the same confidence level in their predictions at the beginning of the semester, those who reasoned were in fact significantly less accurate than the control group in their predictions. Thus, both laypeople and experts exhibit a heightened degree of overconfidence when their predictions and decisions are characterized by a process of reasoning.

c. Bad Statisticians. Special attention must be given to the subject of probabilistic judgment, for this is an area where researchers have uncovered a veritable fool's gold mine of nonrational cognitive anomalies.¹³³

The seminal work in the field remains Tversky and Kahneman's *Judgment Under Uncertainty: Heuristics and Biases*.¹³⁴ In it, they describe the way in which individuals rely on heuristics, or mental rules of thumb, to "reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations."¹³⁵ These heuristics provide a rough and ready means for approximating the results of complex computational tasks; however, they can lead to biases, or "severe and systematic errors"¹³⁶ in probabilistic judgment.

i. Availability. In making decisions about uncertain future events, people tend to ignore statistical data in favor of evidence that is particularly salient, vivid, or easily "available" to them.¹³⁷ That is, their probability judgment is driven by the ease with which they can recall previous occurrences of the event or the ease with which they can imagine the event occurring in the future.¹³⁸ Much of the time a person's experience or available memories can provide a fairly sound

¹³³ See, e.g., Paul Slovic, Judgment, Choice and Societal Risk Taking, in Judgment and Decision in Public Policy Formation 98, 99-100 (Kenneth Hammond ed., 1978) ("By and large . . . research indicates that intelligent people systematically violate the principles of rational decision making when judging probabilities, making predictions, or otherwise attempting to cope with probabilistic tasks.").

¹³⁴ See Tversky & Kahneman, supra note 4.

¹³⁵ Id. at 3.

¹³⁶ Id.

¹³⁷ See generally Susan T. Fiske & Shelley E. Taylor, Social Cognition 142-79, 245-94 (2d ed. 1991) (providing general review of availability heuristic in contexts of social schemas and social encoding).

¹³⁸ In the words of Tversky and Kahneman, who coined the term, "a person . . . employ[s] the *availability heuristic* whenever he estimates frequency or probability by the ease with which instances or associations could be brought to mind." Amos Tversky & Daniel Kahneman, Availability: A Heuristic for Judging Frequency and Probability, 5 Cognitive Psychol. 207, 208 (1973) (emphasis added).

sample on which to base a judgment. At other times, however, the *availability heuristic* biases an individual's estimate.¹³⁹

For instance, in one experiment Tversky and Kahneman asked subjects to state whether words that begin with "r" are more or less common in the English language than those that have an "r" as the third letter.¹⁴⁰ A significant majority of the subjects said that words that begin with an "r" are more likely. The statistical fact is the reverse, but words that begin with "r" are easier to recall or generate than words that have an "r" in the third place.¹⁴¹ In another of their experiments, subjects listened to recorded lists of the names of thirtynine people, some of whom could be described only as well known, the remainder of whom could be described as famous.¹⁴² Some lists included nineteen women and more famous women than men, some included nineteen men and more famous men than famous women. When asked whether men or women predominated on the list they had heard, eighty of ninety-nine subjects chose the sex that involved the larger number of famous individuals.¹⁴³

The availability heuristic can be quite powerful in our everyday decisions. In making risk assessments, individuals will often allow "available" evidence to trump much more probative statistical information of which they are aware. As Matthew Rabin describes:

[O]ur assessment of a given city's crime rate is likely to be too influenced by whether we personally know somebody who has been assaulted, even if we are familiar with much more relevant general statistics. Likewise, dramatic stories by people we know about difficulties with a brand of car are likely to be overly influential even if we are familiar, via *Consumer Reports*, with general statistics of the reliability of different brands.¹⁴⁴

140 See id. at 21.

¹⁴² See id. at 208.

143 See id.

¹³⁹ In general, use of the availability heuristic will yield acceptable results when a person's experience and memory of observed events corresponds well with actual event frequencies. It is likely to lead to overestimation if recall or imagination is enhanced (e.g., easily imagined scenario, recent experience, dramatic or salient event), and underestimation if recall or imagination is difficult (e.g., scenario is not easily imagined, no recent experience, no other knowledge of event). See Richard Nisbett & Lee Ross, Human Inference: Strategies and Shortcomings of Social Judgment 18-23 (1980).

¹⁴¹ For those who have their doubts about just exactly where the letter "r" is more commonly located, consider another of Tversky and Kahneman's findings. Subjects asked about the percentage of words ending in "ing" give a much higher estimate than subjects asked about words in which the next-to-last letter is "n"—though it is clear that there must be more of the latter. See Amos Tversky & Daniel Kahneman, Extensional Versus Intuitive Reasoning: The Conjunction Fallacy in Probability Judgment, 90 Psychol. Rev. 293, 295 (1983).

¹⁴⁴ Rabin, supra note 24, at 30.

That is, we use availability as a substitute for rigorous scientific or probabilistic analysis not only when we lack information on a given subject, but also when we have information but lack the cognitive willpower to utilize it properly.

ii. Representativeness. There is another well-known mental rule of thumb, which scholars have dubbed the *representativeness heuristic.*¹⁴⁵ This refers to the tendency of individuals to judge the frequency or likelihood of something by the degree to which the individual believes it resembles something else (i.e., its class). One consequence of representativeness is that people often pay too much attention to specific details (which may or may not contain relevant information), while ignoring or paying too little attention to background information that is relevant. To understand this heuristic, consider a famous experiment conducted by Tversky and Kahneman.¹⁴⁶ Subjects were given the following information and asked to respond to a set of questions in an anonymous survey:

A panel of psychologists have interviewed and administered personality tests to 30 engineers and 70 lawyers, all successful in their respective fields. On the basis of this information, thumbnail descriptions of the 30 engineers and 70 lawyers have been written... For each description, please indicate your probability that the person described is an engineer, on a scale from 0 to 100....

Jack is a 45-year-old man. He is married and has four children. He is generally conservative, careful, and ambitious. He shows no interest in political and social issues and spends most of his free time on his many hobbies which include home carpentry, sailing, and mathematical puzzles.

The probability that Jack is one of the 30 engineers in the sample of 100 is ___%.

Dick is a 30-year-old man. He is married with no children. A man of high ability and high motivation, he promises to be quite successful in his field. He is well liked by his colleagues.

The probability that Dick is one of the 30 engineers in the sample of 100 is ___%.

¹⁴⁵ See Tversky & Kahneman, supra note 4, at 4:

[[]P]eople typically rely on the representativeness heuristic, in which probabilities are evaluated by the degree to which A is representative of B, that is, by the degree to which A resembles B.... This approach to the judgment of probability leads to serious errors, because similarity, or representativeness, is not influenced by several factors that should affect judgments of probability.

¹⁴⁶ See Daniel Kahneman & Amos Tversky, On the Psychology of Prediction, 80 Psychol. Rev. 237 (1973).

Suppose now that you are given no information whatsoever about an individual chosen at random from the sample. The probability that this man is one of the 30 engineers in the sample of 100 is ___%.

Tversky and Kahneman found that responses to the first two questions were often based on how much the described person was judged to sound like an engineer or lawyer without regard to the 30:70 ratio. For example, the description of Jack was judged with very high probability to involve an engineer. Of course, only three in ten will be engineers. But that fact seems to have been forgotten by many. The description of Bill was intended to provide no information. Tversky and Kahneman found that Bill was judged at 50:50, not 30:70. As they explained, most subjects recognized that the description said nothing relevant about a lawyer-engineer distinction, but apparently forgot the base rate information. If subjects believed that the description did not help them determine the occupation of the person, then they should have gone back to base rates and estimated thirty percent. Finally, with respect to the third question, Tversky and Kahneman found that subjects correctly gave 30:70 odds, indicating that they did know how to use the base rate information.147

From their many studies of this sort, Tversky and Kahneman conclude that "[e]vidently, people respond differently when given no evidence and when given worthless evidence. When no specific evidence is given, prior probabilities are properly utilized; when worthless evidence is given, prior probabilities are ignored."¹⁴⁸ Worthless information trumps more relevant evidence, resulting in a *failure to honor base rates*.

Tversky and Kahneman observed a related misconception in a study of experienced research psychologists who honored the fallacious *law of small numbers*. This is the belief that "even small samples are highly representative of the populations from which they are drawn."¹⁴⁹ As a result of this bias, the psychologists in the experiments, who were asked to make predictions from a limited set of evidence and assess their confidence levels in the predictions, afforded too much credence to results from small samples and "grossly overestimated the replicability of such results."¹⁵⁰

In another demonstration of this effect, Tversky and Kahneman asked undergraduate students the following question:

¹⁴⁷ See Tversky & Kahneman, supra note 4, at 5 (summarizing original study).

¹⁴⁸ Id.

¹⁴⁹ Id. at 7.

¹⁵⁰ Id. at 8.
A certain town is served by two hospitals. In the larger hospital about 45 babies are born each day, and in the smaller hospital about 15 babies are born each day. As you know, about 50 percent of all babies are boys. However, the exact percentage varies from day to day. Sometimes it may be higher than 50 percent, sometimes lower.

For a period of 1 year, each hospital recorded the days on which more than 60 percent of the babies born were boys. Which hospital do you think recorded more such days?¹⁵¹

The same percentage—twenty-two—of respondents estimated that either the large or the small hospital recorded more. The rest fifty-six percent—estimated that it was about the same for both hospitals. Only the twenty-two percent that responded that the small hospital recorded more were correct; that is, seventy-eight percent were wrong. The law of large numbers—which, unlike the law of small numbers, is not fallacious—tells us that the larger hospital with more births per day on average would be more likely to replicate the overall distribution. Subjects obviously did not understand that, nor did they understand that the small hospital would be less likely to replicate the overall distribution.¹⁵²

Individuals experience an inverse bias to the law of small numbers whenever they honor the *gambler's fallacy*, the belief that the roulette wheel is "due" to hit red after a long streak of black. "Chance is commonly viewed as a self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium."¹⁵³ Thus, just as Tversky and Kahneman's psychologist subjects believed that a global pattern could be predicted from a local sample, gamblers believe that a local sample must replicate the global pattern. In truth, neither supposition is valid, for probabilities only become meaningful over sufficiently large sample sizes.¹⁵⁴

A final manifestation of the law of small numbers is that people expect too few lengthy streaks in sequences of random events.¹⁵⁵ In the face of such a streak, people tend to invent spurious explanations for the seeming deviation from randomness, when, in fact, there has been no such deviation. For example, basketball coaches, players, and spectators have long believed in something called a "hot hand" when a basketball player has made a series of shots and when that streak seems too long to be random. Psychologists have shown, how-

- 154 See id. at 7-8.
- 155 See id.

¹⁵¹ See id. at 6.

¹⁵² See id.

¹⁵³ Id. at 7.

ever, that a seemingly hot-handed player is in fact no more likely to make his or her next shot than at other times. Put differently, there appears to be no such thing as a truly "hot hand," only random streaks of success that appear to us too long to be truly random.¹⁵⁶

The danger in using representativeness as shorthand for proper probabilistic decisionmaking is significant. The erroneous belief or desire to see patterns¹⁵⁷ in random events causes decisionmakers to have unrealistic expectations about the stability of observed patterns and the replicability of prior beneficial experiences. Likewise, the failure to honor base rates when making predictions can lead to estimates bearing little or no relationship to actual probabilities. In either case, decisionmakers may also tend to have undue confidence in their assessments, believing that the world is much more ordered and deterministic than it actually is.

iii. Anchoring and Adjustment. In yet another series of their famous experiments, Tversky and Kahneman identified the heuristics of anchoring and adjustment.¹⁵⁸ For reasons that should become clear, this heuristic can be understood as a combination of framing and perseverance. When people are asked to generate an estimate, they frequently anchor on an obvious or convenient number (e.g., the mean or the mode) and then adjust upward or downward from that anchor if there is reason to believe that the correct number should be moved in either direction. This procedure naturally leads to estimations which are skewed toward the initial value.

For instance, in one of Tversky and Kahneman's experiments, subjects were asked to estimate the number of African countries in the United Nations as a percentage of total membership.¹⁵⁹ Before the subjects responded, however, a large wheel of chance was spun in the subjects' presence. Though the wheel contained numbers from one to one hundred, it was rigged to land either on ten or sixty-five. When the wheel landed on ten, subjects estimated that African countries comprised twenty-five percent of the United Nations; when the wheel landed on sixty-five, the estimation rose to forty-five percent.¹⁶⁰

¹⁵⁶ See Amos Tversky & Thomas Gilovich, The "Hot Hand": Statistical Reality or Cognitive Illusion?, 2 Chance 31, 31 (1989); Thomas Gilovich, Robert Vallone, & Amos Tversky, The Hot Hand in Basketball: On the Misperception of Random Sequences, 17 Cognitive Psychol. 295, 296 (1985); Amos Tversky & Thomas Gilovich, The Cold Facts About the "Hot Hand" in Basketball, 2 Chance 16, 16 (1989).

¹⁵⁷ This desire may be connected to the more general tendency to construct causal theories. See supra note 52 and accompanying text.

¹⁵⁸ See Tversky & Kahneman, supra note 4, at 14.

¹⁵⁹ See id.

¹⁶⁰ See id.

What is striking about this demonstration is that the anchor provided to the subjects was overtly random and irrelevant, yet still it had a significant impact on the subjects' intuitive judgments.

For clarity, consider another demonstration of the anchoring effect. Subjects were given ten seconds to compute the result of the following multiplication:

$2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$

Kahneman and Tversky found that the average response given was 512. Then a second group of subjects was given the same problem, only arranged in reverse order:

$8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2$

This time the average response was 2,250.¹⁶¹ Thus, the subjects anchored on the result of the first few steps of multiplication and came up with vastly different estimates of products which, by the commutative property, must be identical.

This disparity is quite understandable: Actual calculation of the products would have been impractical given the short time allowed, and subjects naturally begin the estimation by reading left to right along the series. This tendency to read left-to-right results in estimates that are anchored near the product obtained by multiplying the first few numbers in the series, thereby making the order of the series a key factor in the size of the subjects' estimates. It is for this reason that the order of the factors matters—another framing effect. The effect occurs even though subjects know that they read left to right; they simply do not correct for it. But that is not all. The correct answer is 40,320. When subjects are told that they have underestimated the product, their self-correcting guesses are systematically lower than the true result, and always remain *anchored* to their initial answers.¹⁶² The lower the initial figure, the lower the final result, after correction. As one scholar explains:

It is extremely rare that a subject decides to invert the order of calculation and do it right-to-left. It does not help to know that the product does not depend on the order of factors. We know this, but our intuitive estimates cannot use this piece of knowledge. This is what often happens to us: one corner of our mind is unable to use what another corner of our mind knows full well.

... [O]nce we have made an intuitive estimate, even if we are told that we are wrong, we *still* keep the initial rough estimate as an

¹⁶¹ See id. at 15.

¹⁶² See Piattelli-Palmarini, supra note 3, at 29 (describing anchoring effect).

implicit baseline. We are anchored to it. We are unwilling to neglect it completely and start afresh.¹⁶³

d. Experiential Thinking, Affect, and the Perception of Risk. There is wide consensus among psychologists that individuals process information through two parallel mechanisms: a rational system and an emotionally driven experiential system.¹⁶⁴ The former is logical, deliberate, and abstract. As a consequence, it is also inefficient and ill-suited for the majority of everyday judgments and decisions. Instead, individuals typically rely on experiential thinking that is largely automatic and removed from consciousness. This type of information processing is associated with intuitive judgments, emotional responses, and other subtle, nonconscious reactions to external stimuli. These reactions are referred to collectively in the literature as affect.¹⁶⁵

Significantly, "because [experiential thinking] is generally associated with affect, it is apt to be experienced as more compelling than is dispassionate logical thinking."¹⁶⁶ That is, individuals often will be swayed by the force of their affective responses to events and decisions, regardless of whether their rational, sequential, analytical system would opt for a different course. Moreover, "because the influence is usually outside of awareness, the rational system fails to control it because the person does not know there is anything to control."¹⁶⁷

Reliance on experiential thinking has important consequences for individual perceptions of risk. In contrast to the expected utility maximizer of the economist's model—who would assess all risks based solely on a probabilistic analysis of costs and benefits—the experiential thinker can be expected to view risks as multidimensional concepts entailing a range of beliefs, prejudices, and predispositions. Because most information processing occurs automatically and effortlessly "outside of awareness,"¹⁶⁸ the individual's perception of a given risk is likely to be heavily influenced, if not determined, by the affect

¹⁶³ Id. (first emphasis added); see also Paul Slovic & Sarah Lichtenstein, Comparison of Bayesian and Regression Approaches to the Study of Information Processing in Judgment, 6 Org. Behav. & Hum. Performance 649, 712-16 (1971) (demonstrating that people's adjustments from sometimes arbitrary anchors in making numerical estimates of uncertain quantities are usually insufficient).

¹⁶⁴ See Seymour Epstein, Integration of the Cognitive and the Psychodynamic Unconscious, 49 Am. Psychologist 709 (1994) (reviewing wide variety of psychological theories of cognition that support this bifurcated view).

¹⁶⁵ See id. at 710-13.

¹⁶⁶ Id. at 716.

¹⁶⁷ Id.

¹⁶⁸ Id.

associated with that risk.¹⁶⁹ To give just one example of how this type of processing might work, assume that individuals are empirically more likely to associate a feeling of dread with technologically imposed risks such as nuclear power than naturally imposed risks such as earthquakes. If that were the case, individuals could be expected to perceive the magnitude of a technologically imposed risk to be greater than a probabilistically equal natural risk, solely because of the individual's negative affective response to the idea of technological hazards.

In an early and influential series of articles, Paul Slovic, Baruch Fischhoff, and Sarah Lichtenstein began to explore seriously this potential for qualitative, affective responses to bias individual risk perceptions.¹⁷⁰ Utilizing a psychometric study of the determinants of risk perception, these researchers were able to identify a range of characteristics that heavily influence the way in which individuals perceive a given risk. For instance, as described above, a feeling of "dread" can have powerful influences over the risk that individuals associate with a given activity or technology: "The higher a hazard's score [on a 'dread' impression scale] the more people want to see its current risks reduced, and the more they want to see strict regulation employed to achieve the desired reduction in risk."171 Conversely, the more hazards are viewed as "controllable," "voluntary," and "well-known," the less likely individuals will view the hazard as excessive or undesirable.¹⁷² Other relevant attributes include whether the hazard is observable, whether its effect is immediate or delayed, whether it is a "new" risk, whether its consequences are fatal, whether it is globally

¹⁶⁹ See Melissa L. Finucane, Ali Alhakami, & Paul Slovic, The Affect Heuristic in Judgments of Risks and Benefits 3 (Sept. 29, 1998) (unpublished manuscript, on file with the *New York University Law Review*) (reporting studies showing that people often use "affect heuristic," which improves judgmental efficiency by deriving risk and benefit evaluations from common source).

¹⁷⁰ See P. Slovic, B. Fischhoff, & S. Lichtenstein, Accident Probabilities and Seat Belt Usage: A Psychological Perspective, 10 Accident Analysis & Prevention 281 (1978); Paul Slovic, Baruch Fischhoff, & Sarah Lichtenstein, Characterizing Perceived Risk, in Perilous Progress: Managing the Hazards of Technology 91 (Robert W. Kates et al. eds., 1985); Paul Slovic, Baruch Fischhoff, & Sarah Lichtenstein, Cognitive Processes and Societal Risk Taking, in Cognition and Social Behavior 165 (John S. Caroll & John W. Payne eds., 1976); Paul Slovic, Baruch Fischhoff, & Sarah Lichtenstein, Facts and Fears: Understanding Perceived Risk, in Societal Risk Assessment: How Safe is Safe Enough? 181 (Richard C. Schwing & Walter A. Albers, Jr. eds., 1980); P. Slovic, B. Fischhoff, & Sarah Lichtenstein, Perceived Risk: Psychological Factors and Social Implications, 376 Proc. Royal Soc'y London 17 (1981); Paul Slovic, Baruch Fischhoff, & Sarah Lichtenstein, Rating the Risks, 21 Environment 14 (1979).

 ¹⁷¹ Paul Slovic, Perception of Risk: Reflections on the Psychometric Paradigm, in Social Theories of Risk 117, 121 (Sheldon Krimsky & Dominic Golding eds., 1992).
¹⁷² Id.

catastrophic, and whether it poses high risks to future generations.¹⁷³ What is significant is that none of these attributes are relevant under a strict probabilistic assessment of expected costs and benefits. Thus, the principal determinants of risk perception are affective and experiential, not deliberate and rational.

While early researchers focused on the risk characteristics that tend to lead toward positive or negative evaluative feelings about certain risks, more recent studies have focused on the actual mechanism whereby affective responses influence and bias risk perceptions.¹⁷⁴ The most robust finding from the literature is that perceptions of the costs and benefits posed by risks are inversely related. That is, where a risk is perceived as posing high costs, it tends also to be perceived as posing low benefits, and vice versa.¹⁷⁵ In a series of experiments designed to explore this relationship, Ali Siddiq Alhakami and Paul Slovic found that affect significantly influences the degree and direction of individual risk perceptions:

When the attitude [about an activity or technology] is favorable, the activity or technology being judged may be seen as having high benefit and low risk. On the other hand, when the item being evaluated is viewed unfavorably, with negative affect, it may be seen as having low benefit and high risk. Our general attitudes or affective states may thus "confound" the risk/benefit judgment.¹⁷⁶

Thus, individuals consistently fail to assess costs and benefits separately, as an analytic approach to decisionmaking would require, and instead seem to allow their overall impression of the risk to bias both judgments. In that manner, and consistent with the early findings of Slovic, Fischoff, and Lichtenstein, affect becomes a crucial determinant of individual risk perceptions.¹⁷⁷

As one can see, the manner in which individuals actually perceive and understand uncertainty departs significantly from the actuarial assessments of the scientist or the expected utility functions of the economist. We wish to emphasize that this does not necessarily mean that human understanding of risk is misguided or naive simply because it does not comport with the probabilistic understanding of risk. As Paul Slovic has eloquently put it, "[r]isk does not exist 'out there,' independent of our minds and cultures, waiting to be measured.

¹⁷³ See Paul Slovic, Perception of Risk, 236 Science 282, 282-83 (1987).

¹⁷⁴ See, e.g., Ali Siddiq Alhakami & Paul Slovic, A Psychological Study of the Inverse Relationship Between Perceived Risk and Perceived Benefit, 14 Risk Analysis 1085 (1994); Finucane et al., supra note 169, at 8.

¹⁷⁵ See Alhakami & Slovic, supra note 174, at 1085.

¹⁷⁶ Id. at 1088.

¹⁷⁷ See supra notes 170-73 and accompanying text.

Human beings have invented the concept 'risk' to help them understand and cope with the dangers and uncertainties of life. There is no such thing as 'real risk' or 'objective risk.'"¹⁷⁸ Instead, "real risk" and "objective risk" merely represent the central concepts of an alternative theory of how to perceive and comprehend uncertainty in the world, a theory that is necessarily laden with the subjective values and beliefs of the individuals who constructed and perpetuate it. Our point is simply that there is no reason, standing alone, to give primacy to probabilistic judgments of risk, especially when the overwhelming experience of individuals bears little or no relationship to strict probabilistic assessments.

2. Manipulability of Preferences

The preceding discussion should underscore the fact that we are far from flawless assessors of scientific and probabilistic judgments. Unlike the classical economic actor who "can perfectly process available information about alternative courses of action, and can rank possible outcomes in order of expected utility,"¹⁷⁹ human individuals display a startling ineptitude for comprehending causality and probability. We mistake familiarity with numerosity, we allow our predictions to be skewed by something as arbitrary and irrelevant as the spinning of a wheel, and we report that with a little more practice and concentration, we might do a better job at predicting coin tosses.

Apart from these biases, however, behavioralists have also identified numerous ways in which preferences—holding probability estimates constant—can vary by context.¹⁸⁰ We offer descriptions of these biases to emphasize that the way in which humans think about and exert their preferences is complicated. Von Neumann and Morgenstern's elegantly simple conception of expected utility was just that: simple. Behavioral researchers have shown that we do not order our preferences according to simple maximization axioms, but rather our preferences are shaped at least in part by the manner in which they are elicited: "Alternative descriptions of the same choice problems lead to systematically different preferences; strategically equivalent elicitation procedures give rise to different choices; and the preference between x and y often depends on the choice set in which they are embedded."¹⁸¹ In this manner, for the past three decades,

¹⁷⁸ Slovic, supra note 171, at 119.

¹⁷⁹ Ellickson, supra note 7, at 23.

¹⁸⁰ For an overview of these findings, see Paul Slovic, The Construction of Preference, 50 Am. Psychologist 364 (1995).

¹⁸¹ Amos Tversky, Rational Theory and Constructive Choice, in The Rational Foundations of Economic Behaviour 185, 186 (Kenneth J. Arrow et al. eds., 1996).

behavioral researchers have been offering a compelling criticism of expected utility theory; the time now has come to incorporate their findings into legal analysis so that we may have a fuller, more textured model of human decisionmaking.¹⁸²

a. The Status Quo Bias and Endowment Effect. There is what one economist has called "[o]verwhelming evidence show[ing] that humans are often more sensitive to how their current situation differs from some reference level than to the absolute characteristics of the situation."¹⁸³ Put differently, individuals have a tendency to prefer the state of affairs which they perceive as the status quo rather than switching to an alternative state, other things being equal. That tendency is sometimes referred to as the status quo bias.¹⁸⁴

Russell Korobkin has demonstrated the status quo bias in an experiment involving the reaction of first year law students to a hypothetical contractual setting in which they were asked to advise a shipping company during negotiations with a commercial customer.¹⁸⁵ By changing the applicable contract default rule between subjects, Korobkin found that "subjects exhibited *a large and statistically significant bias in favor of the term embedded in the default rule—the status quo term*."¹⁸⁶ Thus, for example, subjects in one group were asked to recommend a per-package dollar amount (on a scale of one dollar to ten dollars) that the shipping company should pay to contract around a default rule of full consequential damages liability; subjects in a second group were asked to recommend an amount that the company should demand in order to accept full liability beyond a statutory de-

¹⁸⁴ The status quo bias has been known to legal scholars for some time under such names as the offer/asking problem or the willingness to pay versus willingness to accept problem. See, e.g., Hoffman & Spitzer, supra note 7; Duncan Kennedy, Cost-Benefit Analysis of Entitlement Problems: A Critique, 33 Stan. L. Rev. 387, 401 (1981).

¹⁸⁵ See Russell Korobkin, The Status Quo Bias and Contract Default Rules, 83 Cornell L. Rev. 608, 634-41 (1998).

186 Id. at 639 (emphasis added).

 $^{^{182}}$ A similar call made by Herbert Simon to the economic community more generally is worth noting:

Economics without psychological and sociological research to determine the givens of the decision-making situation, the focus of attention, the problem representation, and the processes used to identify alternatives, estimate consequences, and choose among possibilities—such economics is a one-bladed scissors. Let us replace it with an instrument capable of cutting through our ignorance about rational human behavior.

Herbert A. Simon, Rationality in Psychology and Economics, in Rational Choice, supra note 6, at 25, 39-40.

¹⁸³ Rabin, supra note 24, at 13 (citation omitted); see also Jolls et al., supra note 2, at 1535 ("[P]eople evaluate outcomes based on the change they represent from an initial reference point, rather than based on the nature of the outcome itself \dots ").

fault of limited liability.¹⁸⁷ Subjects in the first group recommended paying a *maximum* of \$4.46 to limit consequential damages liability, while subjects in the second group recommended a *minimum* asking price of \$6.96 to accept full liability.¹⁸⁸ Similarly, when faced with a choice between "pay your own fees" or "loser pays" attorney fee provisions, subjects overwhelmingly preferred whichever provision was designated as the state default rule, despite a clear admonition that, "if the parties wish to specify [otherwise] by contract . . . such a provision would be fully enforceable."¹⁸⁹ These two findings, along with others provided by Korobkin,¹⁹⁰ vividly demonstrate for legal scholars the manner in which the status quo bias affects how individuals register their preferences.

Many behavioral tendencies related to the status quo bias have been identified. For instance, when it comes to choosing between options that represent deviations from the status quo, people are substantially more averse to losses from some given reference point than they are attracted to same-sized gains.¹⁹¹ In addition to this *loss aversion*, behavioralists have also identified an *endowment effect*.¹⁹² Once an individual comes to possess an item, she instantaneously (or nearly so) values that item more than she did prior to possessing it. In one well-known study, for example, several scholars randomly allocated to subjects either a coffee mug or six dollars.¹⁹³ Mug holders were then

 190 Korobkin provides several fascinating permutations of the experiment, including scenarios involving a recent legislative reversal of the default rule (to rule out substantive attachment to the 'traditional' rule) and an industry custom of contracting around the default (to clarify what exactly subjects would perceive as the default rule). After demonstrating the operation of the status quo bias in the context of contract default rules, Korobkin goes on to challenge the conventional law and economics wisdom that the selection of default rules matters only when parties face high transaction costs or asymmetrical information. See id. at 664-75.

¹⁹¹ See Daniel Kahneman, Jack L. Knetsch, & Richard H. Thaler, The Endowment Effect, Loss Aversion, and Status Quo Bias, 5 J. Econ. Persp. 193, 197-201 (1991) (explaining how preference for status quo derives in part from finding that losses and gains of equal amount do not have identical impact on decisions but rather that losses generally exert stronger impact).

¹⁹² One may view the endowment effect as a particular instance of the status quo bias: It is the tendency of individuals to value items which they already own higher than an identical item which they do not own. See Korobkin, supra note 185, at 625-30 (describing distinction in significantly more detail); see also Cass R. Sunstein, Endogenous Preferences, Environmental Law, 22 J. Legal Stud. 217, 230 (1993) (describing endowment effect as "special instance" of status quo bias).

¹⁹³ See Daniel Kahneman, Jack L. Knetsch, & Richard H. Thaler, Experimental Tests of the Endowment Effect and the Coase Theorem, 98 J. Pol. Econ. 1325, 1330 (1990).

¹⁸⁷ See id. at 637-41.

¹⁸⁸ See id. at 639.

¹⁸⁹ Id. at 646. Seventy-two percent of subjects presented with a "loser pays" default rule preferred to retain it for the parties' agreement, while 59% of subjects presented with a "pay your own fees" default opposed switching to a "loser pays" rule. See id. at 646-47.

asked to state the minimum amount they would be willing to accept to sell their mugs, while cash holders were asked to state the maximum amount they would be willing to pay for a mug. Despite the fact that mugs were distributed randomly, mug holders as a group turned out to value mugs at approximately twice the amount that cash holders did.¹⁹⁴ Scholars now attribute this peculiar behavior, which has been replicated in many studies, to the endowment effect: The initial allocation of mug ownership affected the value which subjects attached to mugs.¹⁹⁵

In a recent study by George Loewenstein and Daniel Adler, subjects were asked to "[i]magine that we gave you a mug exactly like the one you can see, and that we gave you the opportunity to keep it or trade it for some money."¹⁹⁶ Minimal selling prices were then elicited from subjects both before and after they actually received mugs. This formulation of the now familiar mug study allowed Loewenstein and Adler to test the ability of subjects to predict the operation of the endowment effect. Prior to receiving the mugs, subjects on average predicted that their minimal selling price would be \$3.73.¹⁹⁷ Once they actually received the mugs, however, their minimal selling price averaged \$5.40.¹⁹⁸ Thus, subjects significantly and systematically underestimated the impact that the endowment effect would have on their valuations. As with so many of these biasing or preference-alter-

The status quo bias is also exhibited in multiple-good choice problems. Loss aversion predicts that individuals would prefer the status quo to changes that involve losses of some goods even if compensated with other goods. In one study, for example, students were randomly given either candy bars or mugs. Later, each student was offered the opportunity to exchange her gift for the other one. Ninety percent of both groups chose not to trade. See Jack L. Knetsch, The Endowment Effect and Evidence of Nonreversible Indifference Curves, 79 Amer. Econ. Rev. 1277, 1278 (1989); Jack L. Knetsch & J. A. Sinden, Willingness to Pay and Compensation Demanded: Experimental Evidence of an Unexpected Disparity in Measures of Value, 99 Q.J. Econ. 507, 508 (1984) (explaining that studies demonstrated "the compensation demanded to give up an entitlement far exceeded the respondents' indicated willingness to pay to maintain it").

¹⁹⁶ George Loewenstein & Daniel Adler, A Bias in the Prediction of Tastes, 105 Econ. J. 929, 931 (1995).

¹⁹⁷ See id. at 932.

¹⁹⁸ See id. As Matthew Rabin has noted, Loewenstein and Adler's "procedure underestimates the true degree of misperception, because people don't like to contradict recently expressed predictions of their own behavior." Rabin, supra note 24, at 36. This can be seen in the fact that subjects who had made no prediction at all averaged a selling price of \$5.62. See id.

¹⁹⁴ See id. at 1332.

¹⁹⁵ Another possible explanation would be that those subjects who happened to receive mugs coincidentally had a higher utility for mugs even before the experiment began (perhaps the random allocation disproportionately hit coffee rather than soda drinkers). Besides being statistically unlikely, this explanation is negated by the fact that Kahneman, Knetsch, and Thaler repeated the experiment over several trials with the same subjects, and attained similar results. See id.

ing phenomena, even when people appreciate their effect, they underestimate their magnitude.¹⁹⁹

b. Context Effects and the Effect of Irrelevant Options. Behavioralists have identified a variety of ways in which the context of a choice influences the choice itself.²⁰⁰ For example, researchers have discovered that the addition of a new option to a set of options may increase the proportion of individuals who choose one of the initial options.²⁰¹ This anomaly, an example of context effects, has been demonstrated by student subjects asked to train rats with electric shocks. In one trial, subjects could only select between "mild" and "slightly painful" shocks; in other trials, a third option was present, labeled either "moderately painful" or "extremely painful."202 Subjects were told not to use the more extreme option and none did: thus. the researchers were able to observe whether an individual's preference between A and B would change in the presence of an irrelevant alternative C. While the "slightly painful" option was selected only twenty-four percent of the time in the first trial, it was chosen twentyeight percent of the time when "moderately painful" was also present and thirty-nine percent of the time when "extremely painful" was present.²⁰³ In another experiment designed to test this phenomenon, subjects were offered a choice of either six dollars or an attractive Cross pen, and only thirty-six percent chose the pen. However, when subjects were offered a three-way choice among the cash, the Cross pen, and an inferior pen, forty-six percent chose the Cross pen.²⁰⁴

It is likely that context effects such as these originate from our view of ourselves as "lay scientists." As "lay scientists," we want "reasons" (or "theories" or "hypotheses") for our decisions or conduct. The reasons need not actually be good; they just need to be good enough. As Loewenstein writes:

²⁰¹ See id.

²⁰² Michael Harrison & Albert Pepitone, Contrast Effect in the Use of Punishment, 23 J. Personality & Soc. Psychol. 398, 400-01 (1972).

²⁰³ See id. at 400.

¹⁹⁹ See Loewenstein & Adler, supra note 196, at 935-36; see also supra notes 125-27 (discussing similar evidence); infra notes 217-18 (same); infra text accompanying notes 232-33 (same); infra notes 269-75 (same).

²⁰⁰ See, e.g., Itamar Simonson, Choice Based on Reasons: The Case of Attraction and Compromise Effects, 16 J. Consumer Res. 158, 170-71 (1989) (discussing how addition of various types of options can influence decision to choose one option over another); Itamar Simonson & Amos Tversky, Choice in Context: Tradeoff Contrast and Extremeness Aversion, 29 J. Marketing Res. 281, 281-82 (1992) (explaining how tendency to choose one option over another depends on factors such as tradeoffs implied in set of options and whether outcome is below reference point (loss) or above reference point (gain)).

²⁰⁴ See Simonson & Tversky, supra note 200, at 287.

Most people experience their own actions as resulting from decisions . . . or at least as deliberate. However, it is questionable whether these introspections represent veridical reports of underlying decision processes, or *ex post* rationalizations of behavior. The limitation of verbal reports is well established Trained to view behavior as the result of attribute-based decisions . . . most people in Western culture will almost inevitably interpret their own behavior accordingly.²⁰⁵

The point is that the addition of a new option can provide a "reason" that otherwise was not available for choosing one of the initial options. As such, the findings "suggest[] that a simple axiom of conventional economic theory—involving the irrelevance of added, unchosen alternatives—is wrong."²⁰⁶

c. Elastic Justification. Christopher Hsee has recently uncovered another way in which people's preferences can be altered through decision-irrelevant factors.²⁰⁷ By focusing on differences in individuals' decisions when expected outcomes are expressed as an uncertain range of estimates (a condition that Hsee refers to as "elasticity") rather than a fixed point estimate, Hsee has found that individuals construct "reasons" to justify conclusions that they are already privately motivated to reach.²⁰⁸ Specifically, this process, which Hsee has termed *elastic justification*, refers to the tendency for individuals to use the fact that an option presents a range of outcomes as a justification for choosing among options in a way that, in the absence of elasticity, the individual would not find justifiable.

This bias may be best understood through an example:

A salesman is asked by his company to take a trip to find as many buyers for a certain product as possible. He has a choice of two destination cities: He can find 60 buyers in one city and 40 in the other but the city with fewer buyers is more enjoyable.²⁰⁹

As formulated, the decision should be clear: The salesman should travel to the first city because the number of buyers (the A factor) is a factor relevant to his task, while the enjoyability of the city (the B factor) is not. Hsee theorizes, and supports through empirical experiments, that if the decision is reformulated such that the first city will produce somewhere between thirty and ninety buyers, the sales-

²⁰⁵ George Loewenstein, Out of Control: Visceral Influences on Behavior, 65 J. Org. Behav. & Hum. Decision Processes 272, 276 (1996) (citations omitted).

²⁰⁶ Sunstein, supra note 2, at 1182.

 ²⁰⁷ See Christopher K. Hsee, Elastic Justification: How Tempting but Task-Irrelevant
Factors Influence Decisions, 62 J. Org. Behav. & Hum. Decision Processes 330, 330 (1995).
²⁰⁸ See id.

²⁰⁹ Id.

man will be more likely to select the second, more enjoyable city. This is so regardless of the fact that the first city still presents an *expected* number of buyers equal to the first formulation of the decision, sixty.

The mental process at work in preference reversals such as these is simple:

[E]lasticity in the A factor allows the decision maker to bias his or her view of the A values of the options in such a way that the Bsuperior option may seem not as inferior on the A factor as it originally is, and this biased view makes it more justifiable for the decision maker to choose the B-superior option.²¹⁰

In other words, the salesman will view the expected number of buyers in the less enjoyable city as being toward the low end of the range (say, thirty), thereby making it seem more justifiable to travel to the more enjoyable city. Conversely, if the first city still presented a fixed sixty buyers, but the second city presented a range of between ten and seventy buyers, the salesman would view the expected number of buyers in the second city as being toward the high end of the range (say, seventy). In that manner, regardless of which option is reformulated to have an elastic number of buyers, the salesman will find a way to "justify" selecting the option that is less attractive from the perspective of the only relevant criterion: the expected number of buyers.

This bias of decisionmaking parallels the mechanisms described earlier in connection with motivated reasoning. Both elastic justification and motivated reasoning capture ways in which individuals purport to "justify" or "reason through" their beliefs and decisions, when in actuality their initial impulses have biased the process all along.

d. Time-Variant Preferences. There is a great deal of evidence that, other things being equal, individuals will choose an activity that will deliver immediate benefits and delay any perceived costs.²¹¹ We prefer, in other words, immediate gratification and delayed dissatisfaction. But as this evidence suggests, there is a problem with that pair of preferences. Specifically, people's short-term willingness to delay rewards in exchange for higher returns in the future is often less than people's long-term willingness to delay those same rewards. For instance, most people say they would rather have a prize of a \$100 check available immediately rather than a \$200 certified check that could not be cashed for two years, but do not prefer a \$100 check that could be cashed in six years to a \$200 certified check that could be

²¹⁰ Id.

 $^{^{211}}$ See Hanson & Logue, supra note 93, at 1203-05 (discussing evidence for problem of myopic discounting).

cashed in eight years, even though this is the same choice seen at six years greater delay.²¹²

In a recent experiment, Kris Kirby and Richard Herrnstein asked subjects to choose among a series of pairs of smaller, earlier rewards and larger, later rewards.²¹³ In two experiments offering subjects actual monetary rewards, twenty-three of twenty-four subjects "consistently reversed their choices from the [smaller, earlier reward] to the [larger, later reward] as the delay to both rewards increased."²¹⁴ When the moment of choice is relatively far away, we tend to give proper weight to the later consequence; however, when the moment of choice arrives, the smaller but earlier consequence overshadows the later one, causing an "impulsive" reversal of the original preference. In short, our willingness to delay gratification (or encounter risks) varies over time.²¹⁵ Today we believe that we should stop smoking or diet tomorrow, but tomorrow we feel we should continue smoking or overeating, at least for another day.

In part because of that sort of intertemporal variation, economists have begun to model individuals as a collection of selves— "multiple selves"—each self with its own set of preferences.²¹⁶ Scholars have employed the multiple-selves model to explain many sorts of common behavior that otherwise seem inexplicable within the conventional, single-self, rational-actor model. Greek mythology teaches us of Ulysses, who had himself tied to the mast in order to hear but withstand the song of the Sirens. Researchers today have identified many analogous self-commitment (sometimes called "pre-commitment" or "hands-tying") strategies that many of us employ in our daily lives, such as setting up automatic monthly transfers to invest-

²¹⁶ See Hanson & Logue, supra note 93, at 1205-09 (summarizing Thomas Schelling's groundbreaking work on multiple selves); Rabin, supra note 24, at 39-40 (noting that multiple selves hypothesis is "ready-made" for use by economic theorists).

²¹² See George Ainslie & Nick Haslam, Hyperbolic Discounting, in Choice over Time 57, 69 (George Loewenstein & Jon Elster eds., 1992).

²¹³ Kris N. Kirby & R.J. Herrnstein, Preference Reversals Due to Myopic Discounting of Delayed Reward, 6 Psychol. Sci. 83, 84 (1995).

²¹⁴ Id. at 85.

²¹⁵ For additional treatments of this phenomenon, see Philip J. Hilts, Smoke Screen: The Truth Behind the Tobacco Industry Cover-Up 51-52 (1996) (summarizing Dr. Dunn's study finding that question of who does or does not smoke is really "a question about who is unable to resist the quick gain of nicotine now versus the later catastrophic consequences" and that "[i]n simplified form, this means those who have many other small and large pleasures in their lives are likely to be better at resisting nicotine's lure"); Hanson & Logue, supra note 93, at 1203-05 (discussing how temporal separation of smoking's shortterm benefits and long-term costs helps explain why people who want to quit smoking do not quit); Jolls et al., supra note 2, at 1479 (calling this "bounded willpower," and referring "to the fact that human beings often take actions that they know to be in conflict with their own long-term interests"); Rabin, supra note 24, at 38-41 (reviewing studies).

ment accounts, entering alcohol treatment programs or diet clinics that restrict exit, or devising internal rules of conduct such as "only smoke outdoors."²¹⁷ As with many of the other cognitive-biasing, preference-changing phenomena, individuals seem, at some level, to understand this source of preference shifting. Nevertheless they do not always fully appreciate the extent of deviation between the preference sets, and, in any case, cannot always manage to locate or create successful self-commitment (or pre-commitment) strategies.²¹⁸

e. Reciprocity and Attribution. Most economic models assume that preferences are defined solely over outcomes. But that assumption is clearly inaccurate. As reviewed above, for instance, choices are often determined in significant part by the extent or direction of deviation of the options from some reference point or by the presence or absence of certain options. In addition, there is considerable evidence indicating that preferences are also a function of an actor's perceived conduct or intentions to which a particular outcome is attributed.²¹⁹ "The same people who are altruistic toward deserving people are often indifferent to the plight of undeserving people, and motivated to hurt those whom they believe to have misbehaved."²²⁰

Put differently, there is considerable evidence to suggest that preferences are "reciprocal."²²¹ Reciprocity norms manifest them-

²¹⁹ The distinction between outcomes and conduct attributed to the outcomes—be it inevitable, accidental, reckless, malicious, or intentional—is a distinction recognized in the law, albeit sometimes only implicitly. In tort law, for instance, these sorts of distinctions play a significant role in the doctrinal divisions between intentional and unintentional torts as well as in the doctrinal boundaries of consent and assumption of risk. Attribution theory may also help explain punitive damages. Where an injury is attributed to an intentional act, the harm is more pronounced than it would be where it is not attributed to an intentional act. That is, there is the injury, plus the insult. For that reason, the expectation of redress may be greater, thereby justifying higher damages. These thoughts are explored more fully in Jon D. Hanson & Ana C. Reyes, Law and Attribution: Toward a New Positive Theory of Tort Law (Apr. 10, 1999) (working title for unpublished work in progress).

²²⁰ Rabin, supra note 24, at 21. See also Jolls et al., supra note 2, at 1479 ("In many market and bargaining settings... people care about being treated fairly and want to treat others fairly if those others are themselves behaving fairly.").

²²¹ See Rachel T.A. Croson, Theories of Altruism and Reciprocity: Evidence from Linear Public Goods Games (May 1998) (unpublished manuscript, on file with the *New York University Law Review*) (reviewing literature); Robyn M. Dawes & Richard H. Thaler,

²¹⁷ See Rabin, supra note 24, at 40 (discussing other examples of self-commitment strategies); see also Hanson & Logue, supra note 93, at 1206-08 (same); Jolls et al., supra note 2, at 1479 (same).

²¹⁸ See Hanson & Logue, supra note 93, at 1208-09 (discussing evidence that 70% of current smokers say they would like to quit, and suggesting that real world purchasing contexts make self-commitment strategies likely to fail); Loewenstein, supra note 205, at 272, 274-76 (explaining how visceral factors create discrepancies between "perceived self-interest and behavior"); Rabin, supra note 24, at 41 (discussing importance of self-control for economic theory).

selves in numerous ways, most of which seem relevant to the market context. For example, individuals are often more willing to cooperate with those actors they feel are behaving cooperatively or fairly.²²² On the other hand, individuals will often refuse to cooperate with others who are being uncooperative.²²³ Moreover, individuals are often willing to sacrifice to hurt others who are being unfair. A consumer may refuse to buy a product sold by a monopolist at an "unfair" price, even if she hurts herself by foregoing the product.²²⁴

These sorts of phenomena have been repeatedly demonstrated in experiments employing one or another version of what game theorists call "the ultimatum game."²²⁵ In the most basic version of the game (or experiment), two players are given a sum of money to split. One of the two players, known as the Proposer, decides how the sum should be split and announces that decision to the Responder, who is left with the option of either accepting or rejecting that split. If the

(A) People are willing to sacrifice their own material well-being to help those who are being kind.

(B) People are willing to sacrifice their own material well-being to punish those who are being unkind.

(C) Both motivations (A) and (B) have greater effect on behavior as the material costs of sacrificing becomes smaller.

Matthew Rabin, Incorporating Fairness into Game Theory and Economics, 83 Am. Econ. Rev. 1281, 1282 (1993).

²²² See generally Daniel Kahneman, Jack L. Knetsch, & Richard H. Thaler, Fairness as a Constraint on Profit Seeking: Entitlements in the Market, 76 Am. Econ. Rev. 728, 740 (1986) (describing results of household surveys of public opinions regarding what pricing conduct is perceived as "fair" and "unfair," examining implications of those community norms for market outcomes, and confirming earlier market evidence that fairness considerations have significant market implications); Arthur M. Okun, Prices and Quantities: A Macroeconomic Analysis 170 (1981) (describing some of ways in which fairness considerations may influence pricing behavior in consumer markets); Eldar Shafir & Amos Tversky, Thinking Through Uncertainty: Nonconsequential Reasoning and Choice, 24 Cognitive Psych. 449, 454-55 (1992) (describing results of prisoner's dilemma study in which subjects cooperated 16% of time when other player was known to have cooperated, compared with 3% of time when other player was known to have competed).

223 See supra note 221 (citing authorities); see also Rabin, supra note 24, at 21-22 (reviewing evidence).

²²⁴ See Kahneman et al., supra note 222, at 736 (describing willingness to drive out of one's way to shop at store not engaged in unfair practices); Rabin, supra note 24, at 22 (discussing psychology of reciprocity); see also Jolls et al., supra note 2, at 1480, 1489-93 (explaining that parties "will be willing to punish unfair behavior even at personal financial cost").

²²⁵ See generally Colin Camerer & Richard H. Thaler, Anomalies: Ultimatums, Dictators and Manners, 9 J. Econ. Persp. 209 (1995) (reviewing ultimatum game literature).

Anomalies: Cooperation, J. Econ. Persp. 187, 190-92 (1988) (same); Richard E. Goranson & Leonard Berkowitz, Reciprocity and Responsibility Reactions to Prior Help, 3 J. Personality & Soc. Psychol. 227, 232 (1966) (providing classic experimental evidence); Rabin, supra note 24, at 21-22 (reviewing literature). In a superb article, Rabin has explained much of the evidence regarding the reciprocal nature of human behavior with the following three assumptions:

Responder rejects the offer, neither of the two players gets any of the money, and the game is over. For most economic or game-theoretic models, which assume self-interest on the part of all actors, the outcome was extremely easy to predict: Proposers would split the sum (e.g., ten dollars) disproportionately such that the Responder would get a nominal amount (e.g., one penny) and the Proposer would get the rest. That is the prediction, but "[i]nstead, offers typically average about thirty to forty percent of the total, with a fifty-fifty split often the mode. Offers of less than twenty percent frequently are rejected."²²⁶ Self-interest clearly does not capture the complete psychological picture of findings such as these.

In a related manner, people tend to care about whether an injurer's act was intentional or volitional or whether, instead, the injury was, in some sense, unpreventable. Thus, where the injurer's act is volitional, the victim is far more likely to reciprocate or retaliate with negative actions. To get some sense of how this sort of reaction might play a role in bargaining or market relationships, consider a recent ultimatum-game experiment conducted by Sally Blount, in which she asked three groups of subjects to state their willingness to accept takeit-or-leave-it offers made by anonymous parties regarding how to split ten dollars.²²⁷ The first group was told that the offer was coming from anonymous students and that their response would affect the division between them and the anonymous students. The second group was told that a third party would determine the offer and that the third party would not be affected by their response. The final group was told that the offer would be produced randomly by computer. In one study, subjects accepted average minimal offers of \$2.91, \$2.08, and \$1.20, respectively. Thus, subjects were more willing to accept low offers when those offers were not perceived as the result of volition by the person who would be hurt by rejecting the offer.²²⁸

f. Preference-Trumping Effect of Visceral Factors. While many of the cognitive biases discussed in the behavioral literature address ways in which people incorrectly perceive their self-interest, George Loewenstein has recently offered a compelling theory which seeks to account for cases in which people correctly perceive their self-interest,

²²⁶ Id. at 210.

²²⁷ See Sally Blount, When Social Outcomes Aren't Fair: The Effect of Causal Attributions on Preferences, 63 J. Org. Behav. & Hum. Decision Processes 131, 134-36 (1995).

 $^{^{228}}$ See id. Interestingly, subjects seemed less offended by low offers when those offers purportedly came from a computer rather than a third party, even though the computer and the third party played identical roles in the experiment.

yet still behave in contradiction to that interest.²²⁹ He argues that disjunctions between behavior and perceived self-interest result from *visceral factors* such as the feelings associated with drug addiction, drive states like hunger, thirst and sexual desire, moods and emotions, and physical pain. "At sufficient levels of intensity, these, and most other visceral factors, cause people to behave contrary to their own longterm self-interest, often with full awareness that they are doing so."²³⁰

The most obvious example of such self-destructive behavior can be seen in the actions of drug addicts, who often consume drugs to the exclusion of nourishment, sleep, and even the desire to survive.231 The visceral factor-drug addiction-causes the impacted individual to narrow her focus almost exclusively to the object of that factor, drugs. In a similar manner, visceral factors can cause the individual to experience "a good-specific collapsing of one's time-perspective toward the present."232 Thus, a hungry person is likely to make shortsighted tradeoffs between food now and food delayed, even if that person knows that tomorrow's hunger will be equally intense. Loewenstein explains such behavior by identifying two central premises of the visceral factor theory. First, visceral factors that are experienced now tend to dominate one's attention, crowding out all goals other than satiating the drive behind the visceral factor. Second, visceral factors that will be experienced in the future, have been experienced in the past, or are experienced by other people tend to be discounted by individuals; that is, individuals fail to predict, recall, or perceive in others the force of visceral factors correctly.233

Together, these two factors form the basis for a new account of *impulsivity*. Rather than simply being prone to hyperbolic discount functions, as some commentators have argued,²³⁴ individuals might be suffering the "effect of visceral factors on the desirability of immediate consumption."²³⁵ That is, the impact of visceral factors such as hunger might cause individuals both to overestimate the desirability of immediate consumption and underestimate the desirability of delayed consumption. As a result, they will behave impulsively.²³⁶ The advantage

²³⁶ See id.

²²⁹ See Loewenstein, supra note 205, at 289. In addition to his general account of visceral forces, Loewenstein has also applied his insights more specifically to the phenomenon of addictive behavior. See George Loewenstein, A Visceral Account of Addiction, in Getting Hooked 235 (Jon Elster & Ole Jorgen Skog eds., 1999).

²³⁰ Loewenstein, supra note 205, at 272-73.

²³¹ See id. at 285-86.

²³² Id. at 275.

²³³ See id. at 274-75.

²³⁴ See supra notes 211-18 and accompanying text.

²³⁵ Loewenstein, supra note 205, at 279.

of this account of impulsivity is that it predicts for which goods and in which situations individuals will be most likely to behave impulsively (i.e., when visceral factors such as hunger, thirst, physical pain, or emotions are strong).

Additionally, the visceral factors theory is able to account for "[o]ne of the most difficult patterns of behavior to subsume under a conventional rational choice framework[:] . . . the phenomenon of intrapersonal conflict and self-control."237 While other theorists have attempted to account for such human behavior according to the "multiple selves" models described above,238 Loewenstein describes the behavior in terms of visceral factors. The experience of being "out of control" is attributable to the effect of visceral factors. Because those factors overwhelm an individual's self-interest, of which that individual is fully aware, one experiences the event as if another self were in control of the behavior. For Loewenstein, this represents a more plausible account of the widely recognized sense of intrapersonal conflict that individuals often feel: "The fact that impulsive selves never promote one-another's behavior is not surprising if these selves are not, in fact, coherent entities with consciousness and personal motives, but instead represent the motivational impact of visceral factors."239

Loewenstein's account of visceral factors provides an important insight heretofore absent from the behavioral account of human behavior: "[M]uch behavior is nonvolitional or only partly volitional even in situations characterized by substantial deliberation."²⁴⁰ Moreover, individuals may experience irrationality, not just in the sense of violating axioms of rational decisionmaking, but also in the sense of engaging in "impulsive and self-destructive behavior and . . . actions that violate generally accepted norms about the relative importance of different goals."²⁴¹

g. Framing Effects. We have already introduced the concept of framing effects through Kahneman and Tversky's famous vaccine example at the outset of this Section.²⁴² We revisit it briefly here, however, to emphasize that framing effects are somewhat different from the other cognitive anomalies that have been identified by behavioral researchers. They are perhaps the most obviously exploitable of the biases, capable, for instance, of causing dramatic preference reversals

²³⁷ Id. at 288.

²³⁸ See supra notes 216-18 and accompanying text.

²³⁹ Loewenstein, supra note 205, at 288-89.

²⁴⁰ Id. at 289 (emphasis added).

²⁴¹ Id.

²⁴² See supra notes 42-45 and accompanying text.

based on an entirely nonsubstantive shift in terminology. And that is true inasmuch as they trigger or reflect the operation of *other* cognitive biases. For instance, Kahneman and Tversky's vaccine example relies not only on the operation of framing effects, but also on loss aversion in order to elicit its contradictory results. Whether something is coded as a loss, thus raising the possibility of loss aversion, depends on how it is *framed*. In this respect, one may usefully conceive of framing effects as a mechanism for eliciting other cognitive biases—in other words, a mechanism for manipulating individual perceptions and decisions.

Consider, for instance, a recent study of how framing affects the allocation decisions of university staff employees between two retirement savings funds with different risk-return attributes: bonds (the safe fund) and stocks (the risky fund).²⁴³ Although the employees were shown actual historical data on the returns of the two funds, the data were framed in two different ways: One group of employees was shown the distribution of one-year rates of return, while the second was shown a simulated distribution of thirty-year rates of return. Employees shown the thirty-year returns chose to invest almost all of their savings in stocks, while those shown the one-year returns invested a majority of their funds in bonds.²⁴⁴ As Jolls, Sunstein, and Thaler explain, this result highlights the fact that "the way firms decide to describe and display information ... will have a powerful influence on the choices" of those who receive the information.²⁴⁵ In other words, because firms are in a position to frame the choice, they can alter the decision.

The cognitive influence of framing effects has been demonstrated in numerous other studies, including at least one in which both sets of options were given to the same group of subjects (rather than to separate groups of subjects).²⁴⁶ Not only did the subjects continue to demonstrate the inconsistency, many persisted in their beliefs even after the logical incompatibility of their selections was pointed out to them.²⁴⁷ Throughout these studies, subjects have shown a remarkable proclivity to exhibit different preferences based solely on the manner in which the options are presented.²⁴⁸ As Kahneman and Tversky

²⁴⁸ Public choice theorists have also studied a phenomenon akin to framing effects in the "voting paradox," also known as the "Arrow Impossibility Theorem" or the "Cordocet

²⁴³ See Shlomo Benartzi & Richard H. Thaler, Risk Aversion or Myopia? Choices in Repeated Gambles and Retirement Investments (Nov. 8, 1997) (unpublished manuscript), cited in Jolls et al., supra note 2, at 1534.

²⁴⁴ See Jolls et al., supra note 2, at 1534.

²⁴⁵ Id.

²⁴⁶ See Dawes, supra note 31, at 36-37 (discussing study).

²⁴⁷ See id. at 37.

have commented, the significance of framing "is both pervasive and robust . . . [and] as common among sophisticated respondents as among naive ones . . . In their stubborn appeal, framing effects resemble perceptual illusions more than computational errors."²⁴⁹ We believe that framing effects provide particularly strong evidence in

paradox." See, e.g., Richard H. Pildes & Elizabeth S. Anderson, Slinging Arrows at Democracy: Social Choice Theory, Value Pluralism, and Democratic Politics, 90 Colum. L. Rev. 2121, 2129-35 (1990) (describing above theorems). This refers to voting situations in which "for any option under consideration some majority exists that would prefer one of the other options." Id. at 2129. Thus, the outcome of a vote can depend on purely "procedural" variables such as the order in which different pairs of options are considered and narrowed or, in the terminology of the behavioralists, the manner in which the vote is framed. Public choice theorists have also discovered how elicitation effects such as the "voting paradox" can render elections manipulable by those in a position to set the agenda for a vote. Michael Levine and Charles Plott, for instance, conducted a real world "experiment" of such manipulation. See Michael E. Levine & Charles R. Plott, Agenda Influence and Its Implications, 63 Va. L. Rev. 561, 571-72 (1977). One of the authors was asked by his flying club to devise a fair voting method to determine what planes the club would purchase for use by its members. The author, a social choice theorist, happily responded by constructing a voting agenda that would lead to the outcome he personally favored. See id.

²⁴⁹ Daniel Kahneman & Amos Tversky, Choices, Values, and Frames, 39 Am. Psychologist 341, 343 (1984). As an example of the persistent and nondiscriminatory impact of framing effects, Tversky and Kahneman give the following example, taken from a study of medical decisions:

Respondents were given statistical information about the outcomes of two treatments of lung cancer. The same statistics were presented to some respondents in terms of mortality rates and to others in terms of survival rates. The respondents then indicated their preferred treatment. The information was presented as follows.

Problem 1 (Survival frame)

Surgery: Of 100 people having surgery 90 live through the post-operative period, 68 are alive at the end of the first year and 34 are alive at the end of five years.

Radiation Therapy: Of 100 people having radiation therapy all live through the treatment, 77 are alive at the end of one year and 22 are alive at the end of five years.

Problem 1 (Mortality frame)

Surgery: Of 100 people having surgery 10 die during surgery or the postoperative period, 32 die by the end of the first year and 66 die by the end of five years.

Radiation Therapy: Of 100 people having radiation therapy, none die during treatment, 23 die by the end of one year and 78 die by the end of five years.

The inconsequential difference in formulation produced a marked effect. The overall percentage of respondents who favored radiation therapy rose from 18% in the survival frame (N = 247) to 44% in the mortality frame (N = 336). The advantage of radiation therapy over surgery evidently looms larger when stated as a reduction of the risk of immediate death from 10% to 0% rather than as an increase from 90% to 100% in the rate of survival. The framing

support of the basic thesis of this Article—that the numerous biases to which people are subject can be tapped into by those who set the frame. This follows from our "tendency to accept problem formulations as they are given . . . [to] remain, so to speak, mental prisoners of the frame provided to us by the experimentalist, or by the 'expert,' or by a certain situation."²⁵⁰

C. Critiques

As researchers assembled this impressive collection of observed nonrational phenomena, critics of the behavioral project began to emerge. "In particular, the research fields have come under attack by those who appear to regard rationality as axiomatic."²⁵¹ We offer a brief review of those critiques, along with the rejoinders of behavioral researchers. Our aim is to show that, even in spite of attracting criticism from economists and logicians, behavioral research remains a robust field with serious implications for legal analysis, particularly for products liability.

An early and frequent criticism of behavioral research assumed the basic form, "It takes a theory to beat a theory."²⁵² Von Neumann and Morgenstern had given theorists an immensely flexible concept of human behavior: The simple principle of expected utility maximization could be used to generate prescriptive recommendations and descriptive accounts for all manner of human transactions.²⁵³ The findings of researchers such as Kahneman and Tversky,²⁵⁴ on the other hand, took the form of a hodgepodge of cognitive anomalies—

²⁵⁰ Piattelli-Palmarini, supra note 3, at 30.

²⁵¹ Evans, supra note 46, at 6.

 253 See von Neumann & Morgenstern, supra note 28, at 15-31 (describing their theory for utility).

²⁵⁴ See supra Part I.

effect was not smaller for experienced physicians or for statistically sophisticated business students than for a group of clinic patients.

Daniel Kahneman & Amos Tversky, Rational Choice and the Framing of Decisions, 59 J. Bus. S251, S254-55 (1986). For a summary of examples of this phenomenon in commerce, see Garvin, supra note 97, at 157.

²⁵² See, e.g., Robert E. Scott, Error and Rationality in Individual Decisionmaking: An Essay on the Relationship Between Cognitive Illusions and the Management of Choices, 59 S. Cal. L. Rev. 329, 334 (1986) ("[A] legal theorist is struck by the atheoretical quality of [behavioral research] taken as a whole. No general theories have been advanced linking the separate processes of searching for information, forming judgments and making choices."); Alan Schwartz, Proposals for Products Liability Reform: A Theoretical Synthesis, 97 Yale L.J. 353, 380 (1988):

If the psychologists had a general theory about how people make decisions, and the theory generated predictions about what people will do in various circumstances, their experiments could be regarded as testing these predictions... Psychologists lack such a theory, however. They have instead a large set of observations about how experimental subjects behave.

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predictable, persistent, and pandemic, but lacking any overall structure or systematization that would yield theoretical tractability.²⁵⁵ Admittedly, each individual anomaly could be explained by the researchers through processes such as framing effects or anchoring, but a meta-explanation tying together the various processes was more elusive. Thus, before von Neumann and Morgenstern's model of the rational expected utility maximizer could be displaced, behavioral researchers would have to come up with a unifying theory to explain the various phenomena they were observing.

Kahneman and Tversky responded to this challenge in a paper entitled *Prospect Theory: An Analysis of Decision Under Risk.*²⁵⁶ In it, they first proposed their descriptive theory of human behavior, *prospect theory*, which attempted to unify such phenomena as framing and anchoring into a coherent account of decisionmaking. Howard Latin has provided a useful summary of Kahneman and Tversky's theory:

The central elements in this theory are: (i) people make most choices on the basis of relative gains or losses from an initial reference point, not on absolute states of wealth; (ii) people are generally risk averse for gains and risk seeking for losses, with the latter effect more pronounced; (iii) people assign nonlinear weights to potential gains and losses (for example, the change from \$100 to \$200 is usually accorded greater subjective weight than the change from \$1100 to \$1200); and (iv) sure outcomes are usually overweighted in comparison with uncertain outcomes (for example, "an increase from 0% to 5% appears to have a larger effect than an increase from 95% to 100%").²⁵⁷

To see the explanatory capabilities of prospect theory, we might revisit Kahneman and Tversky's experiment involving four differently framed vaccine programs for a threatened disease.²⁵⁸ Recall that sub-

²⁵⁷ Latin, "Good" Warnings, supra note 7, at 1238 (footnotes omitted) (quoting Kahneman and Tversky, Choices, Values, and Frames, 39 Am. Psychologist 341 (1984)).
²⁵⁸ See supra notes 42-45 and accompanying text.

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²⁵⁵ See Hogarth & Reder, supra note 41, at 20 ("Psychologists have been quick to point out deficiencies in economic reasoning and have amassed much experimental evidence on so-called anomalies. However, psychologists have been slow to propose alternative models that economists might use to overcome the noted descriptive deficiencies.").

²⁵⁶ Daniel Kahneman & Amos Tversky, Prospect Theory: An Analysis of Decision Under Risk, 47 Econometrica 263 (1979). Of course, a great many other explanatory theories of behavior have been offered from both inside and outside of the behavioral research. For instance, in this Article, we also touch upon multiple selves theory and attribution theory, both of which seek to account for human decisionmaking in the way that Kahneman and Tversky's prospect theory does. We focus here on prospect theory, however, because it is most directly responsive to the criticisms raised by defenders of expected utility theory.

jects simultaneously preferred a sure 200 lives saved out of 600 to a chance of saving all 600 lives, and a chance of losing no lives to a sure 400 out of 600 lives lost. Prospect theory helps us unravel the various cognitive processes at work in these apparently conflicting preferences. We know that people are generally risk averse for gains and risk seeking for losses,²⁵⁹ "but whether an event 'codes' as a loss or a gain depends not on simple facts but on a range of contextual factors, including how the event is framed."260 Thus, describing an alternative as resulting in 200 lives saved creates a far different impression than one resulting in 400 lives lost: In the first scenario, the 200 lives code as a gain whereas in the second scenario, the 400 lives code as a loss. Because of loss aversion, people are willing to take a risk in the second scenario that they are not willing to take in the first. They will accept a risk of losing 600 lives for a chance of losing none if the sure option appears as a loss ("If program C is adopted, 400 people will die."). Conversely, they will avoid the risky alternative when the sure option appears to be a gain ("If program A is adopted, 200 people will be saved.").

Prospect theory has won the support of many cognitive psychologists.²⁶¹ It has yet, however, to conquer other departments of the academy in the way that von Neumann and Morgenstern's expected utility theory did. Some fault may lie with the relative complexity and inelegance of the descriptive model. Kahneman and Tversky's decisionmaker is subject to a litany of cognitive influences, whereas von Neumann and Morgenstern's rational maximizer follows only one basic mantra. Indeed, Kahneman and Tversky's decisionmaker may be subject to conflicting biases: For instance, the endowment effect may cause one to want to retain an asset that is dropping in market value while the maxim of loss aversion counsels abandonment. In short, the model provided by behavioral research, in addition to being theoretically rich and descriptively textured, is somewhat unruly.

This difficulty of application, however, does not mean that the model should be rejected, for a complex model with realistic predictive capabilities is far preferable to a simplified model that bears little relationship to actual behavior. Moreover, we have attempted in our own summary of the behavioral research to organize the findings into

²⁵⁹ This effect, known as loss aversion, has been extensively documented. See Latin, "Good" Warnings, supra note 7, at 1238 n.197 (citing sources); see also Kahneman et al., supra note 191, at 197-98 (discussing loss aversion).

²⁶⁰ Sunstein, supra note 2, at 1180.

²⁶¹ See, e.g., Dawes, supra note 31, at 44 ("Prospect theory is a successful descriptor ... not just because it incorporates irrationality, but because it predicts the *direction* of irrationality when it occurs.").

a more tractable depiction of the individual decisionmaker without sacrificing the integrity of our behavioral assumptions. We hope this depiction represents a first step toward achieving the type of realistic yet manageable model that many legal scholars have been calling for since the advent of law and economics.

Another persistent criticism of behavioral research is that it judges subjects against a norm of logic and probabilistic theory that is computationally impossible to apply to problems of real world complexity.²⁶² These critics seem to be saying that researchers should not be surprised when subjects fail to apply Bayes's Theorem²⁶³ perfectly or to compute large sums precisely in their heads: Humans are creatures of finite cognitive capacity and should not be compared to an unrealistic rational ideal. Instead, given limits on cognitive capacities, humans should be viewed as conforming to norms of logic and rationality as best they possibly can. This criticism draws from Herbert Simon's well-known conception of *bounded rationality*:²⁶⁴ "People act in such a way as to maximise benefit to themselves, *within the constraints of their cognitive processing capacity*."²⁶⁵

This criticism, however, fails to give full credit to the behavioral project. Behavioral researchers have acknowledged this notion of bounded rationality—at least implicitly—all along.²⁶⁶ By focusing on problems that are comparatively simple in form yet still induce error, researchers have uncovered behavior that must either support their notions of cognitive heuristic processes, or support a notion of

²⁶⁵ Evans, supra note 46, at 10.

 266 They have also done so explicitly. See, e.g., Judgment Under Uncertainty, supra note 4, at xii (acknowledging debt to Simon for use of notion of bounded rationality); Evans, supra note 46, at 16-20 (defending bias research against charges that it utilizes unrealistic norm of complete rationality rather than bounded rationality).

²⁶² See, e.g., Mike Oaksford & Nick Chater, Bounded Rationality in Taking Risks and Drawing Inferences, 2 Theory and Psychol. 225, 226 (1992) ("Since the mind/brain is a limited information processor, the processes of risky decisionmaking cannot be based on optimal, algorithmic procedures."); W. Kip Viscusi & Wesley A. Magat, Information Processing and Individual Decisions, in Learning About Risk 1, 5 (W. Kip Viscusi & Wesley A. Magat eds. 1987) ("Some studies of individual rationality have used a model of perfect information as the reference point, rather than an optimal learning model in the presence of imperfect information.").

²⁶³ For an introduction to Bayes's Theorem and its difficulties of application by jurors, see Laurence H. Tribe, Trial by Mathematics: Precision and Ritual in the Legal Process, 84 Harv. L. Rev. 1329, 1356-59 (1971) (stating that "mathematical proof, far from providing any clear benefit, may in fact decrease the likelihood of accurate outcomes" in jury trials).

²⁶⁴ See Herbert A. Simon, Models of Man 198 (1975) (explaining that "the capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world") (emphasis removed); Herbert A. Simon, Rationality as Process and as Product of Thought, 68 Am. Econ. Rev. 1, 14 (1978) (same); Herbert A. Simon, supra note 182, at 39 (same).

bounded rationality so "bounded" as no longer to represent rationality at all. Thus, rather than being in tension with Simon's notion, behavioral researchers have embraced it. They have accepted that humans operate within a limited sphere of rational behavior and they have attempted to flesh out the area *beyond* that sphere.²⁶⁷ As Tversky and Kahneman themselves have noted, "[the behavioral research results] are consistent with the conception of bounded rationality originally presented by Herbert Simon. Indeed, prospect theory is an attempt to articulate some of the principles of perception and judgment that limit the rationality of choice."²⁶⁸ Thus, behavioral research should be seen as an important complement to, rather than a contradiction of, bounded rationality theory.

Another frequent argument against the behavioral research and its depictions of nonrational behavior is that if such behavior occurred in real market settings, it would be driven out through an evolutionary process.²⁶⁹ While it is possible to see how irrational behavior might be driven out in, say, a well-functioning stock market,²⁷⁰ in many other contexts the requirements for such arbitrage will not be met. For instance, for a great variety of personal decisions, one's irrationality will not present an opportunity for profit by other actors because entry will not be feasible.²⁷¹ Likewise, for irrational behavior to be driven from a market in the long run, there must be conditions conducive to the spreading of rational capabilities. In other words, people must be able to learn.

As Tversky and Kahneman have argued, "[e]ffective learning takes place only under certain conditions: [I]t requires accurate and immediate feedback about the relation between situational conditions

²⁶⁷ See Evans, supra note 46, at 10 ("It is arguable... that human intelligence must rely on the kind of heuristics that Kahneman and Tversky propose—unreliable and error prone though they may be—given our cognitive restraints.").

²⁶⁸ Tversky & Kahneman, supra note 6, at 88-89 (citations omitted).

²⁶⁹ See Richard Zeckhauser, Comments: Behavioral Versus Rational Economics: What You See Is What You Conquer, in Rational Choice, supra note 6, at 251, 260 ("Even if there are many nonrational participants [in the market], they will in effect starve."); see also infra notes 538-42 and accompanying text.

²⁷⁰ But see Shyam Sunder, Experimental Asset Markets: A Survey, in Handbook of Experimental Economics, supra note 32, at 445, 445-500 (reviewing evidence which shows that even in well-functioning asset markets, "[i]nformation dissemination and aggregation *can* occur, but does not occur under all conditions [and w]hen it does occur, it is rarely instantaneous or perfect").

²⁷¹ See Zeckhauser, supra note 269, at 260 ("[T]he aggregate outcome of a cluster of personal... decisions—such as insuring appropriately, planning for retirement, or having babies in or out of wedlock—will be more heavily influenced by a behavioral component [than by the possibility of arbitrage].").

and the appropriate response."²⁷² These requirements often are not met because:

(i) outcomes are commonly delayed and not easily attributable to a particular action; (ii) variability in the environment degrades the reliability of the feedback . . . ; (iii) there is often no information about what the outcome would have been if another decision had been taken; and (iv) most important decisions are unique and therefore provide little opportunity for learning.²⁷³

These and other necessary conditions for arbitrage to drive out biases successfully have been studied by Thomas Russell and Richard Thaler.²⁷⁴ By investigating the operation of competitive markets in which some agents are fully rational and others are "quasi-rational," Russell and Thaler identify the conditions needed to guarantee that such markets will achieve rational equilibria despite the presence of quasi rational agents. In their analysis, "these conditions are quite restrictive and are unlikely to occur in any but the most efficient of financial markets. In goods markets, a mistake by one individual will generally not create an arbitrage or profit opportunity for someone else."²⁷⁵ Thus, it is not safe to assume that the nonrational behavior identified by researchers such as Kahneman and Tversky will simply be weeded out by an evolutionary process in the market.

Two final criticisms merit discussion. First, the so-called *citation bias* refers to the alleged tendency of behavioral researchers to cite only instances of bias while ignoring studies reporting good reasoning.²⁷⁶ Proponents of the citations bias contend that if a fuller description of cognitive behavior were provided by researchers, we would view nonrational behavior as involving only insignificant aberrations.²⁷⁷ Whether or not this contention is accurate, we will argue in Part III that it is of little or no relevance to our discussion of products liability law. We will argue that even if cognitive biases are comparatively rare and insignificant, they assume a special importance in the consumer product context because consumers are rendered suscepti-

²⁷⁷ See id. at 83.

²⁷² Tversky & Kahneman, supra note 6, at 90.

²⁷³ Id.

²⁷⁴ See Thomas Russell & Richard Thaler, The Relevance of Quasi Rationality in Competitive Markets, 75 Am. Econ. Rev. 1071, 1071-82 (1985).

²⁷⁵ Richard H. Thaler, The Psychological and Economic Conference Handbook: Comments on Simon, on Einhorn, and on Tversky & Kahneman, in Rational Choice, supra note 6, at 95, 97.

 $^{^{276}}$ See Jay J. J. Christensen-Szalanski & Lee Roy Beach, The Citation Bias: Fad and Fashion in the Judgment and Decision Literature, 39 Am. Psychologist 75, 77 (1984) (noting alleged tendency of behavioral literature to give too much emphasis to findings of nonrationality).

ble to bias manipulation by marketers and manufacturers, however rare or isolated the consumer bias may be.²⁷⁸

Finally, it has sometimes been argued that cognitive anomalies are simply a product of experimental design or laboratory conditions and that the behavioral findings do not support conclusions about cognitive performance in the real world.²⁷⁹ "Psychologists are criticized for extrapolating far too freely from their findings and creating a fashionable view outside of the psychological world—in business schools, for example—that people are irrational."²⁸⁰ Like the citation bias, we will argue in Part III that this criticism is irrelevant to our discussion. The consumer product market, after all, in many ways resembles the laboratory setting. We will argue that marketers and manufacturers who devise product advertising schemes are engaged in a project very similar to the scheme that behavioral researchers allegedly have been undertaking: Both projects are intended to trigger cognitive imperfections in their subjects.

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The Academic Debate over the Significance of Behavioral Research for Products Liability Law

In an earlier article, one of us has argued (with Steven Croley) that the evolution of the common law tort rule for product-caused accidents from negligence toward enterprise liability was premised on three primary assumptions: Consumers are imperfectly informed of product risks, manufacturers exert exploitative market power over consumers, and manufacturers are best able to insure against the costs of product-caused accidents.²⁸¹ Contemporary scholars largely agree that, if these assumptions are true, enterprise liability necessarily fol-

²⁸⁰ Evans, supra note 46, at 24.

²⁷⁸ See infra Part III.D.

²⁷⁹ See, e.g., David C. Funder, Errors and Mistakes: Evaluating the Accuracy of Social Judgments, 101 Psychol. Bulletin 75, 76 (1987) (arguing that studies of error have little relevance to accuracy of social judgment); Lola L. Lopes, The Rhetoric of Irrationality, 1 Theory & Psychol. 65, 67 (1991) (asserting that studies purportedly finding irrationality have shed their experimental foundations and thus become popular); see also Viscusi & Magat, supra note 262, at 5 (noting limitation of research to predict behavior in markets where individuals have interest in outcomes and learn how to utilize available information).

²⁸¹ See Steven P. Croley & Jon D. Hanson, Rescuing the Revolution: The Revived Case for Enterprise Liability, 91 Mich. L. Rev. 683, 706-12 (1993); see also George L. Priest, The Invention of Enterprise Liability: A Critical History of the Intellectual Foundations of Modern Tort Law, 14 J. Legal Stud. 461, 517 (1985) (identifying similar list of principles as "true foundation" for enterprise liability).

lows as the optimal tort regime.²⁸² The obvious strategy then for anyone attempting to advocate enterprise liability is to argue the veracity of those underlying assumptions; conversely, those who champion tort reform and other liability-constricting measures must concentrate their energies on debunking these same assumptions.

Legal journals have been filled for three decades with arguments along these lines, producing a body of theory that is intellectually rich and historically important.²⁸³ The indeterminacy of the subject and the great variance of opinions regarding the basic assumptions of absolute manufacturer liability have fueled a debate far outlasting its humble origins in an exploding soda bottle.²⁸⁴ We have seen a wealth of deliberation over the extent and accuracy of consumer product risk information,²⁸⁵ the presence and force of exploitative manufacturer market power,²⁸⁶ and the wisdom of providing product-caused injury

²⁸⁴ See Priest, supra note 281, at 498 (describing Escola v. Coca Cola Bottling Co., 150 P.2d 436 (Cal. 1944), as "the most prominent antecedent of our modern regime"). *Escola* involved an allegedly defective soda bottle which exploded in the plaintiff's hand. While the majority applied traditional negligence and res ipsa loquitur principles to the case, Justice Traynor in concurrence advocated a rule "that a manufacturer incurs an absolute liability when an article that he has placed on the market, knowing that it is to be used without inspection, proves to have a defect that causes injury to human beings." *Escola*, 150 P.2d at 440 (Traynor, J., concurring).

²⁸⁵ See, e.g., William M. Landes & Richard A. Posner, The Economic Structure of Tort Law 280-81 (1987) (arguing that contracting and information costs render inaccurate consumers' estimations of products' risks); W. Kip Viscusi, Reforming Products Liability 64-66 (1991) (noting that "the chief inadequacy of the market is inadequate risk information" and arguing that purpose of products liability is to remedy such inadequacies); Croley & Hanson, supra note 281, at 770-76 (arguing that costs of obtaining consumer product information are prohibitively high); Epstein, supra note 282, at 2203-05 (challenging view that consumers have imperfect product risk information); Latin, "Good" Warnings, supra note 7, at 1240-41 (arguing that consumer cognitive limitations lead to systematic underappreciation of product risks); Schwartz, supra note 252, at 374-84 (arguing that available evidence does not support view that consumers systematically underestimate product risks).

²⁸⁶ See, e.g., Croley & Hanson, supra note 281, at 779-85 (providing renewed theoretical arguments in support of exploitation assumption); George L. Priest, A Theory of the Consumer Product Warranty, 90 Yale L.J. 1297, 1320-25 (1981) (arguing that exploitation assumption is belied by empirical evidence that suggests that warranties allocate product risks efficiently); Alan Schwartz & Louis L. Wilde, Imperfect Information in Markets for Contract Terms: The Examples of Warranties and Security Interests, 69 Va. L. Rev. 1387,

²⁸² See Richard A. Epstein, The Unintended Revolution in Product Liability Law, 10 Cardozo L. Rev. 2193, 2205 (1989) (noting that enterprise liability "makes sense" if one believes that consumers lack ability to prevent losses); Priest, supra note 281, at 527 ("The unavoidable implication of the three presuppositions of manufacturer power, manufacturer insurance, and internalization is absolute liability."); Alan Schwartz, The Case Against Strict Liability, 60 Fordham L. Rev. 819, 832 (1992) (noting that "[s]trict liability may be justified . . . if the [risk information] assumption—that consumers know risks of harm—is false").

 $^{^{283}}$ For a survey of much of the leading scholarship, see Croley & Hanson, supra note 281, at 713-60.

insurance through the tort system, especially pain-and-suffering damages insurance.²⁸⁷

To most observers, champions of enterprise liability have suffered smartly at the hands of tort law critics in recent years.²⁸⁸ Despite this general perception of a "counterrevolution" among torts scholars, however, at least one of the basic assumptions behind enterprise liability remains relatively robust: "The principle assumption in the literature supporting a role for legal liability is that consumers underestimate product defect risks and, as a consequence, put insufficient market pressure on firms to produce safety."289 Traditionally, commentators have taken an information-cost approach to the question of whether consumers are ill-informed of product risks.²⁹⁰ This approach assumes that consumers are rational and responsive to product risk information and that they would therefore learn of those risks for which the marginal benefits exceed the marginal costs of becoming informed. Under the information-cost approach, attention has focused primarily on the efficacy of product warnings given that the information they provide to consumers is costly to acquire.²⁹¹ One of us has argued (with Steven Croley) that the combination of high information costs and low product accident probabilities make warranty and warning information prohibitively costly to obtain.²⁹²

In recent years, however, scholars have begun to take a second, *information-bias* approach to the debate over the extent and accuracy of consumer product risk information.²⁹³ This approach responds to what might be considered an obvious implication of the behavioral

²⁸⁸ See Richard B. Stewart, Crisis in Tort Law? The Institutional Perspective, 54 U. Chi. L. Rev. 184, 189 (1987) ("[T]he critics of enterprise liability have turned the system's own premises against it. Tort law's new paradigm of social welfare has been turned into an indictment of tort law and a justification for abandoning the system.").

²⁸⁹ 1 A.L.I., supra note 23, at 230.

²⁹⁰ See Croley & Hanson, supra note 281, at 770 n.356 (describing approaches of commentators to question of whether consumers are informed of product risks).

²⁹¹ Costly in the sense that consumers must expend time and effort to read and comprehend warnings.

²⁹² See Croley & Hanson, supra note 281, at 770-79.

²⁹³ See, e.g., Schwartz, supra note 282, at 829-32 (considering impact of availability and anchoring biases on consumer judgments); Viscusi, supra note 285, at 64-65 (discussing consumer tendency to overestimate catastrophic, dramatic, and highly publicized risks while underestimating mundane and underpublicized ones).

^{1402-20 (1983) (}arguing on theoretical grounds that manufacturers would not exercise market power over consumers by reducing product or warranty quality).

²⁸⁷ Compare Steven P. Croley & Jon D. Hanson, The Nonpecuniary Costs of Accidents: Pain-and-Suffering Damages in Tort Law, 108 Harv. L. Rev. 1785, 1812-95 (1995) (arguing that consumers prefer some insurance against nonpecuniary losses), with Schwartz, supra note 252, at 362-67 (arguing that consumers would prefer not to receive pain-and-suffering damages), and George L. Priest, The Current Insurance Crisis and Modern Tort Law, 96 Yale L.J. 1521, 1546-47 (1987) (same).

research for products liability law: The demonstrated inability of individuals to follow axioms of rationality under certain conditions calls into question the consumer's ability to comprehend product warnings, regardless of the costs and benefits of reading those warnings. If consumers as a class are cognitively unable to appreciate product risks accurately, then manufacturers—with their superior risk information—should bear liability for product-caused accidents, *including those which are avoidable by consumers at least cost.*²⁹⁴

Contemporary commentators, however, are far from unanimous on the question of whether consumers actually are unable to appreciate product risks and, even if they are, whether they systematically underestimate rather than overestimate product risks. Within the literature, we have seen two general perspectives emerge. The first, belonging to a group we have termed the "Under-Estimators," argues from primarily theoretical grounds that consumers might systematically underestimate product risks. Therefore, increased manufacturer liability might provide an important incentive for manufacturers to address product risks that would otherwise be borne, futilely, by consumers. The second perspective has been adopted by a group of scholars who we refer to collectively as the "Over-Estimators." They argue that the evidence suggests consumers systematically overestimate product risks and are therefore overdeterred from product use. Under this view, increased manufacturer liability would only serve to exacerbate an already pernicious inefficiency.

A. Under-Estimators

The first group of scholars, the Under-Estimators, argue that cognitive anomalies support the view that consumers systematically underestimate product risks. Their position builds on the argument developed early in products liability theory by Guido Calabresi:

²⁹⁴ Cf. William M. Landes & Richard A. Posner, A Positive Economic Analysis of Products Liability, 14 J. Legal Stud. 535, 549-50 (1985) ("If information on product injuries is costly to obtain, we want to place liability (other things the same) on the party who has the information or can obtain it at lower cost."). Although Landes & Posner were speaking specifically about information costs that might impede consumers from obtaining perfect product risk information, their reasoning applies equally to information biases that would produce the same impediment. Indeed, it is possible to conceive of cognitive biases as simply another instance of information costs, capable of being analyzed under the traditional theoretical framework. The difficulty with this conception, however, is that it fails to account for the fact that cognitive biases are largely incapable of being unlearned and therefore present a more permanent obstacle to efficiency than mere information costs. See, e.g., supra notes 5, 110-11, 218 and accompanying text. For this reason, we continue to speak of information biases as a phenomenon distinct and apart from information costs.

[E]ven if individuals had adequate data for evaluating the risk [of a product], they would be psychologically unable to do so. The contention is that people cannot estimate rationally their chances of suffering death or catastrophic injury. Such things always happen to "the other guy," and no amount of statistical information can convince an individual that they could happen to him. Whether people know what is best for themselves in other areas is, therefore, irrelevant to the conclusion that they do not know what is best in deciding between insuring themselves and bearing the risk of an unspread accident cost.²⁹⁵

Scholars espousing this view call for expanded manufacturer liability because they believe that manufacturers are better than consumers at responding rationally to the safety incentives provided by products liability law.²⁹⁶

1. Robert Prentice and Mark Roszkowski

Robert Prentice and Mark Roszkowski, for example, have defended strict products liability on the basis that "consumers are limited in their ability to evaluate and calculate the risks that they face."²⁹⁷ In support of this contention, Prentice and Roszkowski rely on a list of six factors which they argue in combination lead to the conclusion that "consumers . . . understate their needs for injury protection";²⁹⁸ that is, consumers underestimate product risks.

First, "evaluation of risk is heavily biased by culture."²⁹⁹ The authors argue that consumer understanding of risk is strongly colored by cultural attitudes and norms that may bear no relationship to objective fact.

Second, "people tend to exaggerate some dangers and minimize others, usually by overassessing the risks of low-probability events and underassessing the risks of high probability events."³⁰⁰ Here, Prentice and Roszkowski draw from a large body of research that attempts to quantify consumer risk perceptions, including the work of W. Kip

²⁹⁵ Guido Calabresi, The Cost of Accidents 56 (1970).

²⁹⁶ See infra notes 311-12 and accompanying text; see also Latin, "Good" Warnings, supra note 7, at 1282-94.

²⁹⁷ Robert A. Prentice & Mark E. Roszkowski, "Tort Reform" and the Liability "Revolution": Defending Strict Liability in Tort for Defective Products, 27 Gonz. L. Rev. 251, 291 (1991-1992). The authors' views on behavioral research and its implications for products liability law are merely part of a larger project arguing in favor of strict liability along several grounds.

²⁹⁸ Id. at 297.

²⁹⁹ Id. at 292.

³⁰⁰ Id. (footnote omitted).

Viscusi.³⁰¹ Unlike Viscusi,³⁰² however, the authors seem unwilling to draw sweeping conclusions about consumer perceptions, venturing only to say that consumers sometimes underestimate and sometimes overestimate risks.

Third, Prentice and Roszkowski cite the work of Tversky, Kahneman, and others for the general conclusion that "'people do not follow the principles of probability theory in judging the likelihood of uncertain events,' and are therefore frequently unable to gauge the actual dangers that risks pose."³⁰³ Several cognitive biases could be said to impede consumers' ability to appreciate product risks. For example, the authors cite the availability heuristic as tending to lead people to overestimate the frequency of high-profile events such as earthquakes or tornadoes while underestimating the frequency of lesspublicized and less-dramatic risks such as asthma, emphysema, or diabetes.³⁰⁴

Fourth, Prentice and Roszkowski argue that the optimistic bias mitigates against consumer appreciation of product risks.³⁰⁵ As noted above,³⁰⁶ this bias refers to the generic tendency of individuals to view themselves as less vulnerable to a particular risk than others are.

Fifth, the authors cite the illusion of control.³⁰⁷ For Prentice and Roszkowski, the fact that experimental subjects believed that they could become better coin toss predictors with practice suggests that consumers might not fully appreciate the product risks that face them.³⁰⁸ Consumers might mistakenly overestimate the significance of their own "control" over products, believing erroneously that their personal input dampens the operation of chance.

Finally, Prentice and Roszkowski refer to the phenomenon of cognitive dissonance to argue that consumers might disregard product risk information because it tends to discredit the consumer's original

³⁰⁴ See Prentice & Roszkowski, supra note 297, at 294.

305 See id.

³⁰⁶ See supra notes 93-111 and accompanying text.

 307 See Prentice & Roszkowski, supra note 297, at 294 ("[P]eople tend to believe that they exert control over purely chance events, thus increasing their vulnerability, and leading them to conclude that their chances of avoiding injury in a dangerous situation are inappropriately higher than the objective probability would warrant.") (internal quotation marks and footnote omitted).

³⁰⁸ See supra notes 118-19 and accompanying text.

 $^{^{301}}$ See infra notes 358-92 and accompanying text (discussing some of Viscusi's work in this area).

 $^{^{302}}$ See infra notes 368-70 and accompanying text (discussing Viscusi's view of the evidence).

³⁰³ Prentice & Roszkowski, supra note 297, at 293 (footnote omitted) (quoting Daniel Kahneman & Amos Tversky, Subjective Probability: A Judgment of Representativeness, in Judgment Under Uncertainty, supra note 4, at 32, 32).

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decision to purchase the product.³⁰⁹ That is, because people often ignore information that casts doubt on their decisions,³¹⁰ consumers who make a purchase will be reluctant to process safety information that conflicts with their sense of having selected a beneficial, risk-free product.

For Prentice and Roszkowski, those factors in combination strongly suggest that consumers generally underestimate product risks. The implication of that conclusion is obvious: "'[Manufacturers] have no incentive to offer compensation or incur prevention costs for risks that consumers do not perceive.'"³¹¹ Thus, liability should be "aimed primarily at the deliberate decision-making of manufacturers and suppliers."³¹²

2. Howard Latin³¹³

Howard Latin has presented a more exhaustive review of the behavioral research and its implications for products liability law.³¹⁴ Latin focuses on the Comment J presumption from section 402A of the Restatement (Second) of Torts (1965),³¹⁵ which courts have interpreted as precluding independent scrutiny of product design so long as an adequate warning has been supplied by the manufacturer.³¹⁶ Latin's selection of this subject is provocative, for the Comment J presumption rests on background assumptions about consumer behavior which might be said to reflect von Neumann and Morgenstern's expected utility maximizer. Consumers are expected to read product warning information, process the safety data precisely, and make efficient preference selections based on the newfound knowledge.³¹⁷ For

³¹⁰ See Akerlof & Dickens, supra note 112, at 309.

³¹¹ Prentice & Roszkowski, supra note 297, at 297 (quoting John E. Calfee & Clifford Winston, Economic Aspects of Liability Insurance Rules and Liability Insurance, in Liability: Perspectives and Policy 16, 20 (Robert E. Litan & Clifford Winston eds., 1938)). ³¹² Id. at 301.

³¹³ For another review of Latin's work in this area, see Kenneth Ian Weissman, A "Comment J" Parry to Howard Latin's "Good" Warnings, Bad Products, and Cognitive Limitations, 70 St. John's L. Rev. 629 (1996).

³¹⁴ See Latin, "Good" Warnings, supra note 7. Like Prentice and Roszkowski, Latin's article reviews strict products liability on a variety of grounds beyond just behavioral research. See id. at 1197-98.

³¹⁵ The Comment reads: "Where [adequate] warning is given, the seller may reasonably assume that it will be read and heeded; and a product bearing such a warning, which is safe for use if it is followed, is not in defective condition nor is it unreasonably dangerous." Restatement (Second) of Torts § 402A cmt. j (1965).

³¹⁶ See Latin, "Good" Warnings, supra note 7, at 1196 nn.8-9 (discussing cases).

³¹⁷ "The central characteristics of the archetypal [rational actor] analysis are that it emphasizes consumer choice, not consumer safety, and that it assumes adequate disclosure

³⁰⁹ See Prentice & Roszkowski, supra note 297, at 295-96; see also supra text accompanying notes 112-13 (summarizing literature on cognitive dissonance).

Latin, this type of expectation is indicative of a particular mode of legal analysis, one which clearly evokes the normative underpinnings of expected utility theory.

In contrast to that mode of legal analysis, which he terms the "Rational Risk Calculator (RRC) Model,"³¹⁸ Latin proposes an alternative conception of consumer behavior, the "Mistake and Momentary Inattention (MMI) Model."³¹⁹ This MMI Model is enriched by a variety of nonrational features that conspire to prevent the type of consumer risk calculation which Comment J and expected utility theory presuppose. Many of these features—illiteracy and functional illiteracy,³²⁰ predictably inattentive or incompetent groups such as children or unskilled laborers,³²¹ reliance on learned intermediaries such as physicians,³²² and information overload³²³—are identified by Latin as reasons why consumers would not read warnings at all. For present purposes, we will focus on Latin's discussion of why consumers would either fail to understand or fail to follow warnings, even if read.³²⁴

Latin begins his discussion by addressing some of the arguments offered by Alan Schwartz in his products liability scholarship.³²⁵ For instance, Schwartz has argued that the representativeness heuristic³²⁶ leads consumers experiencing a series of safe encounters with products to expect an unsafe encounter, just as the gambler's fallacy³²⁷ leads people to expect a heads coin toss to follow a long series of tails.³²⁸ To Latin, this argument relies upon a flawed application of Kahneman and Tversky's representativeness heuristic: Rather than

- 322 See id. at 1209-10.
- ³²³ See id. at 1211-12.

³²⁴ Although we focus here on Latin's treatment of the behavioral research, Latin also identifies a variety of reasons why consumers would fail to understand or follow warnings from outside of behavioral research. For instance, Latin argues that drafting product warnings necessarily involves imperfect tradeoffs among detail, clarity, and impact; warnings often fail to inform consumers about the consequences of misuse; consumers must contend with competing demands on time and attention; consumers lack perfect memory and do not reread warnings with each product use; some accidents result from reflexive rather than contemplated action; and some warnings are disregarded because manufacturers lack credibility. See id. at 1220-48.

 325 See infra notes 393-417 and accompanying text for a discussion of Schwartz's work in this area.

³²⁶ See supra notes 145-48 and accompanying text.

³²⁸ See Schwartz & Wilde, supra note 286, at 1438-40.

will enable people to choose whatever risk levels are consistent with their preferences." Latin, "Good" Warnings, supra note 7, at 1201.

³¹⁸ Id. at 1199.

³¹⁹ Id.

³²⁰ See id. at 1207-08.

³²¹ See id. at 1208.

³²⁷ See supra text accompanying notes 153-54.

relying on (erroneous) pre-conceived notions of how random series of events should "represent" themselves in small samples, consumers rely on their experiential "input" to construct the "representative" pattern.³²⁹ Because "[m]ost product uses entail small probabilities of harm[,] . . . [p]eople who generalize from their own experiences may treat this limited sample as 'representative' of overall product risks and therefore anticipate continued safety."³³⁰ Latin bolsters this conclusion by pointing out that manufacturer advertising is more likely to portray products as safe and reliable, further cementing the consumer's conception of the products as innocuous.³³¹

Latin next turns to Schwartz's reliance on the availability heuristic.³³² Schwartz uses this heuristic to support the conclusion that vivid images of product accidents will be more salient in consumers' minds than mundane information about reliability; hence the availability heuristic might lead consumers to systematically overestimate the dangers posed by products.³³³ To Latin, this represents an overly broad treatment of the availability heuristic.³³⁴ Admittedly, people may overestimate the severity of such high-profile threats as nuclear power plant meltdowns or airplane crashes, but for the vast majority of product-caused accidents, "safe usage will be far more typical and hence more available."335 Even for those product risks which do achieve salience in the consumer's mind, "[v]ivid risks seldom remain immutably vivid and available because newly publicized hazards gradually supplant old ones."336 In short, Latin believes that the vast majority of product risks will not be readily available to consumer consciousness and, "[b]ecause people seldom think about unavailable risks, the effect is precisely the same as if they were unduly optimistic about those product hazards."337

Like Prentice and Roszkowski, Latin cites cognitive dissonance³³⁸ as a force that might cause consumers to downplay information inconsistent with their beliefs and actions.³³⁹ Thus, Latin argues, someone attracted by the style and power of a Corvette might undervalue the

³²⁹ See Latin, "Good" Warnings, supra note 7, at 1232.

³³⁰ Id. at 1231.

³³¹ See id. at 1232.

³³² See supra notes 137-44 and accompanying text.

³³³ See Schwartz, supra note 252, at 381; Schwartz & Wilde, supra note 286, at 1437-38. ³³⁴ See Latin, "Good" Warnings, supra note 7, at 1233 ("This argument treats product risk in a highly generic manner; in reality, people are exposed to countless hazards created by thousands of discrete products.").

³³⁵ Id.

³³⁶ Id. at 1234.

³³⁷ Id.

³³⁸ See supra notes 112-13 and accompanying text.

³³⁹ See Latin, "Good" Warnings, supra note 7, at 1234.
safety implications of driving a fast sports car.³⁴⁰ This problem might be particularly acute in the frequent case in which product warnings are only available in package inserts or instructions *after* the product has already been purchased. By that point, consumers have already made the purchase decision and formed a positive belief about the product; warning information inconsistent with that belief may be discounted. Furthermore, Latin argues, cognitive dissonance might operate synergistically with consumer overconfidence. Not only might people tend to overestimate their own ability to avoid harmful risks, but they also might tend to ignore information contrary to their inflated sense of competence.³⁴¹

Latin also discusses some complex applications of Kahneman and Tversky's prospect theory³⁴² that indicate limitations on consumers' ability to process risk information. First, because of the anchoring effect,³⁴³ Latin believes that "information on risks often proves less informative than it should be, and anchoring on varied preconceptions leads people to derive different meanings from a given disclosure."344 Not only will people arbitrarily fix on some initial estimate of a product risk, but they will also fail to adjust sufficiently their estimations in the face of new information, such as product warnings. Second, framing effects³⁴⁵ can be used by manufacturers to blunt consumer risk appreciation.³⁴⁶ Third, Latin notes that "people greatly undervalue a reduction in the probability of a hazard in comparison to the complete elimination of that hazard"347 and that warnings and instructions can rarely result in a complete elimination of product risks. Thus, Latin concludes, "users may underestimate the utility of complying with partial risk-reduction measures recommended in warnings."348 Finally, Latin observes that the prevailing legal standard for strict products liability requires an analysis of whether a product design or warning is "unreasonably dangerous"-a standard which leads to ex ante uncertainty for both manufacturers and consumers. Given that people tend to be "risk seeking in the domain of losses,"349 both ac-

³⁴⁰ See id.

³⁴¹ See id. at 1235.

³⁴² See supra notes 256-61 and accompanying text.

³⁴³ See supra notes 158-63 and accompanying text.

³⁴⁴ Latin, "Good" Warnings, supra note 7, at 1238.

³⁴⁵ See supra notes 242-50 and accompanying text.

 $^{^{346}}$ See Latin, "Good" Warnings, supra note 7, at 1241 (explaining that manufacturers often choose to present warnings in manner conducive to sales thereby contributing to consumer underestimation of product risks).

³⁴⁷ Id. at 1239 (quoting Kahneman & Tversky, supra note 42, at 346).

³⁴⁸ Id. at 1239.

³⁴⁹ Id. at 1240.

tors may prefer to accept a chance of a large loss (i.e., personal injury or tort damages) to a sure small loss (i.e., an investment in care). "In effect, legal uncertainty can lead to inefficient risk-seeking behavior."³⁵⁰

Following his exposition of prospect theory, Latin discusses one final cognitive feature which draws from the behavioral researchoverconfidence or optimism.³⁵¹ "People may not respond properly to many risks designated in warnings because they are unduly optimistic about their ability to avoid these hazards."352 Many people not only fail to understand complex risks such as product hazards, but they also fail to realize that they do not understand and hence fail to approach product usage with the requisite caution. Even when they are aware of product risks, however, they will often attribute "accidents and other undesirable results to bad human judgments rather than variable environmental factors."353 This in turn will cause them to discount the risk to their own safety, because they judge themselves to be "unusually capable and careful."354 Thus, both because they fail to understand product risks and because they fail to believe them even when they do understand, consumers might display a systematic overconfidence in their own ability to avoid product harms.355

Having thus introduced a series of heuristics, biases, and other anomalies from the behavioral research, Latin attempts to tie the threads together:

Although I have discussed common heuristics and biases in serial fashion for expositional clarity, their effects on consumer choices are interrelated and often cumulative. Some sources of error may lead to overestimation of product risks in specific product-use contexts and other heuristics and biases will have the opposite effect. Taken together, however, bounded rationality constraints, availability, representativeness, cognitive dissonance, anchoring, and risk seeking in the domain of potential losses all support the conclusion that consumers tend to underestimate rather than overestimate most product risks most of the time.³⁵⁶

Thus, Latin concludes his rigorous treatment of behavioral research and products liability law by citing a string of cognitive anomalies which he believes, in the aggregate, lead consumers to underestimate the prevalence of product risks systematically. By pro-

³⁵⁰ Id.

³⁵¹ See supra notes 93-111 and accompanying text.

³⁵² Latin, "Good" Warnings, supra note 7, at 1243.

³⁵³ Id.

³⁵⁴ Id. at 1244.

³⁵⁵ See id. at 1243.

³⁵⁶ Id. at 1240-41 (emphasis added).

viding a thorough analysis of cognitive features heretofore largely absent from the legal literature, however, Latin's article should be regarded as more than just an argument in favor of increased manufacturer liability. His work, along with an under-appreciated early article on similar issues,³⁵⁷ should be seen as an important step in bringing the wealth of behavioral research to legal scholarship.

B. Over-Estimators

A second group of scholars draws roughly the opposite conclusion from the behavioral research. Rather than viewing Latin's list of underestimation biases as predominant, these scholars find several countering psychological effects that lead them to conclude that consumers overestimate product risks. In their view, consumers are already inappropriately deterred from product consumption, and manufacturers have greater than optimal incentives to invest in product safety. Expanding manufacturer liability would therefore only strengthen those undesirable tendencies. In short, the Over-Estimators are opposed to increased manufacturer liability, at least when premised on assumptions that cognitive heuristics and biases lead consumers to underestimate product risks.

1. W. Kip Viscusi

In a recent article, Viscusi has responded to Latin's arguments and offered his own thoughts on the behavioral research and its implications for consumer risk perception.³⁵⁸ Like Latin, Viscusi's main concern is with the efficacy of product warnings. Unlike Latin, however, Viscusi views warnings as an antidote to consumer cognitive limitations.³⁵⁹ According to Viscusi, the behavioral research should not cause products liability theorists to abandon the prospect of warnings having a beneficial impact on consumer risk information; instead, it should spur theorists toward developing a fuller understanding of product warnings and their operation within the context of bounded consumer rationality. Viscusi's desire to preserve a role for product warnings is premised on what he believes is the superior ability of

³⁵⁷ See Latin, Problem-Solving Behavior and Theories of Tort Liability, supra note 7.

³⁵⁸ See Viscusi, supra note 21. Viscusi's work in this area has been extensive. See Viscusi, supra note 285; W. Kip Viscusi, Fatal Tradeoffs: Public and Private Responsibilities for Risk (1992). We will focus on Individual Rationality, see supra note 21, because it represents Viscusi's most recent and thorough treatment of the subject.

 $^{^{359}}$ See Viscusi, supra note 21, at 628 ("The principal theme of this discussion is that while cognitive limitations may be important and define the context in which warnings are perceived, they do not radically alter how we should think about liability tests or the role of warnings.").

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warnings to allow the possibility for individual choice.³⁶⁰ Thus, like fellow Over-Estimator Alan Schwartz, Viscusi's views of the behavioral research are accompanied by an underlying preference for the individual autonomy associated with the rational actor model over any competing norms.³⁶¹

Viscusi begins by somewhat oddly recharacterizing Latin's argument: "What I call Howard Latin's Law, which is a variant of Murphy's Law, might aptly be summarized as: 'Everything goes wrong.'"³⁶² Viscusi's point is that Latin's "extreme view"³⁶³ may be unduly pessimistic concerning individual capacity for rationality. Admittedly, cognitive limitations play a role in consumer processing of risk information, but "we must identify which failures are important in a particular warning context and, if the failures are consequential, determine how much they impede the efficacy of the warnings."³⁶⁴

Viscusi proceeds to agree with Latin that consumers frequently fail to read product warnings; are often functionally illiterate; are susceptible to information overload; must often rely on intermediaries who may be unreliable; lack sufficient expertise to make many product decisions; vary across populations in a way that prevents optimal warning construction; are widely susceptible to framing effects; and display overconfidence in their own ability to avoid risks.³⁶⁵ Despite agreeing with Latin that consumers are susceptible to such limitations,³⁶⁶ Viscusi refuses to accept Latin's conclusion. Rather, he concludes that "[i]f a warning fails to convey information in a credible manner, the resulting shortcoming should be judged a failure of the warning itself rather than of warning policies more generally."³⁶⁷

365 See id. at 632-34.

³⁶⁷ Id. at 634. In support of this argument against Latin's call for removing the exculpatory effect of product warnings, Viscusi argues by analogy that for many important choices such as "career, school, religion, or spouse" in which greater social costs may result from

 $^{^{360}}$ See id. at 629 ("The flexibility of warnings enables those who are unwilling to incur risks to take appropriate precautions or to avoid the risky activity, and also enables individuals who are willing to engage in risky behavior to do so.").

³⁶¹ See infra note 416 and accompanying text (discussing Schwartz's work).

³⁶² Viscusi, supra note 21, at 631 n.8.

³⁶³ Id. at 630.

³⁶⁴ Id. at 631.

³⁶⁶ Viscusi also notes that Latin "alludes to other forms of failures in decision making, such as the representativeness heuristic, the availability heuristic, and cognitive dissonance." Id. at 634 n.17. Oddly, however, Viscusi refuses to address these behavioral findings, stating that they are "shortcomings of decisions more generally" and are not specific to hazard warnings. Id. A similar excuse could be offered for all of Latin's findings. Illiteracy, for example, is a shortcoming which impacts decisions in far more numerous and more important settings than the product warning context. That does not, however, alter the fact that for the afflicted, illiteracy poses a significant barrier to understanding product warnings.

On that upbeat note, Viscusi turns to the wide body of empirical evidence relating to consumer risk perceptions and finds that a rough pattern of risk perception errors emerges. First, "[s]ome hazards may be hidden, and they may involve risk consequences that are not well publicized."³⁶⁸ Those hazards remain completely removed from consumer consciousness. Second, "[l]ow probability risks, such as those from botulism and tornadoes, tend to be overestimated."³⁶⁹ Finally, "very large risks, such as our lifetime risk of being killed from heart disease or cancer, tend to be underestimated."³⁷⁰ Thus, Viscusi argues, to the extent that product accidents pose low probability risks (as opposed to hidden or high probability risks), they may be overestimated by consumers.

In addition to that empirical evidence, Viscusi cites some cognitive anomalies that he believes point toward consumer overestimation of product risks on a theoretical level. First, alluding to the Ellsberg Paradox,³⁷¹ Viscusi notes the tendency of individuals to react adversely to ambiguity over outcomes. Thus, when consumers have some awareness of a product risk, but not sufficient awareness of it, they may react to the ambiguity by overestimating the threat of the harm. Second, Viscusi argues that "consumers tend to overreact to increases in risk as opposed to risk decreases."³⁷² Here, Viscusi relies on experimental evidence gathered on consumer willingness to pay or willingness to accept values for a series of increases or reductions in the risk of injury from household chemicals. The evidence strongly suggests, in his view, that "[p]erceived risk increases are likely to be

368 Id. at 639.

369 Id.

³⁷⁰ Id.

 371 The Ellsberg Paradox refers to a model that reveals individuals' tendency to be averse to ambiguity as between probabilistically identical outcomes. In it, contestants are given the choice between selecting from an urn containing a 50/50 mix of red and white balls and an urn in which the precise mix of red and white balls is randomly determined. Most individuals prefer the certain 50/50 probability of the first urn, despite the fact that the second urn presents the same probability of success. See id. at 640-41.

372 Id. at 642.

inefficient decisions, "there is little activity on the part of the courts to impose sanctions that would reduce these failures." Id. at 636. We find this argument odd for several reasons. First, it is unclear why the absence of regulation in completely disanalogous contexts should weigh in favor of abstention in the consumer product context. It is not immediately obvious that consumer product decisions should be shrouded with the same degree of privacy/autonomy values that we afford religious faith or marital decisions. Second, there may be features of the consumer product context, such as its relative ease of accident prevention or its relative unimportance to individuals vis-à-vis Viscusi's other examples, which make it a particularly attractive candidate for legal intervention. Finally, Viscusi's argument proves too much for it is hard to know how he would justify requiring warnings, if the analogies were controlling.

viewed with alarm, resulting in a significant danger of overreaction to warnings with respect to new risks that consumers did not view as an accustomed characteristic of the product."³⁷³

Finally, Viscusi cites studies indicating that smokers overestimate the health risks of their smoking for the proposition that "highly publicized risks tend to be overestimated."³⁷⁴ Here, Viscusi is arguing that media coverage or other imagery of product accidents can result in overestimation of the harm through the availability heuristic.³⁷⁵ Indeed, Viscusi believes that "[h]azard warnings [themselves] . . . may create excessive perception of small risks."³⁷⁶ For instance, Viscusi argues that the wording of California's Proposition 65³⁷⁷ would have resulted in consumers receiving "a warning for Liquid Paper that indicated a risk comparable to that of cigarettes."³⁷⁸ Thus, in Viscusi's view, ambiguity aversion, overreaction to risk increases, and the availability heuristic might all lead consumers to overestimate product risks.

Beyond those theoretical arguments, Viscusi also assembles empirical evidence relating directly to the effectiveness of warning labels. For instance, he notes that U.S. per capita cigarette consumption has fallen considerably in the wake of post-World War II warning efforts.³⁷⁹ Likewise, product warnings and prominent media attention of the hazards of saccharin caused a marked decrease in sales of saccharin-containing products.³⁸⁰ Finally, Viscusi describes one experimental study which found that a high proportion of consumers (up to thirty-three percent in the study) could be "informed" through product warnings about the risks of using household bleach.³⁸¹ Thus, while

³⁷³ Id. at 645-46.

³⁷⁴ Id. at 646.

³⁷⁵ For a more complete summary of Viscusi's opinions regarding consumer knowledge of the risks of smoking, see Hanson & Kysar, TBS II, supra note 25, at 1503-05.

³⁷⁶ Viscusi, supra note 21, at 648.

³⁷⁷ Proposition 65 would have required a wide variety of products to carry this warning: "WARNING: The State of California has determined that this product is dangerous to your health." Id. at 648.

³⁷⁸ Id. at 650. In support of this claim, Viscusi offers an experimental survey in which respondents were asked to make comparisons between the perceived severity of differently worded warnings, some of which were modeled after federally mandated cigarette warnings. See id. at 648-50. We note, however, that survey respondents were not told which products the warnings were from, but instead were asked to judge the severity of the warnings in isolation. See id. at 649. Consumers might display different responses when actually viewing the warnings in a product-specific context. That is, other product information besides that contained on the warning may influence consumer perception of the warning itself.

³⁷⁹ See id. at 653-54.

³⁸⁰ See id. at 655.

³⁸¹ Id. at 658-59.

only sixteen percent of respondents were aware that bleach should not be mixed with toilet bowl cleaner when no warning was given, twentythree percent were aware of the precaution after receiving the warning provided on the national bleach brand, Clorox.³⁸² We note, however, that while Viscusi believes that this "evidence suggests that these types of warnings are potentially effective in alerting consumers to the presence of [a] risk and the need to take precautions,"³⁸³ he does not acknowledge that even after receiving the Clorox warning, *less than one-quarter of respondents actually processed and understood the information*.

Perhaps in recognition of this overall failure of the Clorox warning (despite its small incremental success). Viscusi devotes a substantial section of his paper to describing the research which has been undertaken to develop a theory of how warnings should be constructed in order to be most effective. More particularly, he argues that "[t]he salience of the information and the manner in which it is presented do influence, at least to a degree, the ability of consumers to process the information."384 For instance, label clutter refers to the tendency to include more information on a warning label than consumers can process effectively. Similarly, label proliferation-the growing appearance of warning labels on a wide variety of productscan result in decreased consumer risk appreciation by "distort[ing] relative product comparisons" or "dilut[ing] the warnings for the real hazards that should be identified."385 In light of these potential failings of product warnings, Viscusi proposes a uniform format and structure for all warnings, as well as a national hazard warning vocabulary.386

Such a plan would help alleviate the difficulties of comparing risk information across products—it would, for example, distinguish between the hazards of cigarette smoking and Liquid Paper use. Not only would Viscusi adopt such a uniform system, he would make compliance exculpatory. At present, Viscusi believes manufacturers have an incentive to overwarn because they are held liable only for underwarning about product risks, not overwarning. Thus, consumers face a state of label clutter and label proliferation prompted by the legal system.³⁸⁷ In contrast, "[t]he establishment of a uniform vocabulary coupled with a regulatory compliance defense for warnings that

³⁸⁵ Id. at 665-66.

³⁸² See id. at 659 tbl.8.

³⁸³ Id. at 658.

³⁸⁴ Id. at 661.

³⁸⁶ See id. at 666.

³⁸⁷ See id. at 665.

adhere to this vocabulary would ensure that firms could warn consistently across product lines and that the warning language that was selected would have a consistent meaning to the consumers who process the information."³⁸⁸

Viscusi proposes this national warning system in part because he fears an autonomy loss that he believes results from Latin's alternative of putting product risk responsibility on manufacturers.³⁸⁹ At heart, Viscusi's quarrel with Latin appears to be over the intuitive response to one question: What proportion of product-caused accidents are caused by consumer cognitive limitations, and what proportion by deliberate cost-benefit calculations? For Viscusi, the answer is clear: "[W]arnings should remain the desired policy approach even though direct control of the product risk characteristics might protect the small segment of consumers who do not make sound decisions."390 Thus, although consumers do suffer from cognitive limitations, "underestimation [of product risks] is not the norm."391 Instead, Viscusi believes that "for very small risks, there is a consistent pattern of overestimation of the hazards,"392 such that, if anything, consumers are underutilizing products. The proper legal response is therefore not to increase manufacturer liability for product design but to institute a national system of warnings to minimize the impact of consumer cognitive failings. Rather than flee the sinking ship of the rational actor model, Viscusi would try to shore up the leaks.

³⁸⁸ Id. at 666.

³⁸⁹ See id. at 668 ("[O]ne must assess whether the benefits from avoiding mistaken decisions achieved through mandating safety characteristics are sufficient to offset the welfare loss incurred both through the additional cost of providing the safety as well as by the elimination of choices in the marketplace."). We note that Viscusi appears to be arguing against both strict products liability and an alternative of providing substantive product standards and safety requirements through government regulation. See id. at 667 ("How . . . should we assess the desirability of warnings as compared with other more direct interventions, such as either government regulation or tort liability?"). However, his fear of welfare loss associated with "mandating safety characteristics" is overstated with respect to the possible effect of tort liability. Under strict products liability, manufacturers could continue to offer Viscusi's "choice[] in the marketplace" so long as the benefits associated with such choice outweighed the concomitant accident costs. It is not necessarily the case that expanded tort liability would entail "mandat[ory] safety characteristics" or "the elimination of choices in the marketplace"; indeed, arguably such results would occur only when they were socially optimal. Manufacturers would compare the benefits of adding safety features or pulling product options (lowered liability costs) to the costs of those safer features or product options (foregone profits), and decide accordingly. In short, liability for losses is not tantamount to a mandate that such losses be eliminated.

³⁹⁰ Id. at 668 (emphasis added).

³⁹¹ Id. at 671.

³⁹² Id.

2. Alan Schwartz

Alan Schwartz has addressed the issue of cognitive biases and consumer risk perception in two prominent articles.³⁹³ For Schwartz, the stakes are clear: "Strict liability may be justified . . . if the [risk information] assumption—that consumers know risks of harm—is false."³⁹⁴ That is, when consumers underestimate the risks of products, "[s]trict liability is necessary to get the right contracts and the right safety level, as measured by the preferences of well-informed consumers."³⁹⁵ Because he is arguing "The Case Against Strict Liability," it is crucial that Schwartz show why the behavioral research does not establish a convincing case that consumers are optimistic with regard to product risks.³⁹⁶

Schwartz begins by establishing an analytical framework that distinguishes between consumer perception of product risks and consumer perception of safety improvements. For both of these perceptions, consumers either can overestimate, underestimate, or correctly estimate the risk of the product or the effect of a safety improvement. This produces the somewhat counterintuitive result that when a consumer overestimates the effect of a safety improvement (for example, she thinks that the innovation will lower risk levels more than it actually does), the consumer is concomitantly underestimating the actual risk of the product. Schwartz views these two factors as operating independently, such that one cognitive bias could cause a consumer to overestimate the risk of a product ex ante, while another bias could cause the same consumer to overestimate the benefits of a subsequent safety improvement to the product. Needless to say, it is important (and difficult) to assess which effect will be more pronounced on consumers' overall perceptions.397

³⁹³ See Schwartz, supra note 282; Schwartz, supra note 252. Although his works address a full spectrum of issues from products liability theory, we will focus on his treatment of the behavioral research. More specifically, we will focus on his defense of the consumer sovereignty norm against behavioral charges of irrationality and flawed risk perception.

³⁹⁴ Schwartz, supra note 252, at 374.

³⁹⁵ Schwartz, supra note 282, at 823.

³⁹⁶ We note from the outset, however, that Schwartz does not view the behavioral research as clearly decisive in either direction. See infra note 415 and accompanying text. We have placed him with the Over-Estimators more because of his views on strict liability than his specific views on the behavioral research.

³⁹⁷ Schwartz provides an instructive example: Assume that consumers overestimate the risk of medical drugs but also underestimate the benefits of drug safety improvements. Because safety improvements are rare in the medical drug industry, they would have a less pronounced effect on perceptions than the consumer's general view of the product's risk level. "Thus, whether there would be too few or too many accidents without strict liability... is context dependent." Schwartz, supra note 282, at 833.

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Using these categories, Schwartz divides the world of consumer risk perception into nine possible states.³⁹⁸

	Risk Level		
Safety Improvement	0,0	O,P	O,C
	P,O	P,P	P,C
	C,O	C,P	C,C

In this model, "O" represents consumer optimism, "P" represents consumer pessimism, and "C" represents a correct assessment of product risks.³⁹⁹ Consumer perception of safety improvements are reported first, followed by consumer perception of risk levels. Thus, the O,P cell would represent a state in which consumers overestimate the beneficial effect of safety improvements but also overestimate the current risk of a product.

With that framework, Schwartz attempts to discern from the behavioral research which of the nine cells is a viable description of actual consumer perceptions. He begins by observing, "The weight of evidence shows that consumers do not underestimate risk levels."400 Here, Schwartz explicitly relies on Viscusi's summary of consumer perception evidence.⁴⁰¹ He adds, however, that from a theoretical perspective, consumers would also be likely to overestimate product accident rates given the vividness of accidents and the relative staleness of a statistically good safety record. Here, Schwartz is presumably arguing that the availability of product accident imagery, combined with the more general failure of people to appreciate probabilistic data, would cause consumers to overestimate the frequency of accidents.⁴⁰² As Latin argued, however, Schwartz does not explain why product accident rates would not be dulled by the same failure to appreciate probabilistic data, or why product safety experiences would not be overestimated via the availability heuristic given their relatively greater familiarity.⁴⁰³ Nevertheless, Schwartz believes that the combination of Viscusi's empirical data and the theoretical possibility of the

⁴⁰³ See supra notes 137-44 and accompanying text.

³⁹⁸ See id. at 829.

³⁹⁹ See id.

⁴⁰⁰ Id.

⁴⁰¹ See supra notes 368-70 and accompanying text.

⁴⁰² See Schwartz, supra note 282, at 829; see also Schwartz, supra note 252, at 381 ("Because negative information about products is often alarming, it has high salience. This psychological claim implies, and supporting evidence predicts, that consumers attach disproportionate weight to negative data, and thus overreact to product-related risks.").

availability bias increasing product accident salience makes consumer underestimation of product risks unlikely.⁴⁰⁴

Schwartz goes on to note that another cognitive feature, the anchoring effect, might result in insufficient adjustments of consumer risk perceptions in the face of product safety improvements.⁴⁰⁵ Countering this effect, however, is the apparent possibility that consumers might pay more for safety improvements than they are actually worth. thus implying that consumers overestimated the risk of a product ex ante.⁴⁰⁶ Although Schwartz does not cite any empirical support for this possibility, he does note a study which found that an automobile's high crash-worthiness rating strongly influenced consumer purchase decisions.⁴⁰⁷ We are asked then to assume that, given consumers' tendency to use safety as a purchasing criterion, consumers might pay more for safety improvements than is actually warranted by the improvement, which might suggest that consumers initially overestimated the dangerousness of the product. By leading the reader through that inferential odyssey, Schwartz erects what we consider to be a straw man in favor of strict liability: "It is difficult to know whether anchoring . . . is more significant than the effect of pessimism respecting risk levels. To make the best case for strict liability, assume that the anchoring effect is at least as important as the overpayment effect."408

By hypothesizing the overpayment effect as a point in favor of strict liability and then trading it for the anchoring effect, Schwartz appears analytically generous to strict liability. However, as Latin has argued, the anchoring effect may actually point to consumer *underestimation* of product risks rather than overestimation as Schwartz has

⁴⁰⁴ See Schwartz, supra note 282, at 830 ("Because both evidence and theory imply that consumers are not optimists respecting risk levels, the first column of the matrix should be eliminated (all cells that have O as the second letter).").

⁴⁰⁵ See id. ("[I]f consumers think that a product is 'just this dangerous,' they may undervalue evidence that the improved version is materially safer.").

 $^{^{406}}$ Schwartz's phrasing is less explicit: "On the other hand, consumers may be pessimistic about risk levels, which implies that consumers will overpay for safety improvements." Id.

⁴⁰⁷ See id. at 830 n.22 (citing Patrick S. McCarthy, Consumer Demand for Vehicle Safety: An Empirical Study, 28 Econ. Inquiry 530, 541 (1990)).

⁴⁰⁸ Schwartz, supra note 282, at 830. Schwartz's terminology may have gotten the best of him here. The anchoring effect, as used by Schwartz, is a point against strict liability in that it suggests consumers underestimate the benefits of a safety improvement and therefore overestimate the product's risk. Schwartz's view of the overpayment effect, on the other hand, is that it provides evidence that consumers overestimate the benefits of safety improvements and therefore underestimate the product's risk. Thus, to make the best case for strict liability, it is the overpayment effect which must be at least as important as the anchoring effect, not vice versa.

suggested.⁴⁰⁹ Consumers anchor on their original perception of the product at the time of purchase, which is likely to be one of a safe product. Whether through marketing efforts of manufacturers or consumer willingness to ignore data that contradict their purchasing impulse, the original purchase decision is unlikely to involve significant awareness of product risks. Thus, any adjustments from this original anchor will insufficiently account for information concerning the product's levels.

Despite these arguments, Schwartz treats the anchoring effect as tending to prove consumer overestimation of product risks and, as shown above, he argues that the anchoring effect and the overpayment effect should be considered a wash. It is difficult to see, then, how he could conclude that "the view that consumers are optimists respecting the effect of product improvements must be rejected."410 Having just argued that the cases for consumer optimism and pessimism respecting safety improvements are equally compelling (or noncompelling), it is not clear why Schwartz chooses only to disregard possibilities in which consumers behave optimistically. It would be more appropriate in our view to retain both sets of possibilities in recognition that the data is indeterminate.⁴¹¹ Schwartz was too quick to eliminate consumer optimism respecting safety improvements from his analysis, both because he understated the case for optimism and because his decision to exclude optimism as a possibility rested on unconvincing logic.

Based on that questionable reasoning, Schwartz removes consumer optimism about safety improvements from consideration, leaving him with the following four possible states of consumer risk perception: (i) P,P; (ii) C,P; (iii) P,C; (iv) C,C.⁴¹² Of those options, Schwartz believes that only the first and fourth cells are stable.⁴¹³ With the second option, if consumers correctly perceive the effect of safety improvements, eventually their underlying perception of the product's risk level will become correct as well. With the third option, if consumers incorrectly perceive the effect of safety improvements, eventually their initially accurate perception of the product's risk level

⁴⁰⁹ See supra note 344 and accompanying text.

⁴¹⁰ Schwartz, supra note 282, at 830.

⁴¹¹ Conceivably, Schwartz could have argued that both consumer optimism and pessimism respecting safety improvements should be eliminated as possibilities. That position, however, would depend on the unlikely coincidence that the anchoring effect and the overpayment effect operated in tandem to produce correct consumer estimates of safety improvements.

⁴¹² See Schwartz, supra note 282, at 831.

⁴¹³ See id.

will become corrupted by the incorrect information gained from safety improvements.

Thus, the second and third options will merge with the fourth and first, respectively, leaving only those two options as viable possibilities for the state of consumer risk perception. In Schwartz's view, then, either consumers accurately perceive both risk levels and safety improvements (the C,C cell), or they view risk levels and safety improvements pessimistically (the P,P cell). In the latter case, products will be less safe than they should be (because manufacturers have blunted incentives to make safety improvements given consumers' uncharitable perception of them), but there will also be less products purchased than there should be (because consumers view the product risk level as worse than it really is). To Schwartz, determining which one of those trends will predominate is unknowable a priori.⁴¹⁴

Those arguments constitute the bulk of Schwartz's treatment of the behavioral research, a treatment that he acknowledges is incomplete: "This analysis does not provide a conclusive case for rejecting the assumption that consumers misperceive risks. . . . [T]here is substantial uncertainty respecting whether consumers do misperceive risks and what the effect of likely misperceptions are."⁴¹⁵ Given this uncertainty, Schwartz devotes the rest of his article to making a "second order case" against strict liability.⁴¹⁶ That is, accepting that we do not know for certain whether consumers misperceive product risks, Schwartz argues that the best legal regime under such uncertainty is *not* strict liability.

Although we share his sense that the behavioral research is largely indeterminate, we do not feel that this renders a first order case for strict liability impossible.⁴¹⁷ In Part III of this Article and in our companion article, we will take on Schwartz's challenge, attempting to establish on theoretical grounds a first order case for enterprise liability as the most appropriate public response to manufacturer manipulation of consumer risk perceptions.

 417 "[A] first order case for strict liability would establish the existence and effect of imperfect information and then show why strict liability is the appropriate public response." Schwartz, supra note 282, at 835.

⁴¹⁴ See id. at 832.

⁴¹⁵ Id. at 832-33.

⁴¹⁶ Similarly, in his earlier article, Schwartz argued that, given the uncertainty of the psychological evidence, the strict liability debate devolves to a choice among two competing "tiebreaker" rules: the desire to compensate victims, and the desire to uphold free contracting and the consumer sovereignty norm. Of these choices, Schwartz presented an argument in favor of the latter. See Schwartz, supra note 252, at 382-84.

C. The ALI Reporters' Study on Enterprise Responsibility for Personal Injury: A Comprehensive View?

The articles addressed thus far have shared the same basic methodology: Each author appears to have surveyed the vast array of behavioral research in serial fashion, placing study after study in respective baskets of over- and underestimation depending on the direction each particular cognitive anomaly pulls. Then, after this allocation is concluded, a final tally is taken, and the author concludes that, in the aggregate, there appear to be more over- than underestimation anomalies, or vice versa.⁴¹⁸

We believe there is a very simple explanation for this somewhat rudimentary approach to the behavioral research: The research itself is presented in this serial fashion. Despite the best efforts of thinkers like Kahneman and Tversky,⁴¹⁹ the behavioral research remains a somewhat haphazard collection of seemingly unrelated cognitive quirks. Thus, for anyone attempting to draw legal implications from the studies, the natural approach is to address each heuristic and bias individually. Drawing legal conclusions for a topic like consumer risk perception then becomes primarily a game of "who has the most anomalies wins." While we understand the necessity for this approach, we believe that ultimately a more systematic approach will be required before we place confidence in any legal policy conclusions that are drawn from the behavioral research. One attempt at such a treatment, a chapter from the American Law Institute Reporter's Study on Enterprise Responsibility for Personal Injury, is described in this section.

⁴¹⁸ Latin, for instance, is explicit in this analysis: "Taken together, however, bounded rationality constraints, availability, representativeness, cognitive dissonance, anchoring, and risk seeking in the domain of potential losses all support the conclusion that *consumers tend to underestimate rather than overestimate most product risks most of the time.*" Latin, "Good" Warnings, supra note 7, at 1240-41. Schwartz also adopts this methodology, though he draws the opposite conclusion from Latin: After distinguishing between evidence of consumer "'pessimism' [which] creates insufficient incentives for firms to improve safety [and] 'optimism' [which] creates excessive incentives," Schwartz, supra note 282, at 827, he concludes that "[t]he weight of evidence shows that consumers do not underestimate risk levels." Id. at 829. The remaining authors display similar methodologies. See Prentice & Roszkowski, supra note 297, at 297 (noting that "the above [six] factors, in combination, lead consumers to understate their needs for injury protection"); Viscusi, supra note 21, at 630-50 (contrasting "inventory of consumer failings with respect to warnings" with "the potential rationality of individual decisions" in order to develop "patterns of risk perception errors").

⁴¹⁹ See supra notes 256-61 and accompanying text (describing Kahneman and Tversky's prospect theory).

1. The Reporters' Recommendations Based on a Survey of "Evidence About Risk Perceptions"

The Reporters begin with a much-needed cautionary statement: "[T]he degree to which there is overestimation or underestimation of injury risk varies with the character of the risk and the particular market context. Empirical evidence indicates that there are tendencies to both overestimate and underestimate the risk in different circumstances "420 This welcome disclaimer is followed by a summary of what the Reporters appear to regard as the central finding of their research: "One result that is definitely borne out by our review of this evidence is that there is no general support for the widely held assumption that individuals always tend to underestimate product risks when they misperceive the chance of injury."421 Instead, the Reporters find that people display a complex, lock-step awareness of risk levels. Roughly speaking, the Reporters argue that events of very low probability tend to be completely ignored, events of low probability are overestimated, and events of higher probability are underestimated.422

To compile this schedule, the Reporters begin by noting that "[i]n some instances individuals simply ignore events of very low probability."423 Citing "[s]tudies of natural disasters such as earthquakes and floods,"424 the Reporters note that for at least some very low probability risks, people completely fail to register the probabilistic threat. In such cases, people have no information concerning the risk and therefore implicitly set the probability at zero for that activity or event. When people do have some information about a risk, however, they display a different set of miscalculations: They "tend to overestimate low-probability risks and to underestimate the more substantial risks they face."425 Thus, the Reporters argue that people think their chances of being struck by lightning or killed by a tornado are higher than they actually are; conversely, people underestimate their risks of dying from a heart attack or stroke. After developing this schedule, the Reporters argue that for cases "in which the risks posed by a product are actually very small, psychology tells us that

⁴²⁰ 1 A.L.I., supra note 23, at 223.

⁴²¹ Id. at 223-24.

⁴²² See id. at 224-25. A similar delineation is utilized by Viscusi. See supra notes 368-70 and accompanying text.

⁴²³ 1 A.L.I., supra note 23, at 224.

⁴²⁴ Id. (citing Howard Kunreuther et al., Disaster Insurance Protection: Public Policy Lessons 19-41 (1978)).

^{425 1} A.L.I., supra note 23, at 225.

consumers will systematically overreact to any such hazard of which they are aware or which is drawn to their attention."⁴²⁶

The crucial question then becomes whether typical product safety risks actually are "very small" such that they will be overestimated by consumers. Without much elaboration, the Reporters answer yes.⁴²⁷ The Reporters argue first that most product-caused accidents do not fall into the "hidden" or "very low probability" category; thus, consumers do not typically completely fail to recognize a product risk. They maintain that for those rare accidents that *do* fall into this category, they may be "hidden" from manufacturers as well, implying that holding manufacturers liable would not have any beneficial deterrence effect.⁴²⁸ Even if manufacturers are aware of risks that are "hidden" to consumers, the Reporters believe that a warning requirement is sufficient to bring the risk into consumer consciousness, such that it is no longer "hidden." A warning transforms the risk from a very low probability "hidden" risk to a low probability risk which tends, if any-thing, to be overestimated.

It is this second class of risks, the low probability risks, which the Reporters believe represents the typical consumer product accident. Here, because consumers tend to overestimate the severity of these types of risks, safety incentives generated for firms will be too strong rather than too weak. Consumers will demand too much safety, buy too few products, and take too much care during product use.⁴²⁹ This is a problem which the Reporters believe tort law is incapable of alleviating.⁴³⁰ Thus, imperfect consumer risk information might lead to inefficiencies in product markets (just as Calabresi predicted),⁴³¹ but they will lead to the opposite inefficiencies: They will cause *under*consumption as consumers incorrectly perceive product risks as greater than they truly are. Finally, the Reporters discount the importance of the third category of risk—the high probability risk which tends to be underestimated. Such risks in their view do not typify the consumer product accident context.

In light of that analysis, the Reporters advise against a move toward greater manufacturer liability. Instead, they believe that "a sen-

⁴²⁶ Id.

⁴²⁷ See id. at 230 ("The evidence concerning risk perceptions suggests that the most widespread phenomenon is consumer pessimism.").

⁴²⁸ See id.

⁴²⁹ See id. ("[C]onsumers will have excessive price reactions to [the risk]—that is, the drop in consumer demand in response to a small risk is greater than is warranted by the expected accident costs.").

 $[\]frac{430}{430}$ See id. at 223 ("Although this outcome is inefficient . . . it is not the outcome that strict liability was designed to avoid.").

⁴³¹ See supra text accompanying note 295.

sible warning policy"⁴³² should be enacted to ensure that consumers have accurate information about product risk levels and safe usage. "When consumers are so informed, courts can have greater assurance about playing the more limited role... of creating default rules and enforcing the parties' contracts."⁴³³

2. Criticisms of the Reporters' Methodology and Conclusions

While we view the Reporters' Study as a significant early attempt to order the behavioral research into a useable form for products liability theorists, we are nonetheless skeptical of the Reporters' recommendations. In this subsection, we will argue first that the Study does not provide support for the policy conclusion it draws, even assuming that it accurately summarizes the behavioral research. Second, we will attempt to show that the Study's analysis of the behavioral research ignores relevant cognitive phenomena that may have drastically altered the Reporters' conclusions.

In response to the contention that some product risks will be hidden to consumers, the Reporters recommend a warning requirement.⁴³⁴ However, if one accepts the Reporters' summary of the behavioral research, it is unclear why warning requirements would produce a desirable result. In the best case scenario, consumers would read the warning and, assuming the risk was of the very low probability type, develop a new-found irrational fear of the product's risks. That is, providing a product warning would cause the risk to become salient in the consumer's mind, transforming it from a very low probability "hidden" risk to a low probability "overestimated" risk. All that a warning policy would do is replace one inefficiency (underestimation) with another (overestimation). Moreover, of the two inefficiencies, it is only the former that the Reporters believe can be addressed by tort law. Although they acknowledge that enterprise liability can respond to situations in which consumers underestimate product risks,⁴³⁵ they view consumer overestimation as a market inefficiency that tort law is ill-equipped to address. The question, then, is why adopt a policy that will replace a reversible inefficiency with an irreversible one? For those reasons, the Reporters' policy conclusion

⁴³² 1 A.L.I., supra note 23, at 232.

⁴³³ Id.

⁴³⁴ See id. ("Adequate warnings will inform consumers respecting risk levels and use technologies.").

 $^{^{435}}$ See id. at 226-27 (arguing that where consumers appreciate risks posed by generic product category but not specific products within category, "[a] strict liability system responds directly to this potential market imperfection . . . [by allowing] better or worse accident records [to be] directly reflected in the prices [of products]").

regarding warning requirements does not follow inevitably from their summary of the behavioral research.

Our remaining criticisms of the Reporters' Study center mainly on the manner in which they gathered and interpreted the behavioral research. To be fair, we wish to emphasize that some of the weaknesses of the study likely reflect, at least in part, the fact that the behavioral research reflects a still loosely formed theoretical base. Nevertheless, we believe that the Reporters' ordering of the behavioral research is significantly less precise than they suggest. Their summary, again, is that (a) consumers ignore risk probabilities that are too low, (b) they overestimate risks with probabilities that are low but not too low, and (c) they underestimate risks with probabilities that are higher than low. A problem with the framework is that it does not tell us which risks are too low, which are merely low, and which are higher than low. There is no numerical rubric to accompany these categories, and the exemplars provided seem unhelpful. For instance, the Reporters cite earthquakes as a very low probability risk, while tornadoes and lightning are only low probability risks. We find those risks difficult to distinguish, and yet under the Reporters' typology, they are separated by a crucial theoretical chasm: that between consumer underestimation and overestimation.

Without a fuller foundation to the Reporters' risk schedule, it is difficult to see how they reach their conclusion that most product risks are low probability risks. We find it intuitively plausible that most consumer products could fall into the Reporters' *other* two categories; that is, many seemingly innocuous products such as kitchen appliances or office supplies could fall into the very low probability, "hidden" risk category, while other more infamous products such as cigarettes or all-terrain vehicles could fall into the high probability, underestimated risk category.⁴³⁶ Of course, our intuition could be far from the mark, but the important point is that the Reporters' intuition could be equally inexact. We believe it is unwise to base tort law policies on an analytical rubric that draws crucial distinctions, without elaboration, between earthquakes and tornadoes—especially when we believe it is arguable that consumer products are more like very low probability earthquakes than low probability tornadoes.

Apart from this built-in ambiguity, the Reporters' schedule of risk perception also suffers from a non-representative sample of the behavioral research. We would certainly not fault the Reporters for failing to treat *all* identified cognitive biases, for given the vast array

⁴³⁶ Indeed, in our companion article, we argue that consumers do appear to underestimate the risks of smoking. See Hanson & Kysar, TBS II, supra note 25, at 1505-27.

of sometimes ill-defined, sometimes overlapping, and sometimes conflicting biases, such a task would be unwieldy if not impossible. Nevertheless, the Reporters' Study appears to have omitted many of the behavioral phenomena that would tend to suggest that consumers systematically underestimate rather than overestimate product risks.

For instance, the Reporters' Study fails to consider the effect that cognitive dissonance might have on consumer risk perception. As Latin, Prentice, and Rozskowski pointed out, cognitive dissonance might cause consumers to fail to heed important product safety information.⁴³⁷ That is, consumers might ignore or downplay their own information that they face a risk in order to avoid the dissonance that results from such contemplation. Similarly, the Reporters' Study ignore susceptible to exogenous influences than they.⁴³⁸ Because of this bias, even if people overestimate generalized risks, they might still underestimate their own personal incidence of that risk.

In light of the evidence suggesting that the optimistic bias is a robust phenomenon,⁴³⁹ it would be a serious error for the Reporters' Study to rely on generalized rather than personal perceptions of risk. The truly misleading aspect of both the optimistic bias and cognitive dissonance is that, in one sense, they appear to validate the Reporters' schedule of risk perceptions. That is, people might report that they perceive a certain risk to be a certain level even if their behavior does not correspond to that report. It is important to remember, then, that consumers may be placed on a separate schedule of actual behavior toward risk in contrast to the Reporters' schedule of reported risk perceptions. In this alternative schedule, consumers might be said to behave in a manner demonstrating an underestimation of product risks. That is, consumers might behave optimistically even if they think or respond to surveys pessimistically. The significant point, of course, is that it is consumers' actual behavior that determines the efficiency of product markets, not their generalized perceptions of risks.

In addition to these biases, the Reporters also ignored many of the phenomena identified by Latin, Prentice, and Roszkowski as possible sources of consumer underestimation of product risks. For instance, because of the availability heuristic,⁴⁴⁰ people tend to ignore statistical data in favor of evidence that seems relevant to them or is easily recalled when making decisions about uncertain future events. As the overwhelming majority of consumer experiences with products

⁴³⁷ See supra notes 309-10, 339-41 and accompanying text.

⁴³⁸ See supra notes 93-111 and accompanying text.

⁴³⁹ See supra notes 110-11 and accompanying text.

⁴⁴⁰ See supra notes 137-44 and accompanying text.

are safe, consumers might base their estimates of products' risks on that easily recallable perception of products as safe. Similarly, the illusion of control⁴⁴¹ might cause consumers to underestimate certain product risks based on the misperception that the product is under their control. People exhibit a strong tendency to overestimate their influence over the likelihood of events: Consumers might easily overestimate their chances of avoiding a product risk through some combination of their own skill and luck. Finally, the Reporters ignored Latin's identification of the many ways in which prospect theory illuminates consumer risk perception. For example, because of anchoring,⁴⁴² people might adjust insufficiently their initial assessments of a product risk in light of new information such as product warnings.

We are not arguing that any of these biases is individually sufficient to carry the day for the Under-Estimators. We are arguing, however, that a treatment of the behavioral research that fails to examine any of the above biases is suspect. Taken together, the various underestimation biases indicate that consumer risk perception may be far more complicated than the Reporters' schedule would suggest. Rather than a neat tri-level awareness of product risk, consumers might exhibit widely varying attitudes toward risks depending on context and circumstances. For example, consumers might systematically underestimate the risk of Product A because they control it, while overestimating the risk of Product B because it has achieved salience through high-profile media coverage. Even the risk of Product A alone may be simultaneously underestimated and overestimated depending on the consumer's frame. In short, we are dealing here with a highly textured, complex question about the nature of human cognition. In their effort to order the behavioral research into a form capable of vielding policy conclusions for tort law, the ALI Reporters may have unwittingly given short shrift to research that contradicted their schedule of risk perception. That discounted research, if incorporated into the analysis, might have led to vastly different policy conclusions than those eventually reached by the Reporters.

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THE PROBLEM OF MANIPULATION

In this Section, we begin discussion of our own view of the behavioral research. We depart from previous commentators in two significant respects. First, we accept that the behavioral research is simply too indeterminate to draw broad conclusions about whether consum-

⁴⁴¹ See supra notes 114-21 and accompanying text.

⁴⁴² See supra notes 158-63 and accompanying text.

ers underestimate or overestimate product risks. Second, we consider our policy analysis to be largely unaffected by that indeterminacy, because the behavioral research supports a far different and far more important implication for products liability law. Consumers, regardless of whether they would otherwise systematically over- or underestimate product risks, are susceptible to manipulation by manufacturers due to their cognitive anomalies. This susceptibility to manipulation produces an opportunity for exploitation that no profitmaximizing manufacturer can ignore. We view this latter point as the single most significant implication to be drawn from the behavioral research for scholars of products liability law.

A. The Indeterminacy of the Behavioral Research

Unlike the Over- and Under-Estimators, we are unwilling to generalize from the behavioral research on the question of consumer product risk perceptions. Although we recognize the power of any individual cognitive bias to influence consumer behavior, we do not view the behavioral research as capable of generating an overall prediction about the manner in which consumers will perceive product risks.⁴⁴³ Indeed, the mere fact that there are Over- and Under-Estimator camps suggests that the behavioral research is incapable of easy or incontestable application to products liability.

We hold that view for a variety of reasons. First, as noted above, it seems likely that different cognitive anomalies may simultaneously bias consumer risk perceptions in different directions. For instance, consumers might fail to realize the significance of product safety warnings when presented in statistical fashion but also overreact to similar information when presented in a vivid television news account. Second, it appears impossible to tell, ex ante, which cognitive effect will be most pronounced in any given context. That is, when analyzing a consumer product setting, it is impossible to know as a theoretical matter whether representativeness, anchoring, dissonance, overconfidence, or any other cognitive bias will exact the greatest influence on consumer perceptions. Even if the existence of their effect can be predicted, the relative impact cannot.

Finally, the behavioral research, however intriguing and persistent its findings, lacks an organizing principle that would render it ca-

⁴⁴³ As George L. Priest has noted, "consumer perceptions are very difficult to identify or to measure. As a consequence, hypotheses concerning the relationship between perceptions and [product information] are highly speculative and essentially nonfalsifiable." Priest, supra note 286, at 1298; see also Schwartz, supra note 282, at 833 ("In short, there is substantial uncertainty respecting whether consumers do misperceive risks and what the effect of likely misperceptions are.").

pable of answering the question of whether consumer risk perceptions are accurate. The behavioral research remains a field of loosely interrelated cognitive anomalies lacking a unifying principle. To generalize from the behavioral research about whether consumers systematically over- or underestimate product risks would therefore require a coherence and tractability which the behavioral research currently lacks.

B. The Irrelevancy of Indeterminacy and the Endogenous Nature of Perceptions

Despite those sources of indeterminacy, the behavioral research still presents an invaluable lesson for scholars of products liability law: Consumers are subject to a host of cognitive biases which, particularly when taken together, appear to render them vulnerable to manipulation. Thus, our view of the behavioral research complements our criticism of the methodology employed by earlier torts scholars.444 Earlier scholars reviewed the behavioral research to arrive at a generalization about consumer risk perceptions and then simply inserted that generalization into the familiar market model. In essence, they treated cognitive biases as exogenous factors that exert a significant but fixed influence on consumer risk perceptions. Such a strategy is not only futile, given the indeterminate nature of the behavioral research, but it also ignores the most significant finding of the behavioral research: Consumers do exhibit systematic and predictable cognitive biases that the careful psychological researcher or the clever marketer can induce. Put differently, individual perceptions can be studied, isolated, and manipulated by those in a position to influence the individual's perceptual context.

In light of the behavioral research, therefore, consumer perceptions should be treated as factors endogenous to the market model, such that the behavior of others within that model may influence consumers' perceptions. Our point may be illustrated through a simple example. Suppose, rather than modeling economic behavior, our exercise is to model the behavior of a cognitive psychologist and a group of experimental subjects. For instance, suppose we are attempting to predict whether a particular survey will reveal the influence of framing effects on the subjects. The approach of earlier scholars simply has been to theorize, based on no additional information about the nature of the survey, that the subjects either will or will not exhibit the influence of framing effects. In large part, the determination has seemed to come down to the scholar's intuitive sense about whether cognitive biases are or are not a robust phenomenon. This approach

⁴⁴⁴ See supra notes 417-19 and accompanying text.

is misguided, for without far more extensive information on the nature of the survey, one cannot predict the results of the experiment by independently focusing on the biases of the subjects. Instead, we believe that one should consider additionally the motivations, biases, and beliefs of the other actor in the model, the cognitive psychologist, for it is this researcher who is in control of the substance, form, and *frame* of the survey. Our prediction would then be that the subjects will exhibit the influence of framing effects in the survey. This prediction is not based on a chauvinistic position either for or against cognitive biases or on an ill-informed guess about the nature of the experimental survey. Rather, it is based on a prediction about the motivations of the researcher who, being an interested academic, we surmise has constructed the survey in a manner likely to yield interesting cognitive phenomena.

Of course, this prediction depends on the academic having sufficient knowledge of cognitive biases and training in experimental design to demonstrate reliably the existence of framing effects through the survey. One might take issue with that aspect of our prediction, at least insofar as we are implicitly comparing consumer product manufacturers to cognitive psychologists. In the next Section, however, we will argue that there is no such requirement of knowledge and training in the market for consumer products. Instead, we will argue that the competitive forces of the market will lead, in an evolutionary fashion, to a state in which manufacturers behave *as if* they had the requisite knowledge and training to manipulate consumer perceptions, whether or not they actually do.

C. Manufacturer Manipulation of Consumers

Applying these insights to the consumer product market leads to the following conclusion: Once it is acknowledged that consumer risk perceptions may be affected by, for instance, the manner in which information is framed, then it becomes inevitable that manufacturers will exploit those framing effects in a way that maximizes manufacturer profits. Other things being equal, it is in the manufacturer's interest for consumers to have the lowest estimate of product risks possible: The lower the consumer's risk estimate, the more consumers will be willing to pay for the product, leading to greater sales and increased profits for manufacturers. Generating consumer underestimation of product risks in this manner is simply another means of cost externalization, a practice that manufacturers have every incentive to pursue. Manipulation goes further than just minimizing perceived costs, however. Manufacturers can also attempt to shape consumer views of product benefits. That is, manufacturers may also elevate consumer willingness to pay by manipulating the view that consumers have of a product's benefits (as opposed to its costs). In either case, consumer failure to perceive product attributes accurately can lead to undesirable levels of consumption.

Some scholars have noted that risk assessments are manipulable in this fashion, but have failed to see that manufacturers can take advantage of such manipulability. That failing is evident, for example, in Viscusi's work on risk perceptions. He attempts to discredit studies that suggest that consumers underestimate risks by arguing that the designers of the studies manipulated survey respondents through framing effects: "Some observed biases in past studies may be due to the manner in which the risk perception question is framed rather than to any underlying shortcoming in individual behavior."445 Here, Viscusi recognizes that survey respondents, like consumers, are subject to manipulation, but he later fails to see how that vulnerability will play out in the retail product context. Similarly, Viscusi's own proposal for reforming products liability law-imposing a national, uniform warning system-at least implicitly acknowledges that consumer risk perceptions can be manipulated or shaped by the manner in which information is presented. Nevertheless, Viscusi fails to recognize that similar manipulations can be perpetrated by manufacturers for less benign or paternalistic reasons than Viscusi's proposal entails.

Finally, Viscusi argues in one of his more famous articles that the addition of child-safety caps on medications did not lower the incidence of child poisonings in the expected fashion.⁴⁴⁶ Instead, through something Viscusi termed *the lulling effect*, consumers overestimated the efficacy of safety caps and responded by lowering their own parental care levels. Put differently, the fairly insignificant design change of safety caps had the effect of substantially altering consumer risk estimates. We believe that if government regulators can have an optimism-producing effect that is both unintentional and contrary to their

⁴⁴⁶ Viscusi's work in this area is synthesized in Fatal Tradeoffs, supra note 358, at 234-42.

⁴⁴⁵ Viscusi, supra note 358, at 102. An example of what Viscusi means by this can be seen in a study that he performed involving worker willingness to accept values for occupational exposure to various chemical hazards. See Viscusi, supra note 21, at 651-54. In that study, workers were shown warnings containing risk information for various hazards such as TNT or asbestos and were subsequently asked to evaluate how much of a wage increase they would require to accept occupational exposure to the hazard. See id. Viscusi's methodology inadvertently may have heightened subject awareness of the hazards simply by virtue of the nature of surveys: While survey respondents are instructed to read and analyze product warnings in an isolated setting where no other task confronts them, workers on the job likely confront risk information in a far different and less accessible manner.

goal, then certainly manufacturers can generate similar effects when they act deliberately in pursuit of profit.

Even Prentice, Roszkowski, and Latin, who each recognize that consumers may be subject to manipulation by manufacturers,447 do not fully realize the significance of this vulnerability. They do not appear to realize that manipulation of consumers by manufacturers is not simply a possibility in light of the behavioral research but that it is an inevitable result of the competitive market. Cognitive biases present profit-maximizing opportunities that manufacturers must take advantage of in order to stay apace with competition. Whether by design or not, the market will evolve to a state in which only firms that capitalize on consumer cognitive anomalies survive.⁴⁴⁸ Thus, even if consumers initially approach a product greatly overestimating its safety risks, manufacturers will attempt to counteract that misperception through calculated marketing techniques or other bias manipulations. Even if the overwhelming majority of cognitive biases points toward overestimation of product risks, manufacturers will selectively target only those biases that lead to underestimation of risks. Indeed, even if the behavioral researchers themselves have failed to discover a particular bias, the forces of the market will lead manufacturers to exploit it; that is, manufacturers will behave as if they know the behavioral literature and then some. They have all the incentives to discover the biases even if they do so unwittingly and even if they and we cannot name them. Again, not only can manufacturers achieve these effects, but the hidden hand of market forces requires that they do so in order to remain competitive.

Next we explore a few of the possible ways in which manufacturers might accomplish such manipulation, using our review of the behavioral literature from Part I as a frame for the discussion. We do not offer these descriptions as strong predictions of actual manufacturer behavior; rather, we intend to present a few exemplars of the type of manipulative conduct that one might expect to find in products markets, given the existence of consumer cognitive limitations.⁴⁴⁹ In

⁴⁴⁹ We hesitate to offer precise predictions of manufacturer behavior for at least two reasons. First, we believe that it is difficult if not impossible to determine ex ante which

⁴⁴⁷ See Latin, "Good" Warnings, supra note 7, at 1239 ("An important conclusion of prospect theory is that consumer responses to risk information can be deliberately or unintentionally manipulated by the ways in which manufacturers and other actors with superior information frame their disclosures."); Prentice & Roszkowski, supra note 297, at 297 (noting that consumers "have great difficulty determining the risk of a product and are exposed to producer manipulation").

 $^{^{448}}$ Cf. Milton Friedman, The Methodology of Positive Economics, in Essays in Positive Economics 3 (1953) (arguing that assumptions posited by economic models are often not accurate but can be helpful for predictive purposes).

essence, we are engaging in a thought-project similar to that of the Over- and Under-Estimators, only instead of theorizing about how cognitive biases will influence *consumer* perceptions, we are theorizing about how *manufacturers* will behave given that consumers are subject to those biases.

1. Manipulation of Scientific and Probabilistic Judgments

As noted in Part I, individuals tend to act as lay scientists, adopting and testing hypotheses about the world in a manner that often fails to comport with rationalist ideals. While understandable given individual cognitive limitations, this departure from models of scientific and statistical reasoning nevertheless creates an opportunity for manufacturers to shape, influence, and exploit consumer perceptions.

The Formation and Influence of Personal Hypotheа. Strong evidence suggests that individuals generate, revise, and ses. sustain personal hypotheses in ways designed to provide "support" for desired conclusions. The cart, essentially, is before the horse, a cognitive condition captured well by Ziva Kunda's term motivated reasoning.450 This self-serving reasoning process is accomplished through a variety of biases such as the belief perseverance bias or the confirmatory bias. Each of those cognitive mechanisms, in addition to supporting the process of motivated reasoning, opens the door for manufacturers to influence the perceptions that consumers have of a product's risks. For instance, given that individuals tend to disregard evidence that contradicts their initial hypotheses,451 manufacturers might attempt to create a favorable impression in consumers as soon as possible so that their initial views create interference with any unfavorable information that subsequently comes to light. Conversely, because salient public announcements regarding a product's risks may lead one generation of consumers to view the product with added suspicion, manufacturers might seek to attract the next generation that was not exposed to the salient event. Some scholars have suggested that "fresh thinkers" (such as a next generation) may more readily generate alternate hypotheses (such as non-risky views of a product),

cognitive features will dominate in any given situation. See supra notes 443-46 and accompanying text. Second, we believe that regardless of how well-developed the behavioral research becomes, the powerful incentives provided by consumer products markets will drive manufacturers to be more sophisticated than researchers when it comes to uncovering cognitive anomalies. See supra notes 447-48 and accompanying text.

⁴⁵⁰ See supra notes 88-91 and accompanying text.

⁴⁵¹ See supra note 61-63 and accompanying text.

inasmuch as they do not suffer the interference of the initial hypothesis.⁴⁵²

Once the favorable product impression is established, manufacturers might seek to take advantage of the confirmatory bias by providing consumers with any and all evidence that does not unambiguously support an opposing, negative view of the product. Because of the confirmatory bias, any such evidence will tend to be misread by the consumer as additional support for the initial product impression. This possibility of confirmation through ambiguous evidence might explain the omnipresent practice of marketing products with gee-whiz statistical data, authoritative surveys of physicians, and imposing bar graphs, all of which, upon inspection, turn out to contain nothing of informative value. After all, researchers have discovered that the more ambiguous and complex the evidence, the more that evidence seems to be susceptible to the confirmatory bias.⁴⁵³

In a similar fashion, the confirmatory bias appears to cause lay scientists to view disconfirming evidence with an unjustifiably jaundiced eye. Any aspect of disconfirming evidence that appears capable of a less damaging, alternate explanation will be latched onto by individuals eager to maintain their initial hypotheses.⁴⁵⁴ Hence, manufacturers of risky products might seek to offer "alternate" explanations for any evidence that suggests that their products are dangerous. Due to the confirmatory bias, individuals also appear to gain more conviction in their original hypotheses merely by hearing of methodological or conceptual flaws in evidence that contradicts their hypotheses.⁴⁵⁵ The natural strategy for manufacturers of risky products, therefore, is to identify for consumers any and all problems in evidence that is damaging to product impressions.

The benefit to manufacturers of establishing a favorable product impression in this manner is that the impression becomes to a large extent entrenched. The practice of hypothesis-based filtering causes an individual to interpret ambiguous evidence in light of her initial hypothesis, which in turn reinforces her conviction in the hypothesis and makes her even more willing to interpret further ambiguous evidence as consistent with it.⁴⁵⁶ Additionally, the entity effect can cause an individual to retain belief in a hypothesis even when it has been thoroughly discredited; that is, an individual's belief in a hypothesis may be completely independent of the veracity of the data underlying

⁴⁵² See Rabin, supra note 24, at 26 (citing D.N. Perkins, The Mind's Best Work (1981)).

⁴⁵³ See supra note 60 and accompanying text.

⁴⁵⁴ See supra note 62 and accompanying text.

⁴⁵⁵ See supra note 63 and accompanying text.

⁴⁵⁶ See supra note 76 and accompanying text.

it.⁴⁵⁷ For those reasons, manufacturers that create a favorable first impression of a product hold a significant advantage in later debates over the safety or value of that product.

b. False Self-Confidence. Apart from orchestrating the formation and perseverance of product impressions in this manner, manufacturers can also capitalize on the many ways in which individuals display an unwarranted sense of self-confidence. For instance, the optimistic bias might make individuals unduly responsive to product appeals that emphasize the ability to avoid negative product aspects. Just as researchers were able to demonstrate that ninety-seven percent of consumers believe they are average or above average in their ability to avoid bicycle or power-mower accidents,⁴⁵⁸ manufacturers of other products might be able to convince a similar preponderance of consumers that negative product experiences will not befall them.

Significantly, many of the factors identified by researchers as leading to naive optimism—past experiences free from harm, a perception that risks are of low frequency, and a perception that the harm is preventable by human action⁴⁵⁹—will already characterize consumer perceptions of product harms. As products do generally pose low-risk harms, the vast majority of consumer experiences with products will be innocuous. Manufacturers might employ ubiquitous portrayals of carefree product experiences to reinforce this perception.

Research by Neil Weinstein and William Klein⁴⁶⁰ points to more proactive ways in which manufacturers may exploit the optimistic bias. While studying the debiasing effects of various public health information campaigns, Weinstein and Klein discovered that certain tactics might actually *increase* rather than decrease the effect of optimism on individual risk estimates. Three warning strategies in particular were identified as having this exacerbating effect: one in which subjects were given a list of worst-case risk factors, one in which subjects were shown an image of a high-risk individual as a comparison, and one in which subjects were given a list of personal risk-decreasing factors.⁴⁶¹ The first two approaches caused an increase in individual optimism because individuals "exaggerate the health-threatening behaviors and underestimate the health-enhancing behaviors of their peers, arriving at comparative-risk judgments that are optimistically

⁴⁵⁷ See supra notes 77-87 and accompanying text.

⁴⁵⁸ See supra note 101 and accompanying text.

⁴⁵⁹ See supra notes 107-09 and accompanying text.

⁴⁶⁰ See Weinstein & Klein, supra note 110.

⁴⁶¹ See id. at 138.

biased by using an inappropriate standard of comparison."⁴⁶² Thus, by giving subjects a "worst-case" list of risk factors or a "high-risk" comparison target, the researchers provided them with further "support" for their biased self-conception. Likewise, with the third warning strategy, researchers gave subjects an opportunity to "pay greater attention to their own risk-decreasing factors than to their risk-increasing factors or selectively misremember how often they engage in relevant behaviors."⁴⁶³ What is significant is that while these results may be achieved unwittingly (and with great dismay) by public health advocates, they may also be achieved (wittingly or unwittingly but with far less dismay) by manufacturers. That is, manufacturers of risky products may provide consumers with lists of risk-decreasing factors or a particularly high-risk consumer as a comparison example so that consumers will process the information in a self-serving manner and thereby exacerbate the optimistic bias.

Cognitive dissonance may provide an opportunity for manufacturers to further solidify these effects. The tendency of individuals to seek cognitive consistency by disregarding or downplaying information that contradicts their favorable views of themselves⁴⁶⁴ might make consumers especially receptive to advertising that helps reinforce that cognitive consistency. Thus, manufacturers of, say, alcohol and fatty foods might use advertisements featuring healthy, fit, thin models. Consumers viewing the ads will fix on the image portrayed by the models to help resolve the dissonance they feel when engaging in unhealthy behavior.

Finally, the tendency of individuals to treat random events as if they are controllable by human skill⁴⁶⁵ indicates another way in which manufacturers might manipulate consumer overconfidence. A recent advertising campaign for a four-wheel drive vehicle illustrates the type of manipulation that may be possible due to the illusion of control.⁴⁶⁶ The campaign features a driver calmly and expertly averting a series of near-disasters involving an overturned semi-trailer, an avalanche, and a herd of elk, all on the driver's way home from work. The implicit suggestion is that all owners of this particular vehicle display a similar ability to avoid accidents, regardless of how random and uncontrollable those accidents may appear. Recalling that a key factor in the operation of the optimistic bias is a perception that a given risk

⁴⁶² Id. at 133.

⁴⁶³ Id.

⁴⁶⁴ See supra notes 112-13 and accompanying text.

⁴⁶⁵ See supra notes 114-21 and accompanying text.

⁴⁶⁶ Ironically, this campaign may not have been ultimately effective, as the authors cannot remember the name of the car manufacturer that waged it.

is preventable by individual action,⁴⁶⁷ the benefits to the manufacturer of fostering this illusion of control are manifest.

c. Bad Statisticians. Many product attributes are probabilistic. Parts and equipment failure rates, as well as accidental injury rates, are all probabilistic outcomes. Moreover, many products—such as smoke alarms, extended service contracts, auto safety features, and some pharmaceutical drugs—are designed to reduce the impact of probabilistic losses. This point is not lost on manufacturers: "[M]anagers of products with probabilistic attributes must consider how consumers' valuations are likely to differ from expected valuations."⁴⁶⁸ By studying this disparity, manufacturers can better understand how to shape consumers' valuations in an effort to reduce consumer sensitivity to product risks or to exaggerate consumers' perceptions of risks that the product is said to reduce.

For instance, the availability heuristic⁴⁶⁹ can be easily tapped into by simply maximizing the frequency and intensity of advertisements. A moment's introspection about the relative amounts of air time spent on jubilant beer advertisements versus alcoholism awareness campaigns suggests the power of this heuristic. Alternatively, the human desire to observe patterns in random events-expressed in both the law of small numbers and the gambler's fallacy⁴⁷⁰—might be utilized by manufacturers to generate false images of what behavior or characteristics are representative of users of a product. The late actorcomedian George Burns, with his longevity and omnipresent cigar, comes to mind as an excellent spokesperson for tobacco products. "See," the implicit message would go, "smokers do live long, happy lives." Similarly, the willingness of individuals to ignore prior probabilities in favor of new, worthless information⁴⁷¹ suggests a clear method for manufacturers to obscure product risk attributes: confound the consumer audience with meaningless information. Finally, Kahneman and Tversky's phenomenon of anchoring and adjustment presents another instance for manufacturer influence over consumer perceptions. Because adjustment insufficiently accounts for new evidence, perceptions tend to be biased toward the anchor, or first assessment of a probabilistic event.⁴⁷² Thus, manufacturers may treat

⁴⁶⁷ See supra note 107 and accompanying text.

⁴⁶⁸ Gerald E. Smith & Thomas T. Nagle, Frames of Reference and Buyers' Perceptions of Price and Value, 38 Cal. Mgmt. Rev. 98, 112 (1995).

⁴⁶⁹ See supra notes 137-44 and accompanying text.

⁴⁷⁰ See supra notes 149-56 and accompanying text.

⁴⁷¹ See supra note 148 and accompanying text.

⁴⁷² See supra notes 158-63 and accompanying text.

anchoring as a valuable mechanism for fixing consumer risk perceptions during the initial product purchase context, when all products are safe and attractively packaged; and they may rely on adjustment from that initial anchor to account insufficiently for the enclosed risk information which is read, if at all, well after the product has been purchased.

Inasmuch as consumer risk assessments have been the touchstone for selecting among liability standards and determining the legal effect of product warnings,⁴⁷³ these behavioral phenomena potentially have dramatic implications for products liability law. If humans systematically falter whenever "beliefs concerning uncertain events are expressed in numerical form as odds or subjective probabilities,"⁴⁷⁴ then any products liability theory that depends on consumers possessing adequate product risk information will need to be re-examined.

d. Experiential Thinking, Affect, and the Perception of Risk. The impact of experiential thinking in the consumer context has been stated nicely by an early proponent of the significance of affect to decisionmaking:

We sometimes delude ourselves that we proceed in a rational manner and weigh all the pros and cons of the various alternatives. But this is probably seldom the case. Quite often, 'I decided in favor of X' is no more than 'I liked X.'... We buy the cars we 'like,' choose the jobs and houses we find 'attractive,' and then justify these choices by various reasons⁴⁷⁵

In other words, our affective responses to products more often than not determine the purchasing decision, regardless of whether we experience the decision as having resulted from "reasons."

Manufacturers clearly stand to gain from cultivating positive affect in relation to their products. Perhaps this explains the omnipresent practice of feel-good advertising that carries little if any information about the product being pitched, but plenty of gushing views of the happiness, wealth, and beauty that can allegedly be gained from its consumption. Indeed, the decades-long "Marlboro Man" campaign of Philip Morris might be considered the ultimate in such "lifestyle advertising." By continually offering depictions of the free and natural cowboy smoker, Phillip Morris may have succeeded

 $^{^{473}}$ See, e.g., Viscusi, supra note 285, at 146 ("[I]f hazard warnings are effective in fully communicating the [product] risk, then any additional examination of whether a product design is defective is redundant since the market has already performed such a risk-utility test.").

⁴⁷⁴ Tversky & Kahneman, supra note 4, at 3.

⁴⁷⁵ R. B. Zajonc, Feeling and Thinking: Preferences Need No Inferences, 35 Am. Psychologist 151, 155 (1980).

in instilling in many smokers a positive affective association with the product. The significance of this accomplishment is that subsequent negative information about smoking will be viewed by the consumer through the bias of experiential thinking. As Seymour Epstein explains:

Cigarette advertising agencies and their clients are willing to bet millions of dollars in advertising costs that the visual appeal of their messages to the experiential system will prevail over the verbal message of the surgeon general that smoking can endanger one's life, an appeal directed at the rational system.⁴⁷⁶

Given the durability of such practices throughout this century, the bet appears to be a good one.

Practices such as these find significant theoretical support in Alhakami and Slovic's finding that risk and benefit are often confounded in people's minds. Because of this failure to segregate analysis of risk and benefit, individuals may be susceptible to manipulation.⁴⁷⁷ For instance, it has been shown that providing information designed to increase the perceived benefits of various technologies can lead to a decrease in the perceived risks of those technologies.⁴⁷⁸ Again, findings such as this appear to explain a great deal of product advertising, particularly for notoriously harmful products such as cigarettes. By developing a positive affect around the product, manufacturers can not only bias the consumer's interpretation of conflicting evidence but also actually decrease the consumer's existing perception of the product's risk.

2. Manipulation of Preferences

A second set of ways in which manufacturers might manipulate consumers is through an alteration of their preferences. Like the manipulation of scientific and probabilistic judgments, this type of manipulation can occur in ways relevant to products liability law. Elevating the consumer's willingness to pay for the product is simply the flip-side of reducing the consumer's perception of the product's risks.

a. The Status-Quo Bias and Endowment Effect. For instance, the endowment effect presents an opportunity for manufacturers to

⁴⁷⁶ Epstein, supra note 164, at 712.

⁴⁷⁷ See Alhakami & Slovic, supra note 174, at 1096 ("[I]t might be possible to change perceptions of risk by changing perceptions of benefit and to change perceptions of benefit by changing perceptions of risk.").

⁴⁷⁸ See id.

increase the perceived utility of their products.⁴⁷⁹ By simply getting the product into the hands of the consumer, its value to that consumer may be enhanced. Thus, manufacturers might use money-back guarantees, test drives, thirty-day no-risk trial periods, free samples, and other marketing ploys, all of which are designed to create in the consumer a sense of ownership.⁴⁸⁰ Because of the endowment effect, the sense of ownership by itself might lead the consumer to experience an increased valuation of the product. Significantly, it has been demonstrated that people are unable to predict the operation of the endowment effect.⁴⁸¹ Thus, marketers utilizing an endowment effect approach have the added advantage that consumers will fail to perceive the risks of taking a product home—they will, in effect, really perceive it as a "no-risk" offer.

b. Context Effects and the Effect of Irrelevant Options. Manufacturers may similarly increase the likelihood of purchase by carefully controlling the context in which the purchase choice is presented. For instance, the introduction of an irrelevant third option has been shown to affect the preferences that some individuals have for original options.⁴⁸² Manufacturers seeking to capitalize on this bias need only add new "irrelevant" options designed to enhance the attractiveness of the original ones. For instance, it is folk wisdom in the restaurant industry that every dessert menu should have at least one excessively indulgent item to make the others appear comparatively less indulgent. Similarly, manufacturers can make products appear less expensive by adding a higher-priced option to the product line. Itamar Simonson and Amos Tversky demonstrated the wisdom of this marketing technique in an experiment asking subjects to select a microwave oven based on various product features and prices.⁴⁸³ Fifty-seven percent of the subjects given a choice only between a low-priced Emerson and a medium-priced Panasonic preferred the Emerson model. When a high-priced Panasonic model was

⁴⁷⁹ See supra notes 192-98 and accompanying text.

⁴⁸⁰ See Smith & Nagle, supra note 468, at 101:

[[]I]t is often better to decouple product acquisition and payment by first endowing buyers with the product. If buyers can be persuaded to take the product home, they will adjust their reference point to include the newly acquired asset. They will then be reluctant to return the product when payment is due, since this will require that they incur a loss.

See also Richard H. Thaler, Toward a Positive Theory of Consumer Choice, 1 J. Econ. Behav. & Org. 39, 46 (1980) (describing "two week trial period" as marketing strategy that takes advantage of endowment effect).

⁴⁸¹ See supra notes 196-98 and accompanying text.

⁴⁸² See supra notes 202-04 and accompanying text.

⁴⁸³ See Simonson & Tversky, supra note 200, at 286-87.

added to the selection, however, sixty percent of the subjects selected the medium-priced Panasonic, thus dramatically increasing Panasonic's share of the experimental market.

c. Elastic Justification. Manufacturers of risky products can capitalize on the individual's penchant for elastic justification by ensuring that a range of possible accounts of the product's hazards are available. As Christopher Hsee has shown, when an attribute is expressed as a range of possible values rather than as a fixed value, individuals interpret the range in favor of the outcome they are predisposed to select.484 Thus, if a consumer were predisposed to purchase an item that provided short-term pleasure with long-term illeffects, the manufacturer could benefit significantly from generating controversy over the exact nature of the long-term ill-effects. By enlarging the range of possible outcomes to include more innocuous ones than those urged by, say, public health or consumer advocates, manufacturers can provide consumers with a "reason" or "justification" for ignoring the warning messages and continuing to consume the product. In this manner, elastic justification can serve as a powerful tool by which manufacturers minimize the damage caused by negative accounts of product hazards.

d. Time-Variant Preferences. We noted earlier the marked tendency for individuals to seek immediate gratification and delayed dissatisfaction, despite a recognition that such practices can lead to a net loss of utility.⁴⁸⁵ That individuals often struggle with intertemporal self-control in this manner may have significant implications for consumer behavior in numerous contexts.⁴⁸⁶ Any product which offers short-term gratification at the cost of long-term adverse consequences (e.g., alcohol, fatty foods, environmentally hazardous products) can be marketed in a manner that exploits this well-recognized weakness of human will. Also, manufacturers of fatty foods or addictive substances might package their wares in small sizes or amounts to capitalize on the tendency of individuals to seek self-control strategies for resisting these choices. The individual, enticed by the promise of an

⁴⁸⁴ See supra notes 207-10 and accompanying text.

⁴⁸⁵ See supra notes 211-18 and accompanying text.

⁴⁸⁶ For a discussion of some of those implications, see David Laibson, Golden Eggs and Hyperbolic Discounting, 112 Q.J. Econ. 443 (1997); Richard H. Thaler & H.M. Shefrin, An Economic Theory of Self-Control, 89 J. Pol. Econ. 392, 398-404 (1981); Deborah M. Weiss, Paternalistic Pension Policy: Psychological Evidence and Economic Theory, 58 U. Chi. L. Rev. 1275 (1991); see also Hanson & Logue, supra note 93, at 1205-09 (describing some ways in which smokers appear interested in, but unable easily to, precommit to quit their habits).

instantaneous sugar rush, will be able to rationalize the purchase because the small package ensures only a limited degree of indulgence. As at least one commentator has noted, "the role of self-control in purchasing decisions is well known among marketing experts."⁴⁸⁷

e. Reciprocity and Attribution. According to attribution theorists, consumers search for causes following a product failure, and the cause to which they attribute the failure can have a significant effect on their reaction to the failure.⁴⁸⁸ Attribution theorists have identified several dimensions along which causal inferences are made in the consumer context.⁴⁸⁹ Valerie Folkes, for instance, has found that three causal dimensions go a long way toward explaining or predicting consumer reactions.⁴⁹⁰ One such dimension, which she calls *stability*, is a measure of whether the inferred cause is relatively permanent or temporary.⁴⁹¹ A second causal dimension, *locus*, has to do with whether the cause of the product failure is perceived as located with the manufacturer or the consumer.⁴⁹² The third dimension, which Folkes refers to as *controllability*, has to do with the extent to which the cause was the consequence of the manufacturer's volition.⁴⁹³

The evidence suggests that consumer responses are significantly influenced by these causal dimensions of stability, locus, and controllability.⁴⁹⁴ For example, where consumers perceive a cause to be stable they are more apt to prefer a refund to an exchange because an exchange would not redress the underlying problem. Where the manufacturer is the locus of the failure, the consumer is perceived to be entitled to redress, including a refund and an apology, but where fail-

⁴⁸⁷ Rabin, supra note 24, at 41.

⁴⁸⁸ See, e.g., S. Krishnan & Valerie A. Valle, Dissatisfaction Attributions and Consumer Complaint Behavior, in 6 Advances in Consumer Research 445, 448 (William L. Wilkie ed., 1978); Marsha L. Richins, Negative Word-of-Mouth by Dissatisfied Consumers: A Pilot Study, 47 J. Marketing 68, 72, 74 (1983) (correlating consumers' likelihood of complaining with their attribution of product failure to causes external to them).

⁴⁸⁹ See Bernard Weiner, Human Motivation chs. 7 & 8 (1980) (reviewing relevant literature).

⁴⁹⁰ See Valerie S. Folkes, Consumer Reactions to Product Failure: An Attributional Approach, 10 J. Consumer Res. 398 (1984) (building on theoretical work of Bernard Weiner).

⁴⁹¹ See id. at 399 ("For example, a car might be poorly repaired because the mechanic was sloppy just this once, or the mechanic might be a consistently sloppy worker.").

⁴⁹² See id. ("For example, a set of bookshelves might collapse because the consumer assembled them incorrectly or because the manufacturer made a defective product.").

⁴⁹³ See id. ("For example, when shoes are poorly repaired because the shop does not train its personnel, the cause is under the shop's control; when the poor repair is due to an externally set fire in the store, the cause is not under the shop's control.").

⁴⁹⁴ See id. at 400-07 (using above-described causal dimensions to interpret data from studies).

ure is consumer-related, the consumer is not perceived to be entitled to redress.⁴⁹⁵ Moreover, controllability and locus both influence *anger* reactions. That is, consumers feel angry and vengeful (desiring to hurt the firm's business) when they perceive that a product failure is the consequence of the manufacturer's volitional acts.⁴⁹⁶ The evidence also indicates that consumers, in response to that anger, are less likely to repurchase a product from the same seller.⁴⁹⁷

This analysis offers many implications for the possibility of manufacturer manipulation. For instance, because individuals tend to prefer cooperating with those they view as behaving cooperatively or fairly, manufacturers will benefit from cultivating an appearance of cooperation and fairness.⁴⁹⁸ Thus, if a product is discovered to pose a safety threat, manufacturers might choose to project an image of cooperative concern, irrespective of actual manufacturer behavior. Manufacturers might also attempt to shift the perceived locus of a product failure to consumers, much as cigarette manufacturers have invested a great deal of effort portraying the risks of smoking as a consequence of consumer decisions.⁴⁹⁹ More generally, manufacturers might do whatever they can to deny controllability.⁵⁰⁰ To the ex-

⁴⁹⁶ See id. at 405; see also Valerie S. Folkes, The Availability Heuristic and Perceived Risk, 15 J. Consumer Res. 13, 20 (1988) ("Consumers are angrier about product failure when they believe the firm has control over the problem than when constraints force the firm's actions."). For a slightly updated version of the more complex contributors to and effects of anger, see Valerie S. Folkes, Susan Koletsky, & John L. Graham, A Field Study of Causal Inferences and Consumer Reaction: The View from the Airport, 13 J. Consumer Res. 534, 534-35 (1987).

⁴⁹⁷ See, e.g., Folkes et al., supra note 496, at 534-35 (providing evidence of that effect with respect to delayed airline passengers). Furthermore, according to Jolls, Sunstein, and Thaler, "[t]his is the same behavior that drives boycotts, where consumers refrain from buying something they normally enjoy in order to punish an offending party." Jolls et al., supra note 2, at 1495.

 $\frac{498}{498}$ See Folkes, supra note 490, at 407-09 (discussing how manufacturers can alleviate consumer anger by cooperating with consumer).

⁴⁹⁹ See Graham E. Kelder, Jr. & Richard A. Daynard, The Role of Litigation in the Effective Control of the Sale and Use of Tobacco, 8 Stan. L. & Pol'y Rev. 63, 82 (1997) ("The tobacco companies won many of the first and second wave cases by asserting the defenses of assumption of risk and contributory negligence, or by asserting that the smoker's willfulness, not the industry's misbehavior, was the proximate cause of the plain-tiff's smoking and consequent illness.").

⁵⁰⁰ Indeed, Folkes offers manufacturers just this advice. See Folkes, supra note 496, at 20 ("[M]arketers want to know what facilitates retrieval of successful product performances and hampers failure recall.... This may be accomplished by influencing consumers' attributions for product failure. Consumers are angrier about product failure when they

⁴⁹⁵ See id. at 399-400:

When product failure is firm-related, the inequity of the exchange upsets the relationship between buyer and seller: the consumer has been wronged. Besides giving a refund, damaged interpersonal relations must be repaired. By means of an apology, the firm admits to and regrets not providing the promised product benefit.
tent that products do pose risks to consumers, they might be characterized as natural or inevitable risks that manufacturers are powerless to avoid. Because individuals tend to seek retribution less against uncooperative actors whom they view as lacking volition, manufacturers of risky products who characterize the risk as inevitable in this manner will suffer less consumer ill will. Finally, where causal attributions are extremely complex, consumers sometimes do not arrive at a causal attribution at all. In those circumstances, consumers often turn to the manufacturer for assistance in making the causal attribution.⁵⁰¹ As a result, manufacturers might attempt to make causal attributions as complex as possible so that they can more powerfully influence consumer perceptions.

f. Preference-Trumping Effect of Visceral Factors. The preference-trumping effect of visceral factors has obvious and powerful implications for product manufacturers who seek to manipulate consumer preferences and perceptions. For instance, Loewenstein himself notes that cookie shops often vent baking smells into shopping malls in order to trigger the visceral factor of hunger⁵⁰² and that "[d]istilled spirits ads opt for simple 'bottle, glass, and ice' depictions to help consumers visualize the experience."503 These are but two examples of a broader phenomenon: Because Loewenstein's theory "predicts . . . that impulsive behavior will tend to occur when visceral factors such as hunger, thirst, physical pain, sexual desire or emotions are intense,"504 one should expect marketers to emphasize those same visceral factors heavily in order to maximize impulsive (consumption) behavior. Thus, appeals for food products might attempt to emphasize hunger through vivid, close-up views of freshly baked pizza, or through free potato chip samples at grocery stores. Makers of pain relievers might seek to offer compelling metaphors of headache pain: "It felt like a jackhammer going off inside my head." And it almost goes without saying that manufacturers of virtually any product may utilize sexual desire as a visceral factor that increases impulsive consumption. These tactics have, of course, been a feature of consumer products advertising since its inception. What Loewenstein's account of visceral factors adds to the topic, however, is an understanding that

believe the firm has control over the problem than when constraints force the firm's actions.").

⁵⁰¹ See Folkes, supra note 490, at 407 (stating that consumers may turn to manufacturers to facilitate causal attribution with complex products).

⁵⁰² See Loewenstein & Adler, supra note 196, at 279.

⁵⁰³ Stephen J. Hoch & George Loewenstein, Time-Inconsistent Preferences and Consumer Self-Control, 17 J. Consumer Res. 492, 497 (1991).

⁵⁰⁴ Loewenstein & Adler, supra note 196, at 279.

such appeals can result in behavior that is at odds with one's preferences.⁵⁰⁵

Framing Effects. Richard Thaler has extensively studied the g. way in which such psychological phenomena as framing effects can illuminate the concept of consumer choice. Drawing from Kahneman and Tversky's prospect theory, Thaler has developed a concept of mental accounting, which forms the basis of a behaviorally based model of consumer choice.⁵⁰⁶ A representative example of Thaler's findings includes the rather surprising result that money, contrary to standard economic assumptions, is not fungible.⁵⁰⁷ This can be seen in the fact that most individuals would not drive across town to save twenty-five dollars on a car, but would to save twenty-five dollars on a vacuum cleaner. Thus, twenty-five dollars is simultaneously worth more and less than a trip across town. For our purposes, Thaler's theory of mental accounting provides insight into the way in which manufacturers might utilize framing effects and prospect theory to manipulate consumer perceptions. Because his work involves the earliest and most influential application of behavioral research to the study of consumers, we will consider it in some detail.

Thaler proposes replacing the utility function from economic theory with the *value function* developed by Kahneman and Tversky as a central aspect of their prospect theory.⁵⁰⁸ The value function could be described as more psychologically textured than the utility function for at least three reasons. First, it assesses perceived gains and losses relative to some natural references point-a feature of the model which takes account of the fact that "people appear to respond more to perceived changes than to absolute levels."509 Second, the value function is assumed to be concave for gains and convex for losses. This merely acknowledges the fact that the perception of quantities is a relative process. Twenty-five dollars is a small percentage of the price of an automobile but a significantly larger percentage of the price of a vacuum cleaner. Third, the loss function is steeper than the gain function, a feature which Thaler describes as capturing the endowment effect. Losing something that one owns is perceived as more pronounced than gaining the identical item, just as people "will de-

⁵⁰⁵ See id. at 289.

⁵⁰⁶ See Richard Thaler, Mental Accounting and Consumer Choice, 4 Marketing Sci. 199 (1985); Thaler, supra note 480.

⁵⁰⁷ See Richard H. Thaler, Quasi Rational Economics 28 (1991).

⁵⁰⁸ See id.

⁵⁰⁹ Id.

mand more to sell an item they own than they would be willing to pay to acquire the same item."⁵¹⁰

Utilizing this enriched model of consumer value perceptions, Thaler examines the case in which an individual experiences the joint outcome (x,y). Psychologically, the individual could perceive the result of such an experience as v(x + y) or as v(x) + v(y). The former case Thaler refers to as integration; the latter, segregation. Whether an individual prefers integration or segregation of outcomes x and y will depend on their magnitude and whether they are gains or losses. If both are gains, Thaler predicts that segregation is preferred because the value function is concave for positive values.⁵¹¹ If both are losses, Thaler predicts that integration is preferred for the inverse reason.⁵¹² If gains and losses are mixed, Thaler predicts that the individual would prefer integration where gains exceed losses.⁵¹³ Where losses exceed gains, Thaler predicts that the individual would prefer segregation of the gain, especially where it is small relative to the loss (such small gains Thaler refers to as "silver linings").

After verifying these predictions with experimental evidence,⁵¹⁴ Thaler discusses their implications for the theory of marketing: "The results of [the joint outcome study] can be summarized by two principles: segregate gains and integrate losses. Each principle also has a corollary: segregate 'silver linings'... and integrate (or cancel) losses when combined with larger gains."⁵¹⁵

Thus, manufacturers desiring to enhance the perceived value of their products need only follow Thaler's concise instructions. For instance, product features should be described separately so that gains appear segregated. "The most vivid examples of this are the late-night television advertisements for kitchen utensils."⁵¹⁶ But wait, there's more. Product rebates can be used as an effective form of price promotion because they seem to follow the silver lining principle: "A rebate strongly suggests segregating the saving."⁵¹⁷ Where losses are concerned, "sellers have a distinct advantage in selling something if its cost can be added to another larger purchase."⁵¹⁸ Thus, individuals can frequently be convinced to purchase optional stereo or security

⁵¹⁰ Id.

⁵¹¹ See id. at 29 ("Moral: Don't wrap all the Christmas presents in one box.").

⁵¹² See id. ("For example, one desirable feature of credit cards is that they pool many small losses into one larger loss and in so doing reduce the [perceived] total value lost."). ⁵¹³ This is because the loss function is steeper than the gain function.

⁵¹⁴ See Thaler, supra note 507, at 31-32.

⁵¹⁵ Id. at 38.

⁵¹⁶ Id.

⁵¹⁷ Id. at 39.

⁵¹⁸ Id.

systems when buying a new car, despite the less than competitive price car dealers typically charge for such options. Finally, Thaler notes, the federal government appears to be following the principle of cancellation (whereby smaller losses are integrated with larger gains) by withholding tax payments from wages as opposed to requiring payment in one lump sum.

Another lesson to be gained from the mental accounting model of consumer behavior stems from the significance of a reference outcome to perceived value. Because consumers generally perceive value in relation to some expected or "just" outcome, manufacturers must be mindful not only of the value of the goods sold but also of the manner in which they are sold (i.e., "the perceived merits of the 'deal'").⁵¹⁹ Thus, Thaler notes, professional sports leagues, the manufacturers of the toy behind the latest Christmas season craze, and the operators of the most popular restaurant in town all face a similar dilemma—each could, at times when demand exceeds supply, charge a higher than "normal" price and still sell out of their respective goods and services. However, the ongoing nature of the seller-buyer relationship prevents such opportunism. Because the elevated price would be judged in relation to the "normal" price, customers would experience significant disutility from the nature of the transaction and would be less likely to offer the manufacturer repeat business.520

Thaler provides guidance for manufacturers who wish to circumvent such social norms. First, steps can be taken to raise the perceived reference price. This can be accomplished by explicitly suggesting a high reference price (for instance, by offering a "suggested retail price") or by raising the perceived cost of the product (for instance, by adding amenities that give the product an appearance of luxury, whether or not the individual consumer herself actually values the added amenities).⁵²¹ Second, manufacturers can tie the sale of the product to something else, thus integrating the premium price for the product into a larger purchase. Thaler notes that Super Bowl tickets frequently are sold in packages that include airfare and hotel, thereby masking the ticket premium to some degree.⁵²² Finally, manufacturers can offer the product in an unusual size or format, thus making it difficult for consumers to conceive of an appropriate reference price. As a prime example of this tactic, Thaler reminds the reader that candy at movie theaters, in addition to being priced well above ordi-

- 521 See id. at 42.
- 522 See id.

⁵¹⁹ Id. at 33.

⁵²⁰ See id. at 40.

nary retail levels, is "typically sold only in large containers rarely seen in other circumstances."⁵²³

Other researchers have begun to follow Thaler's work in this area by further examining the way in which framing effects can alter customer perceptions. Gerald Smith and Thomas Nagle have found that "[m]anagers can . . . influence purchase decisions by how they present, or 'frame,' price and benefits relative to a reference point."524 For instance, it is preferable to begin with a higher reference point and then offer a discount in appropriate circumstances, rather than begin with a lower price and charge a premium. "If the explicit base price is seen as the starting point, buyers paying a higher price will view their failure to qualify for a discount as a gain denied. They will find that less objectionable than being charged a premium, which they would view as an explicit loss."525 This disparity in perceived value from formally identical outcomes stems from the fact that individuals perceive out-of-pocket costs as weighted more heavily than opportunity costs.⁵²⁶ For the same reason, banks have been able to convince customers to keep a minimum amount in their checking accounts in order to avoid monthly fees, even where the fees would be less than the (opportunity) cost of the foregone interest.527

The importance of reference prices to consumer perceptions also suggests significant implications for managerial price setting. For instance, when introducing a new product such as an electronics good, manufacturers might consider setting the initial price high in order to establish an elevated reference price. In personal sales settings, "the salesperson should begin by first framing customers' perceptions by showing them products above their price range, even if customers may not be in the market for such products."⁵²⁸ Finally, because consumers, as noted in Thaler's discussion of the value function, view price in proportional terms rather than in absolute terms, manufacturers can carefully calibrate price changes to minimize or maximize impact. Price increases can be accomplished in small steps over time with little or no effect on consumer perceptions.⁵²⁹ This is because the buyer's implicit reference price will be elevated subtly throughout the gradual price elevation.

⁵²³ Id.

⁵²⁴ Smith & Nagle, supra note 468, at 100.

⁵²⁵ Id. at 101.

⁵²⁶ See Thaler, supra note 480, at 43-47.

⁵²⁷ See Smith & Nagle, supra note 468, at 102.

⁵²⁸ Id. at 106.

⁵²⁹ See id. at 108.

3. Summary

Although we have attempted in the foregoing discussion to describe some of the ways in which manufacturers may manipulate consumers' risk perceptions and preferences, for reasons described above⁵³⁰ we are sure that our list is both over- and underinclusive. Thus, we wish to emphasize that our central prediction regarding manufacturer behavior remains far more general: Manufacturers will respond to market incentives by manipulating consumer perceptions in whatever manner maximizes profits. Our accompanying articles provide market evidence of this possibility of manipulation, as well as an argument that enterprise liability provides the best legal response to it.⁵³¹ Here, we conclude by explaining why two of the most persistent criticisms of the behavioral research do not affect our understanding of manufacturer manipulation of consumer risk perceptions.

D. Answering the Critiques of Behavioral Research

As noted in Part I, the behavioral research has been criticized on the ground that researchers allegedly tend to cite instances of poor analytical reasoning, while failing to credit the numerous situations in which individuals act in accordance with principles of rationality.532 This so-called citation bias, however valid as applied to behavioral research generally, is irrelevant to our depiction of consumer product markets. Regardless of whether instances of cognitive bias make up only a small percentage of overall consumer thought processes, manufacturers have every incentive to isolate those instances and utilize them for gain. Thus, for instance, manufacturers have the incentive and ability to exploit consumers by triggering instances of mental accounting even if it can be shown that, in the absence of such exploitation, consumers would only rarely rely on mental accounting. Put another way, regardless of whether mental accounting is a relatively infrequent cognitive phenomena for consumers generally, it will not be infrequent when consumers purchase a new car-this is because car salespeople know that many new car purchasers are easily persuaded to purchase high-margin options such as stereos. Thus, the citation bias, for our purposes, gives way to the exploitation bias: the tendency of manufacturers and retailers to exploit only those consumer cognitive phenomena that result in increased sales, higher profits, and decreased perceptions of risk.

⁵³⁰ See supra note 449.

⁵³¹ See Hanson & Kysar, TBS II, supra note 25; Hanson & Kysar, TBS III, supra note 26.

⁵³² See supra note 276 and accompanying text.

Similarly, our depiction of consumer product markets is unaffected by the frequent criticism that the behavioral research bears little relevance to "real world" situations. Schwartz has restated this argument as follows:

The external validity of [the behavioral research] is now in controversy . . . [because] the tasks people are assigned in laboratories sometimes seem too artificial to support a strong inference that persons routinely misperform important tasks in their actual lives. Consequently, it seems premature to make this experimental data the factual premise of important legal rules.⁵³³

There are two possible objections to this argument. First, one might argue in defense of the behavioral research that the researchers' laboratory conditions effectively replicate real world situations and that, if anything, the real world is far more complex and therefore *more* likely to induce analytical reasoning errors.⁵³⁴ Second, even if cognitive anomalies are phenomena especially generated by laboratory settings, there are many reasons to suppose that they will be equally present in the consumer product setting. This is because manufacturers, through careful marketing strategies and control over product information, are able to construct "laboratories" of consumerism. That is, manufacturers have the incentive and ability to induce anomalies in consumers in just the manner that behavioral researchers do for laboratory subjects.

Both manufacturers and researchers have a large degree of control over the content and form of information conveyed to their subjects, both have command of their subjects' attention whether through a survey questionnaire or a television commercial or product package, and both are able to determine precisely the nature of the decision context—whether it is in a lab or in front of a carefully arranged store display. Perhaps the only difference between manufacturers and behavioral researchers is that manufacturers are operating under much stronger financial incentives and typically have more opportunities to ensure that their efforts succeed. In short, even if cognitive anomalies are less frequent in the "real world," there is no reason to suppose that the typical consumer product context is representative of the "real world" and therefore no reason to doubt the existence of cognitive anomalies in consumer purchasing decisions.

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⁵³³ Schwartz, supra note 252, at 380.

⁵³⁴ As one commentator put it: "If biases, errors, and mistakes are so easy to produce in laboratory reasoning tasks, it beggars belief to suppose that these are easily avoided at all other times." Evans, supra note 46, at 25.

CONCLUSION

In recent decades legal economists have converged upon numerous broad (if rarely articulated) tenets-tenets that we believe have had a profound influence on the sort of policy analysis that legal economists conduct and the sort of conclusions that they reach. Perhaps the most significant example is the nearly axiomatic view that there is no force as powerful as market forces-that is, the incentives that people (or firms) have to exchange goods or money in order to increase their own personal welfare. A second tenet is that, by happy coincidence, well-functioning markets lead to desirable (that is, social-welfare maximizing or efficient) outcomes. A third tenet follows from the first two: Policymakers should not attempt to regulate or otherwise "interfere" with markets absent some evidence of a market failure.535 Finally, a fourth tenet is that there exists only a finite set of clearly defined and reasonably tractable market failures-e.g., collective action problems, externalities, informational asymmetries, and strategic behavior.

With the first three tenets, we are, at least for purposes of this Article, largely in agreement. It is the fourth that we seek to challenge. Conspicuously absent from the set of potential market failures is the problem of irrational actors. That is, economists have traditionally paid little mind to the possibility that consumers or firms cannot or do not act in accord with the rational actor model on which most efficiency analysis is premised. For that seeming oversight, they have offered two general justifications. First, they assert that there is inadequate evidence that actors are biased in a way that threatens the basic law and economics model. To be sure, it is easy to come up with anecdotal evidence of irrationality, but a great deal of policy-related scholarship is concerned with group behavior, not individual behavior.536 Furthermore, absent any reason to believe that actors are biased in any particular way, the law of large numbers ensures that the errors of individuals will wash out and the estimates of the group will be roughly accurate.⁵³⁷ As the evidence of systematic bias has mounted.

⁵³⁵ Relatedly, legal economists generally assume that the goal of any regulation should be to replicate the results that the hampered market would otherwise yield, if well-functioning. It is for those sorts of reasons that there has emerged a consensus among economists that the best way to ensure that regulation is effective is to employ regulation that relies on the same powerful incentives that drive well-functioning markets—so-called *incentive-based regulation*. See Hanson & Logue, supra note 93, at 1174 (arguing trend in regulation is toward incentive-based regulation).

 $^{^{536}}$ Cf. Richard G. Lipsey, Peter O. Steiner, & Douglas D. Purvis, Economics 19 (8th ed. 1987) ("There are many situations in which group behavior can be predicted accurately without certain knowledge of individual behavior.").

⁵³⁷ See id. at 21:

however, this justification for downplaying the problem of nonrational actors has, as we detailed in Part II, given way to debate over the net effect of many potentially conflicting biases. The second general type of justification is that, even if there were some tendency of economic actors to be biased, those tendencies would be largely quashed through various forms of market discipline.538 This justification, which depends in part on some of the economic tenets just described, takes a variety of forms, most of which involve a more or less explicit analogy to natural selection accounts of biological evolution.⁵³⁹ Probably the best known economic rendition of the point was made in a now-classic essay by Milton Friedman.⁵⁴⁰ As Friedman argued, economic actors will, whether conscious of it or not, behave "as if" they are attempting to maximize their own utility just as an expert pool player will behave "as if" he or she is knowledgeable of the complex physics of motion entailed in the game.⁵⁴¹ Survival in the marketplace, just like success in billiards, requires as much. Current assessments of the significance of behavioralism for law and economics contain the same threads of "as if" rationality and Darwinian discipline.542

[Because of the law of large numbers,] we can assert with confidence that more people will make small errors than will make large errors, that the larger the error the fewer will be the number making it, that roughly the same number of people will overstate as will understate the distance, and that the average error of all individuals will be close to zero.

⁵³⁸ See, e.g., Peter Knez, Vernon L. Smith, & Arlington W. Williams, Individual Rationality, Market Rationality, and Value Estimation, 75 Am. Econ. Rev.: Papers & Proc. 397, 401 (1985) (suggesting that individual irrational behavior decreases with increased market exposure).

⁵³⁹ See, e.g., Jack Hirshleifer, Economics from a Biological Viewpoint, 20 J.L. & Econ. 1, 9-10 (1977) (using natural selection analogy to explain why successful firms pursue profit maximization); Frank H. Easterbrook & Daniel R. Fischel, The Economic Structure of Corporate Law 31 (1991) (finding that market weeds out practices that do not assist investors); Frank H. Easterbrook, The Supreme Court, 1983 Term—Foreword: The Court and the Economic System, 98 Harv. L. Rev. 4, 8 (1984) (comparing evolutionary forces disciplining courts and those disciplining market participants and writing: "Often [business managers] thrash about quite innocent of economic theory. No matter. Those who offer what consumers want—by design or by accident—and produce it at low cost will prosper. Rewards and punishments arise automatically in any market system.").

540 Friedman, supra note 448.

 541 See id. at 21-22; see also id. at 15-16 (defending "as if" arguments and arguing that utilitarian model is good for describing and predicting individual actions, even if individual does not consciously engage in utility-maximizing choice); Richard A. Posner, Economic Analysis of Law 4 (5th ed. 1998) ("Rational maximization should not be confused with conscious calculation.").

⁵⁴² See, e.g., Jennifer Arlen, Comment: The Future of Behavioral Economic Analysis of Law, 51 Vand. L. Rev. 1765, 1782 (1998) (applying two strands to show that in futures market those who incorrectly assess risks are eliminated and market as whole functions as if individuals rationally assess risk).

In our view, this Article substantially undermines those justifications by showing that they, in effect, do not take behavioralism seriously. The behavioralist literature reviewed here makes clear the potential for a new sort of market failure, *market manipulation*: Because individuals are subject to a host of nonrational yet systematic cognitive phenomena, any party who has control over a decisionmaking context can influence the perceptions of the decisionmaker. When a party to a transaction has the ability to assert this influence, the underlying transaction will not necessarily yield an increase in social welfare. Indeed, flipping Friedman's classic justification of the rational actor model, one might say that the evolutionary forces of the market will force the parties in the dominant position to behave "as if" they know and understand how best to use the teachings of the behavioral literature to manipulate other actors for gain.

For instance, to use the example from this Article, manufacturers and marketers in consumer product markets can shape consumer risk assessments by altering the way they manufacture, package, and market their products. What is more, that possibility creates profit-enhancing opportunities for manufacturers and marketers by affording them a way of increasing consumer willingness to pay. As a result, the problem of market manipulation seems inescapable in an unregulated consumer product market. Manufacturers, to survive, *must* behave "as if" they are attempting to manipulate consumer risk perceptions. And in light of the immense power of the market forces driving these attempts, it seems highly doubtful that manufacturer strategies (be they deliberate or accidental) will fail.

Of course, the reader might view our arguments as overstated. Indeed, the reader might react to these arguments as Viscusi reacted to Latin's arguments—by viewing them as unduly pessimistic, even paranoid.⁵⁴³ Admittedly, there are overtones of pessimism in a theory that suggests that "we fall into all sorts of cognitive traps at almost every moment of our lives."⁵⁴⁴ There may be a tinge of paranoia in a theory that predicts massive corporations will behave as if they have meticulously studied consumers' cognitive processes, all so that we may be manipulated like marionettes in a multibillion-dollar game of consumption. Surely, one might respond, we have mistaken a cloudy sky for a falling one.

Initially, our reaction was the same: We hesitated to believe such a pessimistic, even condescending, view of consumers and, by implica-

⁵⁴³ See supra notes 362-64 and accompanying text (describing Viscusi's characterization of "Howard Latin's Law").

⁵⁴⁴ Piattelli-Palmarini, supra note 3, at 28.

tion, ourselves. After learning, however, that the manufacturer of Campbell's Soup knows, as an empirical fact, that placing soup cans *out* of alphabetical order on store shelves will increase sales by exactly six percent,⁵⁴⁵ our view began to change. After discovering that retailers, studying such research as "*Arousal Hypotheses*" and the Effects of *Music on Purchasing Behavior*,⁵⁴⁶ can lower customer blink rates from the normal average of thirty-two times a minute to a narcotic fourteen blinks a minute, we began to suspect that our manipulation hypothesis was not so far-fetched after all. And, finally, when we learned that Anheuser Busch, coiners of the beer-marketing gem, "Put a little weekend in your week," had relied on a decade-long psychological study of drinking behavior to develop marketing profiles capable of targeting those who use alcohol to escape their problems,⁵⁴⁷ we knew that we were on to a full-fledged theory.

These examples provide a tiny sample of the empirical evidence that we offer in our accompanying article.⁵⁴⁸ They are, of course, anecdotal, and much of our evidence will be similarly modest. Our aim, however, also will be modest: to show, as an empirical matter, that at least *some* manufacturer manipulation of consumers is occurring in the market consistent with our theoretical prediction, and to make what sounds compelling in theory also seem plausible in practice. After providing market evidence toward this end, we will consider the implications of this evidence for the still raging products liability debate regarding the most desirable liability standard.⁵⁴⁹ We will argue that an enterprise liability regime provides the best available response

 $^{^{545}}$ The reason, of course, is that by making it more difficult to find our desired can of tomato soup, we are more likely to stumble across that attractive-looking can of clam chowder. See Jack Hitt, The Theory of Supermarkets, N.Y. Times, Mar. 10, 1996, § 6 (Magazine), at 58 (describing strategy in supermarket product placement).

⁵⁴⁶ Patricia Cain Smith & Ross Curnow, "Arousal Hypothesis" and the Effects of Music on Purchasing Behavior, 50 J. Applied Psychol. 255, 255-56 (1966) (showing level of music affects length of time consumers spend in stores); see also Ronald E. Milliman, Using Background Music to Affect the Behavior of Supermarket Shoppers, J. Marketing, Summer 1982, at 86, 90 (finding tempo of music in store can affect pace of customer flow and sales volume).

⁵⁴⁷ See Russel L. Ackoff & James R. Emshoff, Advertising Research at Anheuser-Busch, Inc. (1968-74), Sloan Mgmt. Rev., Spring 1975, at 1 (reviewing market research analyzing link between drinking patterns and advertising). A similar tactic was apparently investigated by the Federal Trade Commission in 1976: "According to [FTC] staff, studies [that identified problem drinkers] were used in an advertisement for Johnnie Walker Black Label which appeared to offer the product to relieve stress and tension associated with striving for success—'The road to success is paved with rocks. Let us smooth them for you.'" Eric Clark, The Want Makers 276 (1988) (one set of internal quotation marks omitted) (reviewing tactics used by alcohol marketers).

⁵⁴⁸ See Hanson & Kysar, TBS II, supra note 25.

⁵⁴⁹ See Hanson & Kysar, TBS III, supra note 26.

to the problem of market manipulation. Implications of the problem of market manipulation for areas of law outside of products liability we will leave for still later articles.