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I. INTRODUCTION

The past decade has witnessed a burgeoning interest in the application of behavioral science to the law.[1] An earlier paradigm, centered around law and economics, is being challenged by those who would infuse a heavy dose of cognitive psychology, behavioral economics, and behavioral decision theory into this mix.[2] The frontispiece of a recent volume titled "Behavioral Law and Economics"[3] defines this new field as one that aims to show how, with a clearer knowledge of human behavior, we might be better able to predict the actual effects of law and to assess the real, and potential, role of law in society.[4]

The traditional approach to law and economics has assumed standard economic principles in which *homo economicus* maximizes utility within a stable set of preferences, after gathering and processing information in an optimal way. Simon sharply criti-

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1. *See, e.g.*, Symposium, *The Legal Implications of Psychology: Human Behavior, Behavioral Economics, and the Law*, 51 Vand. L. Rev. 1495 (1998).
2. *See* Behavioral Law and Economics (Cass. R. Sunstein ed., 2000).
3. *See id.*
4. *See id.*

cized this view, arguing that decision-making is better described in terms of *bounded* rationality.[5] A boundedly rational decision maker attempts to attain some satisfactory, although not necessarily maximal, level of achievement. Simon's conceptualization highlighted the role of perception, cognition and learning in decision-making and directed researchers to examine the psychological processes by which decision problems are represented and information is processed.[6]

About the same time as Simon, Edwards introduced psychologists to the "exceedingly elaborate, mathematical and voluminous" economic literature on choice and reviewed the handful of relevant experimental studies then in existence.[7]

During the subsequent years of the past century, the information processing view proposed by Simon has dominated empirical research on judgment and decision-making.[8] This has led to a torrent of studies aimed at describing and understanding the mental operations associated with these behaviors. The result has been a far more complicated portrayal of decision-making than that provided by utility maximization theory. It is now generally recognized among psychologists and among a growing number of legal scholars that utility maximization provides only limited insight into the processes by which decisions are made. For example, legal scholars have become well aware of the research on the heuristics and biases that affect judgments in the face of uncertainty. Discussions of hindsight bias, overconfidence, status quo bias, availability and representativeness appear frequently in the literature.[9]

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5. *See* Herbert A. Simon, *Rational Choice and the Structure of the Environment*, 63 Psychol. Rev. 129, 137-38 (1956).

6. *See id.* Some legal scholars have also rejected the standard view. Posner contends that "economic analysis of law . . . long ago abandoned the model of hyperrational, emotionless . . . nonstrategic man (or woman)[.]" Richard A. Posner, *Rational Choice, Behavioral Economics, and the Law*, 50 Stan. L. Rev. 1552 (1998).

7. *See* Ward Edwards, *The Theory of Decision Making*, 51 Psychol. Bull. 380 (1954).

8. *See* Simon, *supra* note 5, at 129-38.

9. *See generally* Jon D. Hanson & Douglas A. Kysar, *Taking Behavioralism Seriously: Some Evidence of Market Manipulation*, 112 Harv. L. Rev. 1420 (1999) (presenting empirical evidence of market manipulation and its role in market failure) [hereinafter Hanson & Kysar I]; Jon D. Hanson & Douglas A. Kysar, *Taking Behavioralism Seriously: The Problem of Market Manipulation*, 74 N.Y.U. L. Rev. 630 (1999) (reviewing thoroughly these phenomena and drawing out their implica-

Preference and choice have also been subject to a great deal of analysis by behavioral researchers and legal scholars. A basic assumption of rational theories of choice is the principle of *invariance,*[10] which states that the relation of preference should not change across equivalent descriptions of the options (description invariance) or equivalent methods of elicitation (procedure invariance). Without stability across equivalent descriptions and equivalent elicitation procedures, one's preferences cannot be represented as maximization of utility.

A sizable body of research now shows that description invariance and procedure invariance do not hold. Preferences appear to be remarkably labile, sensitive to the way a choice problem is described or "framed" and sensitive to the mode of response used to express the preferences.[11] These failures of invariance have contributed to a new conception of judgment and choice in which beliefs and preferences are often constructed–not merely revealed–in the elicitation process.

Among the specific empirical demonstrations of preference liability and manipulability that have interested legal scholars are preference reversals,[12] prominence effects,[13] loss aversion,[14] the endowment effect,[15] status quo and omission biases,[16] framing

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tions for market manipulation and products liability) [hereinafter Hanson & Kysar II].

10. *See* Amos Tversky & Daniel Kahneman, *Rational Choice and the Framing of Decisions*, 59 J. Bus. 251 (1986); Amos Tversky et al., *Contingent Weighting in Judgment and Choice*, 95 Psychol. Rev. 371 (1988).

11. *See* Baruch Fischhoff et al., *Knowing What You Want: Measuring Labile Values, in* Cognitive Processes in Choice and Decision Behavior 117-41 (Thomas S. Wallsten ed., 1980); Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 Econometrica 263 (1979); Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, 211 Science 453 (1981).

12. *See* Sarah Lichtenstein & Paul Slovic, *Reversals of Preference Between Bids and Choices in Gambling Decisions*, 89 J. Experimental Psychol. 46 (1971); Sarah Lichtenstein & Paul Slovic, *Response-Induced Reversals of Preference in Gambling: An Extended Replication in Las Vegas*, 101 J. Experimental Psychol. 16 (1973).

13. *See* Tversky et al., *supra* note 10.

14. *See* Kahneman & Tversky, *supra* note 11; Robin Gregory et al., *The Role of Past States in Determining Reference Points for Policy Decisions*, 55 Organizational Behav. & Hum. Decision Processes 195 (1993).

15. *See* Jack L. Knetsch, *The Endowment Effect and Evidence of Nonreversible Indifference Curves*, 79 Amer. Econ. Rev. 1277 (1989).

16. *See* Ilana Ritov & Jonathan Baron, *Status-Quo and Omission Bias*, 5 J. Risk & Uncertainty 49 (1992).

effects[17] and mental accounting effects.[18]

The many studies showing that people do not behave according to the dictates of utility theory have been troubling to economists, whose theories assume that people are rational in the sense of having preferences that are complete and transitive and in the sense of choosing what they most prefer.[19] Whatever the reluctance of economists to acknowledge these behavioral phenomena, legal scholars are certainly examining them carefully.[20] As Sunstein observes:

> Analysis of law should be linked with what we have been learning about human behavior and choice. After all, the legal system is pervasively in the business of constructing preferences, descriptions, and contexts for choice . . . law can construct rather than elicit preferences internally, by affecting what happens in ordinary transactions, market and nonmarket.[21]

Just as the law is continually evolving, so is our understanding of the psychology of human judgment, preference and choice. Behavioral researchers are coming to recognize that there is another aspect of information-processing that has been rather neglected–this is the automatic, experiential, affect-based side of our mental life, which appears every bit as important as the analytic/deliberative side that has been the focus of much prior research.

This article will describe new theory and empirical findings demonstrating the powerful influence of affect on decision-making. This work goes beyond the heuristics and biases work, which was highly analytical, into the domain of experiential (affect-based)

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17. *See* Barbara J. McNeil et al., *On the Elicitation of Preference for Alternative Therapies*, 306 New Eng. J. Med. 1259 (1982).

18. *See* Richard Thaler, *Mental Accounting and Consumer Choice*, 4 Marketing Sci. 199 (1985).

19. *See generally* David M. Grether & Charles R. Plott, *Economic Theory of Choice and the Preference Reversal Phenomenon*, 69 Am. Econ. Rev. 623 (1979) (reacting to early reports of violations of procedure invariance); Daniel M. Heusman, *On Dogmatism in Economics: The Case of Preference Reversals*, 20 J. Socio-Economics 205 (1991) (criticizing economists for failing to take these findings seriously).

20. *See* Hanson & Kysar I, *supra* note 9; Hanson & Kysar II, *supra* note 9; Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 Stan. L. Rev. 1471 (1998); Donald C. Langevoort, *Behavioral Theories of Judgment and Decision Making in Legal Scholarship: A Literature Review*, 51 Vand. L. Rev. 1499 (1998); Sunstein, *supra* note 2, at 2.

21. Sunstein, *supra* note 2, at 2.

thinking. After describing this perspective, I shall examine recent studies demonstrating how experiential thinking misleads young smokers and causes them to misperceive the risks of smoking. Because experiential thinking is essential to rational behavior yet capable of misguiding us, I will argue that we humans are *both* Rational Actors and Rational Fools.

II. THE AFFECT HEURISTIC

This section introduces a theoretical framework that describes the importance of affect in guiding judgments and decisions. As used here, "affect" means the specific quality of "goodness" or "badness" (i) experienced as a feeling state (with or without conscious awareness) and (ii) demarcating a positive or negative quality of a stimulus. Affective responses occur rapidly and automatically–note how quickly you sense the feelings associated with the stimulus word "treasure" or the word "hate." I shall argue that reliance on such feelings can be characterized as "the affect heuristic." In this section, I shall briefly trace the development of the affect heuristic across a variety of research paths.[22]

A. *Background*

A strong early proponent of the importance of affect in decision-making was Zajonc, who argued that affective reactions to stimuli are often the very first reactions, occurring automatically and subsequently guiding information processing and judgment. According to Zajonc, all perceptions contain some affect. "[w]e do not just see 'a house': We see a *handsome* house, an *ugly* house, or a *pretentious* house."[23] He later adds:

> We sometimes delude ourselves that we proceed in a rational manner and weight all the pros and cons of the various alternatives. But this is probably seldom the actual 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

22. *See* Paul Slovic et al., *The Affect Heuristic*, *in* Intuitive Judgment: Heuristics and Biases (Thomas Gilovich et al. eds., forthcoming 2001) (on file with author).

23. Robert B. Zajonc, *Feeling and Thinking: Preferences Need No Inferences*, 35 Am. Psychol. 151, 154 (1980).

> 'attractive,' and then justify these choices by various reasons . . . .[24]

Affect also plays a central role in what have come to be known as "dual-process theories" of thinking, knowing and information processing. As Epstein has observed:

> There is no dearth of evidence in every day life that people apprehend reality in two fundamentally different ways, one variously labeled intuitive, automatic, natural, non-verbal, narrative, and experiential, and the other analytical, deliberative, verbal, and rational.[25]

Table 1,[26] adapted from Epstein, further compares these two systems. One of the characteristics of the experiential system is its affective basis. Although analysis is certainly important in many decision-making circumstances, reliance on affect and emotion is a quicker, easier, and more efficient way to navigate in a complex, uncertain and sometimes dangerous world. Many theorists have given affect a direct and primary role in motivating behavior. Epstein's view on this is as follows:

> The experiential system is assumed to be intimately associated with the experience of affect, . . . which refer[s] to subtle feelings of which people are often unaware. When a person responds to an emotionally significant event . . . the experiential system automatically searches its memory banks for related events, including their emotional accompaniments . . . . If the activated feelings are pleasant, they motivate actions and thoughts anticipated to reproduce the feelings. If the feelings are unpleasant, they motivate actions and thoughts anticipated to avoid the feelings.[27]

Also emphasizing the motivational role of affect, Mowrer conceptualized conditioned emotional responses to images as prospective gains and losses that directly "guide and control performance in a generally sensible adaptive manner."[28] He criticized theorists who postulate purely cognitive variables, such as expectancies (probabilities) intervening between stimulus and response, cautioning that we must be careful not to leave the organism at the

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24. *Id.* at 155.

25. Seymour Epstein, *Integration of the Cognitive and Psychodynamic Unconscious*, 49 Am. Psychol. 709, 710 (1994).

26. *See infra* app., tbl.1.

27. Epstein, *supra* note 25, at 716.

28. O. Hobart Mowrer, Learning Theory and Behavior 30 (1960).

choice point "lost in thought." Mowrer's solution was to view expectancies more dynamically (as conditioned emotions such as hopes and fears), serving as motivating states leading to action.

One of the most comprehensive and dramatic theoretical accounts of the role of affect in decision-making is presented by the neurologist Antonio Damasio, in his book *Descartes' Error: Emotion, Reason, and the Human Brain.*[29] Damasio's theory is derived from observations of patients with damage to the ventromedial frontal cortices of the brain that has left their basic intelligence, memory and capacity for logical thought intact but has impaired their ability to "feel"–that is, to associate affective feelings and emotions with the anticipated consequences of their actions.[30] Close observation of these patients combined with a number of experimental studies led Damasio to argue that this type of brain damage induces a form of sociopathy[31] that destroys the individual's ability to make rational decisions; that is, decisions that are in his or her best interests. Persons suffering from this type of damage became socially dysfunctional even though they remain intellectually capable of analytical reasoning.

Commenting on one particularly significant case, Damasio observes:

> The instruments usually considered necessary and sufficient for rational behavior were intact in him. He had the requisite knowledge, attention, and memory; his language was flawless; he could perform calculations; he could tackle the logic of an abstract problem. There was only one significant accompaniment to his decision-making failure: a marked alteration of the ability to experience feelings. Flawed reason and impaired feelings stood out together as the consequences of a specific brain lesion, and this correlation suggested to me that feeling was an integral component of the machinery of reason.[32]

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29. Antonio R. Damasio, Descartes' Error: Emotion, Reason, and the Human Brain (1994).

30. *See id.*

31. *See* Antonio R. Damasio et al., *Individuals with Sociopathic Behavior Caused by Frontal Damages Fail to Respond Automatically to Social Stimuli*, 41 Behav. Brain Res. 81 (1990).

32. Damasio, *supra* note 29, at xii.

In seeking to determine "what in the brain allows humans to behave rationally,"[33] Damasio argues that thought is made largely from images, broadly construed to include sounds, smells, real or imagined visual impressions, ideas and words.[34] A lifetime of learning leads these images to become "marked" by positive and negative feelings linked directly or indirectly to somatic or bodily states (Mowrer and other learning theorists would call this conditioning). "In short, *somatic markers are . . . feelings generated from secondary emotions.* These emotions and feelings *have been connected, by learning, to predicted future outcomes of certain scenarios.*"[35] When a negative somatic marker is linked to an image of a future outcome it sounds an alarm. When a positive marker is associated with the outcome image, it becomes a beacon of incentive. Damasio concludes that somatic markers increase the accuracy and efficiency of the decision process and their absence degrades performance by "compromising the rationality that makes us distinctly human and allows us to decide in consonance with a sense of personal future, social convention, and moral principle."[36]

Based on ideas about affect marking images,[37] which in turn motivates behavior,[38] affect can be portrayed as an essential component in many forms of judgment and decision-making. Specifically it was proposed that people use an *affect heuristic* to make judgments.[39] That is, representations of objects and events in people's minds are tagged to varying degrees with affect. In the process of making a judgment or decision, people consult or refer to an "affect pool" containing all the positive and negative tags associated with the representations consciously or unconsciously. Just as imaginability, memorability and similarity serve as cues for probability judgments,[40] affect may serve as a cue for many important judgments. Relying on an affective impression can be far easier—more efficient—than weighing the pros and cons or retrieving

33. *Id.*
34. *See id.*
35. *Id.* at 174.
36. *Id.* at xii.
37. *See id.*
38. *See, e.g.,* Epstein, *supra* note 25; Mowrer, *supra* note 28.
39. *See* Melissa L. Finucane et al., *The Affect Heuristic in Judgments of Risk and Benefits*, 13 J. Behav. Decision Making 1 (2000).
40. *See generally* Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 Science 1124 (1974) (describing the availability and representativeness heuristics).

from memory many relevant examples, especially when the required judgment or decision is complex or mental resources are limited. This characterization of a mental short-cut leads to labeling the use of affect a "heuristic."

B. *Empirical Evidence*

This section presents and integrates a series of diverse studies demonstrating the operation of the affect heuristic.

1. *Manipulating Preferences Through Controlled Exposures*

The fundamental nature and importance of affect has been demonstrated repeatedly in a remarkable series of studies by Zajonc and his colleagues.[41] The concept of stimulus exposure is central to all of these studies. The central finding is that, when objects are presented to an individual repeatedly, the "mere exposure" is capable of creating a positive attitude or preference for these objects.

In the typical study, stimuli such as nonsense phrases, faces or Chinese ideographs are presented to the subject at varying frequencies. In a later session, the subject judges these stimuli on liking or familiarity, or both. The more frequent the exposure to a stimulus, the more positive the response. A meta-analysis of mere exposure research published between 1968 and 1987 included over 200 experiments examining the exposure-affect relationship.[42] Unreinforced exposures were found to reliably enhance affect toward visual, auditory, gustatory, abstract, and social stimuli.[43]

Winkielman, Zajonc and Schwarz demonstrated the speed with which affect can influence judgments in studies employing a subliminal priming paradigm.[44] Participants were "primed" through exposure to a smiling face, a frowning face, or a neutral polygon presented for 1/250 of a second, an interval so brief that there is no recognition or recall of the stimulus.[45] Immediately fol-

41. *See, e.g.*, Robert B. Zajonc, *Attitudinal Effects of Mere Exposure*, 9 J. Pers. & Soc. Psychol. Monograph 1 (1968).

42. *See* Robert F. Bornstein, *Exposure and Affect: Overview and Meta-Analysis of Research, 1968-1987*, 106 Psychol. Bull. 265 (1989).

43. *See id.*

44. *See* Piotr Winkielman et al., *Subliminal Affective Priming Resists Attibutional Interventions*, 11 Cognition and Emotion 43 (1997).

45. *See id.*

lowing this exposure, an ideograph was presented for two seconds, after which the subject rated the ideograph on a scale of liking.[46] Mean liking ratings were significantly higher for ideographs preceded by smiling faces.[47] This effect was lasting. In a second session, ideographs were primed by the "other face," the one not associated with the stimulus in the first session.[48] This second priming was ineffective because the effect of the first priming remained.[49]

The perseverance of induced preferences was tested by Sherman, Kim and Zajonc[50] who asked participants to study Chinese characters and their English meanings.[51] Half of the meanings were positive (e.g., beauty), half were negative (e.g., disease).[52] Then participants were given a test of these meanings followed by a test in which they were given pairs of characters and were asked to choose the one they preferred.[53] Participants preferred characters with positive meaning 70% of the time.[54] Next, the characters were presented with neutral meanings (e.g., desk, linen) and subjects were told that these were the "true" meanings.[55] The testing procedure was repeated and, despite learning the new meanings, the preferences remained the same.[56] Characters that had been initially paired with positive meanings still tended to be preferred.[57]

These various studies demonstrate that affect is a strong conditioner of preference, whether or not the cause of that affect is consciously perceived. They also demonstrate the independence of affect from cognition, indicating that there may be conditions of affective or emotional arousal that do not necessarily require cognitive appraisal. This affective mode of response, unburdened by cognition and hence much faster, has considerable adaptive value.

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46. *See id.*
47. *See id.*
48. *See id.*
49. *See id.*
50. *See* D. A. Sherman et al., Affective Perseverance: Cognitions Change but Preferences Stay the Same (1998).
51. *See id.*
52. *See id.*
53. *See id.*
54. *See id.*
55. *See id.*
56. *See* Sherman et al., *supra* note 50.
57. *See id.*

2. *Image, Affect and Decision-making*

Consistent with the literature just reviewed, a number of non-laboratory studies have also demonstrated a strong relationship between imagery, affect and decision-making.[58] Many of these studies used a word-association technique to discover the affective connections that the individual had learned through life experiences.[59] This method presents subjects with a target stimulus, usually a word or very brief phrase, and asks them to provide the first thought or image that comes to mind.[60] The process is then repeated a number of times, say three to six, or until no further associations are generated.[61] Following the elicitation of images, subjects are asked to rate each image they give on a scale ranging from very positive (e.g., +2) to very negative (e.g., –2), with a neutral point in the center.[62] Scoring is done by summing or averaging the ratings to obtain an overall index.[63]

This imagery method has been used successfully to measure the affective meanings that influence people's preferences for different cities and states[64] as well as their support or opposition to technologies such as nuclear power.[65]

Table 2[66] illustrates the method in a task where one respondent was asked to give associations to each of two cities and, later, to rate each image affectively. The cities in this example show the clear affective superiority of San Diego over Denver.[67] The study showed that summed image scores such as these were highly predictive of expressed preferences for living in or visiting cities.[68] In

58. *See, e.g.*, Paul Slovic et al., *Perceived Risk, Stigma, and Potential Economic Impacts of a High-Level Nuclear Waste Repository in Nevada*, 11 Risk Analysis 683 (1991); Alida Benthin et al., *Adolescent Health–Threatening and Health-Enhancing Behaviors: A Study of Word Association and Imagery*, 17 J. Adolescent Health 143 (1995); Ellen Peters & Paul Slovic, *The Role of Affect and Worldviews as Orienting Dispositions in the Perception and Acceptance of Nuclear Power*, 26 J. Applied Psychol. 1427 (1996); Donald G. MacGregor et al., *Imagery, Affect, and Financial Judgment*, 1 J. Psychol. & Fin. Markets 104 (2000).

59. *See* Slovic et al., *supra* note 58; Benthin et al., *supra* note 58.

60. *See* Slovic et al., *supra* note 58, at 688; Benthin, *supra* note 58, at 145.

61. *See* Slovic et al., *supra* note 58.

62. *See id.*

63. *See id.* at 690-91.

64. *See id.*

65. *See* Peters & Slovic, *supra* note 58, at 1428.

66. *See infra* app., tbl.2.

67. *See* Slovic et al., *supra* note 58.

68. *See id.* at 690.

one study they found that the image score predicted the location of *actual* vacations during the next eighteen months.[69]

Subsequent studies have found affect-laden imagery elicited by word associations to be predictive of preferences for investing in new companies on the stock market[70] and predictive of adolescents' decisions to take part in health-threatening and health-enhancing behaviors such as smoking and exercise.[71]

3. *Evaluability*

The research described above points to the importance of affective impressions in judgments and decisions. However, the impressions themselves may vary not only in their valence but in the precision with which they are held. It turns out that the precision of an affective impression substantially impacts judgments.

The distributional qualities of affective impressions and responses can be conceptualized as "affective mappings." Consider, for example, some questions posed by Mellers, Richards and Birnbaum: "How much would you like a potential roommate if all you knew about her was that she was said to be intelligent?"[72] Or, "Suppose, instead, all you knew about her was that she was said to be obnoxious?"[73] Intelligence is a favorable trait but it is not very diagnostic (e.g., meaningful) for likeableness, hence its affective map is rather diffuse.[74] In contrast, obnoxiousness will likely produce a more precise and more negative impression.[75]

How much would you like a roommate said to be both intelligent *and* obnoxious? Anderson has shown that the integration of multiple pieces of information into an impression of this sort can be described well by a weighted-average model where separate weights are given to intelligence and obnoxiousness, respectively.[76] Mellers' study further showed that the weights in such integrative tasks are inversely proportional to the variance of the

69. *See id.*
70. *See* MacGregor et al., *supra* note 58.
71. *See* Benthin et al., *supra* note 58.
72. Barbara A. Mellers et al., *Distributional Theories of Impression Formation*, 51 Organizational Behav. & Hum. Decision Processes 313 (1992).
73. *Id.*
74. *See id.*
75. *See id.*
76. *See* Norman H. Anderson, Foundations of Information Integration Theory (1981).

impressions.[77] Thus we would expect the impression produced by the combination of these two traits to be closer to the impression formed by obnoxiousness alone, reflecting greater weight given to obnoxiousness due to its smaller variance (more precise affective mapping). The meaning of a stimulus image appears to be reflected in the precision of the affective feelings associated with that image. More precise affective impressions reflect more precise meanings and carry more weight in impression formation, judgment and decision-making.

Hsee developed the notion of *evaluability* to describe the interplay between the precision of an affective impression and its meaning or importance for judgment and decision-making.[78] Evaluability is illustrated by an experiment in which Hsee asked people to assume they were music majors looking for a used music dictionary. In a joint-evaluation condition, participants were shown two dictionaries, A and B (see Table 3), and asked how much they would be willing to pay for each.[79] Willingness-to-pay was far higher for Dictionary B, presumably because of its greater number of entries. However, when one group of participants evaluated only A and another group evaluated only B, the mean willingness to pay was much higher for Dictionary A. Hsee explains this reversal by means of the *evaluability principle*. He argues that, without a direct comparison, the number of entries is hard to evaluate, because the evaluator does not have a precise notion of *how good* or *how bad* 10,000 (or 20,000) entries are. However, the defects attribute is evaluable in the sense that it translates easily into a precise good/bad response and thus it carries more weight in the independent evaluation. Most people find a defective dictionary unattractive and a like-new one attractive. Under joint evaluation, the buyer can see that B is far superior on the more

77. *See* Mellers et al., *supra* note 72.

78. *See* Christopher K. Hsee, *Elastic Justification: How Unjustifiable Factors Influence Judgments*, 66 Organizational Behav. & Hum. Decision Processes 122 (1996) [hereinafter Hsee I]; Christopher K. Hsee, *The Evaluability Hypothesis: An Explanation for Preference Reversals Between Joint and Separate Evaluations of Alternatives*, 67 Organizational Behav. & Hum. Decision Processes 242 (1996) [hereinafter Hsee II]; Christopher K. Hsee, *Less is Better: When Low-Value Options Are Valued More Highly Than High-Value Options*, 11 J. Behav. Decision Making 107 (1998) [hereinafter Hsee III].

79. *See infra* app., tbl.3.

important attribute, number of entries. Thus number of entries becomes *evaluable* through the comparison process.

According to the evaluability principle, the weight of a stimulus attribute in an evaluative judgment or choice is proportional to the ease or precision with which the value of that attribute (or a comparison on the attribute across alternatives) is mapped into an affective impression. In other words, affect bestows meaning on information[80] and the precision of the affective meaning influences our ability to use information in judgment and decision-making. Evaluability can thus be seen as an extension of the general relationship between the variance of an impression and its weight in an impression-formation task.[81]

Hsee's work in evaluability is noteworthy because it shows that even very important attributes may not be used by a judge or decision maker unless they can be translated precisely into an affective frame of reference. As described in the next section, Hsee finds evaluability effects even with familiar attributes such as the amount of ice cream in a cup.[82] Similar effects have also been demonstrated with other familiar things such as amounts of money or human lives.

4. *Proportion Dominance*

In situations that involve uncertainty about whether we will win or lose or that involve ambiguity about some quantity of something (i.e., how much is enough), there appears to be one information format that is highly evaluable, leading it to carry great weight in many judgment tasks. This is a representation characterizing an attribute as a proportion or percentage of something, or as a probability. We shall refer to the strong effects of this type of representation as "proportion dominance."[83]

A mundane and innocent form of proportion dominance has been demonstrated by Hsee, who found that an overfilled ice cream container with 7 oz. of ice cream was valued more highly (measured by willingness to pay) than an underfilled container with 8 oz. of ice cream.[84] This "less is better effect" reversed itself when

80. *See* Charles E. Osgood et al., The Measurement of Meaning (1957).
81. *See* Mellers et al., *supra* note 72.
82. *See* Hsee III, supra note 78, at 111-14.
83. I thank Chris Hsee for suggesting this term.
84. *See* Hsee III, *supra* note 78; *infra* app., fig.1.

the options were juxtaposed and evaluated together.[85] Thus, the proportion of the serving cup that was filled appeared to be more evaluable (in separate judgments) than the absolute amount of ice cream.[86]

A rather different demonstration of proportion dominance comes from studies of preferences among simple gambles. It has long been known that the rated attractiveness of a gamble offering the chance to win some monetary payoff was typically more determined by the probability of winning that by the size of the payoff.[87] Consider the gamble offering 7 chances out of 36 (played on a roulette wheel with 36 numbers) to win $9 (otherwise get nothing).

The relatively high weight given the probability when rating the attractiveness of such gambles may be explained by the fact that the probabilities are more readily interpreted as attractive or unattractive than are the payoffs. For example, seven out of thirty-six chances to win are rather unattractive odds; on the other hand, a $9 payoff may be harder to evaluate because its attractiveness depends upon what other payoffs are available.

If we could make a gamble's payoff more evaluable, that is, more readily perceived as good or bad, we would presumably enhance the weight given to payoff in the attractiveness rating.[88] One group of subjects rated the gamble, 7/36 win $9, on a twenty-point scale varying from zero (not at all attractive) to twenty (very attractive).[89] The mean rating was 9.4.[90]

Hypothesizing that the attractiveness of $9 might not be readily apparent, we reasoned that a bet offering $9 to win and only 5¢ to lose should appear to have a very attractive payoff ratio.[91] This led us to predict that one might increase the attractiveness of a gamble by adding a small loss to it.[92] This prediction was con-

85. *See id.*

86. *See id.*

87. *See* Paul Slovic & Sarah Lichtenstein, *Relative Importance of Probabilities and Payoffs in Risk Taking*, 78 J. Experimental Psychol. Monograph 1 (1968); William M. Goldstein & Hillel J. Einhorn, *Expression Theory and the Preference Reversal Phenomena*, 94 Psychol. Rev. 236 (1987).

88. *See* Slovic et al., *supra* note 22.

89. *See id.*

90. *See id.*

91. *See id.*

92. *See id.*

firmed. Adding a 5¢ loss boosted the mean attractiveness rating from 9.4 to 14.9.[93]

This curious finding, that adding a small loss to a gamble increases its rated attractiveness, fits well with the notions of affective mapping and evaluability. According to this view, a probability maps relatively precisely onto the attractiveness scale because probability has a lower and upper bound (0 and 1) and a midpoint below which a probability is "poor" or "bad" (i.e., has worse than an even chance) and above which it is "good" (i.e., has a better than even chance). People know where a given value, such as 7/36, falls within the bounds, and what it means–"I'm probably not going to win." In contrast, the mapping of a dollar outcome (e.g., $9) onto the attractiveness scale is diffuse, reflecting a failure to know how good or bad or how attractive or unattractive $9 is. Thus, the impression formed by the gamble offering $9 to win with no losing payoff is dominated by the relatively precise and unattractive impression produced by the 7/36 probability of winning. However, adding a very small loss to the payoff dimension brings the $9 payoff into focus and thus gives it meaning. The combination of a possible $9 gain and a 5¢ loss is a *very attractive* win/loss ratio, leading to a relatively precise mapping onto the upper end of the scale. Whereas the imprecise mapping of the $9 carries little weight in the averaging process, the more precise and now favorable impression of $9 and 5¢ carries more weight, thus leading to an increase in the overall favorability of the gamble.

Proportion dominance surfaces in a powerful way in a very different context, studies of life-saving interventions.[94] For example, one study found that people's willingness to intervene to save a stated number of lives was determined more by the proportion of lives saved than by the actual number of lives that would be saved.[95] However, when two or more interventions were directly compared, number of lives saved became more important than pro-

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93. *See id.*

94. *See* David Fethersonhaugh et al., *Insensitivity to the Value of Human Life: A Study of Psychophysical Numbing*, 14 J. Risk & Uncertainty 283 (1997); Jonathan Baron, *Confusion of Relative and Absolute Risk in Valuation*, 14 J. Risk & Uncertainty 301 (1997); Karen E. Jenni & George Loewenstein, *Explaining the "Identifiable Victim Effect,"* 14 J. Risk & Uncertainty 235 (1997); James Friedrich et al., *Psychophysical Numbing: When Lives Are Valued Less as the Lives At Risk Increase*, 8 J. Consumer Psychol. 277 (1999).

95. *See* Fetherstonhaugh et al., *supra* note 94, at 297.

portion saved.[96] Thus, number of lives saved, standing alone, appears to be poorly evaluable,[97] as was the case for number of entries in Hsee's music dictionaries. With a side-by-side comparison, the number of lives became clearly evaluable and important,[98] as also happened with the number of dictionary entries.

Slovic, drawing upon proportion dominance and the limited evaluability of numbers of lives, predicted (and found) that people would more strongly support an airport-safety measure expected to save 98% of 150 lives at risk than a measure expected to save 150 lives.[99] Saving 150 lives is diffusely good, hence only weakly evaluable, whereas saving 98% of something is clearly very good because it is so close to the upper bound on the percentage scale, and hence is highly evaluable and highly weighted in the support judgment.[100] Subsequent reduction of the percentage of 150 lives that would be saved to 95%, 90%, and 85% led to reduced support for the safety measure but each of these percentage conditions still garnered a higher mean level of support than did the save 150 lives condition.[101]

5. *Insensitivity to Probability*

Outcomes are not always affectively as vague as the quantities of money, ice cream and lives that were dominated by proportion in the above experiments. When consequences carry sharp and strong affective meaning, as is the case with a lottery jackpot or a cancer, the opposite phenomenon occurs—variation in probability often carries too little weight. As Loewenstein, Weber, Hsee and Welch observe, one's images and feelings toward winning the lottery are likely to be similar whether the probability of winning is one in 10 million or one in 10,000.[102] They further note that response to uncertain situations appears to have an all or none characteristic that is sensitive to the *possibility* rather than the

96. *See id.* at 296-97.
97. *See id.* at 297.
98. *See id.* at 291.
99. *See* Slovic et al., *supra* note 22. This was, of course, a between-groups study. In a side-by-side comparison, everyone gives more support to saving all 150 lives.
100. *See id.*
101. *See id.; infra* app., tbl.4.
102. *See* George Loewenstein et al., *Risk as Feelings*, Psychol. Bull. (forthcoming 2001).

probability of strong positive or negative consequences, causing very small probabilities to carry great weight.[103] This, they argue, helps explain many paradoxical findings such as the simultaneous prevalence of gambling and the purchasing of insurance.[104] It also explains why societal concerns about hazards such as nuclear power and exposure to extremely small amounts of toxic chemicals fail to recede in response to information about the very small probabilities of the feared consequences from such hazards.[105] Support for these arguments comes from Rottenstreich and Hsee, who show that if the potential outcome of a gamble is emotionally powerful, its attractiveness or unattractiveness is relatively insensitive to changes in probability as great as from .99 to .01.[106]

6. *The Affect Heuristic in Judgments of Risk and Benefit*

Another stream of research that, in conjunction with many of the findings reported above, led to recognition of the affect heuristic, had its origin in an early study of risk perception.[107] One of the findings in that study and subsequent replications of it was that perception of risk and society's response to risk was strongly linked to the degree to which a hazard evoked feelings of dread.[108] Thus activities associated with cancer (e.g., activities exposing people to radiation or toxic chemicals) are seen as riskier and more in need of regulation than activities associated with less dreaded forms of illness, injury, and death (e.g., accidents).

A second finding in the study[109] has been even more instrumental in the study of the affect heuristic. This is the finding that judgments of risk and benefit are negatively correlated.[110] For many hazards, the greater the perceived benefit, the lower the per-

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103. *See id.*

104. *See id.*

105. *See* Nancy Kraus et al., *Intuitive Toxicology: Expert and Lay Judgments of Chemical Risks*, 12 Risk Analysis 215 (1992).

106. *See* Yuval Rottenstreich & Christopher K. Hsee, *Money, Kisses & Electric Shocks: On the Affective Psychology of Risk*, Psychol. Sci. (forthcoming 2001) (manuscript on file with author).

107. *See* Baruch Fischhoff et al., *How Safe is Safe Enough? A Psychometric Study of Attitudes Towards Technological Risks and Benefits*, 9 Policy Sci. 127 (1978).

108. *See id.* at 140; Paul Slovic, *Perception of Risk*, 236 Science 280, 281-83 (1987).

109. *See* Fischhoff et al., *supra* note 107.

110. *See id.* at 148-49.

ceived risk and vice versa.[111] Smoking, alcoholic beverages and food additives, for example, tend to be seen as very high in risk and relatively low in benefit, whereas vaccines, antibiotics and x-rays tend to be seen as high in benefit and relatively low in risk.[112] This negative relationship is noteworthy because it occurs even when the nature of the gains or benefits from an activity is distinct and qualitatively different from the nature of the risks. That the inverse relationship is generated in people's minds is suggested by the fact that risk and benefit generally tend to be positively (if at all) correlated in the world.[113] Activities that bring great benefits may be high or low in risk but activities that are low in benefit are unlikely to be high in risk (if they were, they would be proscribed).[114]

A study by Alhakami and Slovic found that the inverse relationship between perceived risk and perceived benefit of an activity (e.g., using pesticides) was linked to the strength of positive or negative affect associated with that activity.[115] This result implies that people base their judgments of an activity or a technology not only on what they *think* about it but also on what they *feel* about it.[116] If they like an activity, they are moved to judge the risks as low and the benefits as high; if they dislike it, they tend to judge the opposite—high risk and low benefit.[117]

Alhakami and Slovic's findings suggested that use of the affect heuristic guides perceptions of risk and benefit, as depicted in Figure 2.[118] If so, providing information about risk should change the perception of benefit and vice-versa.[119] For example, information stating that benefit was high for some technology should lead to more positive overall affect that would, in turn, decrease perceived

111. *See id.*

112. *See id.* at 147.

113. *See id.* at 148-49.

114. *See id.* This inverse relationship is found as well when the correlation is computed across individuals judging the same activity. Thus one person may judge nuclear power to be high in risk and low in benefit whereas another might judge it low in risk and high in benefit.

115. *See* Ali S. Alhakami & Paul Slovic, *A Psychological Study of the Inverse Relationship Between Perceived Risk and Perceived Benefit*, 14 Risk Analysis 1085 (1994).

116. *See id.* at 1088.

117. *See id.* at 1094-95.

118. *See infra* app., fig.2.

119. *See infra* app., fig.3.

risk.[120] Indeed, Finucane, Alhakami, Slovic and Johnson conducted this experiment, providing four different kinds of information designed to manipulate affect by increasing or decreasing perceived risk and increasing or decreasing perceived benefit.[121] In each case there was no apparent logical relation between the information provided (e.g., information about risks) and the nonmanipulated variable (e.g., benefits).[122] The predictions were confirmed.[123] When the information that was provided changed either the perceived risk or the perceived benefit, an affectively congruent but inverse effect was observed on the non-manipulated attribute, as depicted in Figure 3.[124] These findings support the theory that risk and benefit judgments are causally determined, at least in part, by the overall affective evaluation.

The affect heuristic also predicts that using time pressure to reduce the opportunity for analytic deliberation (and thereby allowing affective considerations freer rein), should enhance the inverse relationship between perceived benefits and risks. In a second study, Finucane and others showed that the inverse relationship between perceived risks and benefits increased under time pressure, as predicted.[125] These two experiments with judgments of benefits and risks are important because they support the contention by Zajonc that affect influences judgment directly and is not simply a response to a prior analytic evaluation.[126]

7. *Judgments of Probability, Relative Frequency, and Risk*

The affect heuristic has much in common with the model of "risk as feelings" proposed by Loewenstein and with dual process theories put forth by Epstein, Sloman and others.[127] Recall that Epstein argues that individuals apprehend reality by two interactive, parallel processing systems.[128] The *rational* system is a de-

120. *See* Alkahmi & Slovic, *supra* note 115, at 1094-95.
121. *See* Finucane et al., *supra* note 39.
122. *See id.* at 1.
123. *See id.*
124. *See infra* app., fig.3.
125. *See* Finucane et al., *supra* note 39, at 9-13.
126. *See* Zajonc, *supra* note 24.
127. *See* Loewenstein et al., *supra* note 102; Epstein, *supra* note 25; Steven A. Sloman, *The Empirical Case for Two Systems of Reasoning*, 119 Psychol. Bull. 3 (1996).
128. *See supra* text accompanying note 24.

liberative, analytical system that functions by way of established rules of logic and evidence (e.g., probability theory).[129] The *experiential* system encodes reality in images, metaphors and narratives to which affective feelings have become attached.[130]

To demonstrate the influence of the experiential system, Denes-Raj and Epstein showed that, when offered a chance to win a prize by drawing a red jelly bean from an urn, subjects often elected to draw from a bowl containing a greater absolute number, but a smaller proportion, of red beans (e.g., 7 in 100) than from a bowl with fewer red beans but a better probability of winning (e.g., 1 in 10).[131] For these individuals, images of 7 winning beans in the large bowl appeared to dominate the image of 1 winning bean in the small bowl.[132]

We can characterize Epstein's subjects as following a mental strategy of "imaging the numerator" (i.e., the number of red beans) and neglecting the denominator (the number of beans in the bowl). Consistent with the affect heuristic, images of winning beans convey positive affect that motivates choice.

Although the jelly bean experiment may seem frivolous, imaging the numerator brings affect to bear on judgments in ways that can be both non-intuitive and consequential. Slovic, Monahan and MacGregor demonstrated this in a series of studies in which experienced forensic psychologists and psychiatrists were asked to judge the likelihood that a mental patient would commit an act of violence within 6 months after being discharged from the hospital.[133] An important finding was that clinicians who were given another expert's assessment of a patient's risk of violence framed in terms of a relative frequency (e.g., of every 100 patients similar to Mr. Jones, 10 are estimated to commit an act of violence to others) subsequently labeled Mr. Jones as more dangerous than did clinicians who were shown a "statistically equivalent" risk expressed as a

129. *See id.*

130. *See supra* text accompanying notes 24-30.

131. *See* Veronika Denes-Raj & Seymour Epstein, *Conflict Between Intuitive and Rational Processing: When People Behave Against Their Better Judgment*, 66 J. Personality & Social Psychol. 819 (1994).

132. *See id.* at 823.

133. *See* Paul Slovic et al., *Violence Risk Assessment and Risk Communication: The Effects of Using Actual Cases, Providing Instruction, and Employing Probability Versus Frequency Formats*, 24 L. & Hum. Behav. 271 (2000).

probability[134] (e.g., "Patients similar to Mr. Jones are estimated to have a 10% chance of committing an act of violence to others"[135]). Similar results have been found by Yamagishi, whose judges rated a disease that kills 1,286 people out of every 10,000 as more dangerous than one that kills 24.14% of the population.[136]

Not surprisingly, when clinicians were told that "20 out of every 100 patients similar to Mr. Jones are estimated to commit an act of violence,"[137] 41% would refuse to discharge the patient.[138] But when another group of clinicians was given the risk as "patients similar to Mr. Jones are estimated to have a 20% chance of committing an act of violence," only 21% would refuse to discharge the patient.[139]

Follow-up studies showed that representations of risk in the form of individual probabilities of 10% or 20% led to relatively benign images of one person, unlikely to harm anyone, whereas the "equivalent" frequentistic representations created frightening images of violent patients (e.g., "Some guy going crazy and killing someone").[140] These affect-laden images likely induced greater perceptions of risk in response to the relative-frequency frames.

Although frequency formats produce affect-laden imagery, story and narrative formats appear to do even better in that regard. Hendrickx, Vlek and Oppewal found that warnings were more effective when, rather than being presented in terms of relative frequencies of harm, they were presented in the form of vivid, affect-laden scenarios and anecdotes.[141] Sanfey and Hastie found that, compared with respondents given information in bar graphs or data tables, respondents given narrative information more accu-

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134. *See id.* at 289-90.

135. *Id.*

136. *See* Kimihiko Yamagishi, *When a 12.86% Mortality is More Dangerous than 24.14%: Implications for Risk Communication,* 11 Applied Cognitive Psychol. 495, 504 (1997).

137. Slovic et al., *supra* note 133, at 288.

138. *See id.*

139. *Id.*

140. *Id.* at 291-93.

141. *See* Laurie Hendrickx et al., *Relative Importance of Scenario Information and Frequency Information in the Judgment of Risk*, 72 Acta Psychologica 41, 58-60 (1989).

rately estimated the performance of a set of marathon runners.[142] Furthermore, Pennington and Hastie found that jurors construct narrative-like summations of trial evidence to help them process their judgments of guilt or innocence.[143] The potency of narrative may be due to affect increasing the memorability of information[144] or enhancing individuals' engagement in the task which in turn facilitates the comprehension and integration of information.[145]

Perhaps the biases in probability and frequency judgment that have been attributed to the availability heuristic[146] may be due, at least in part, to affect. Availability may work not only through *ease* of recall or imaginability, but because remembered and imagined images come tagged with affect. For example, Lichtenstein, Slovic, Fischhoff, Layman and Combs invoked availability to explain why judged frequencies of highly publicized causes of death (e.g., accidents, homicides, fires, tornadoes and cancer) were relatively overestimated and underpublicized causes (e.g., diabetes, stroke, asthma, tuberculosis) were underestimated.[147] The highly publicized causes appear to be more affectively charged, that is, more sensational, and this may account both for their prominence in the media and their relatively overestimated frequencies.

III. Further Evidence

The studies described above represent only a small fraction of the evidence that can be marshaled in support of the affect heuristic. Although we have developed the affect heuristic to explain findings from studies of judgment and decision-making (e.g., the inverse relationship between perceived risks and benefits), one can

142. *See* Alan Sanfey & Reid Hastie, *Does Evidence Presentation Format Affect Judgment? An Experimental Evaluation of Displays of Data for Judgments*, 9 Psychol. Sci. 99, 103 (1998).

143. *See* Nancy Pennington & Reid Hastie, *A Theory of Explanation-Based Decision Making*, *in* Decision Making in Action: Models and Methods 188, 194-96 (G. Klein et al. eds., 1993).

144. *See* Vincent Price & Edward J. Czilli, *Modeling Patterns of News Recognition and Recall*, 46 J. Comm. 55 (1996).

145. *See* Keith Oatley, *A Taxonomy of Literary Response and a Theory of Identification in Fictional Narrative*, 23 Poetics 53 (1994).

146. *See* Amos Tversky & Daniel Kahneman, *Availability: A Heuristic for Judging Frequency and Probability*, 5 Cognitive Psychol. 207 (1973).

147. *See* Sarah Lichtenstein et al., *Judged Frequency of Lethal Events*, 4 J. Experimental Psychol.: Hum. Learning & Memory 551 (1978).

find related proposals in the literature of marketing and social cognition. For example, Wright proposed the "affect-referral heuristic" as a mechanism by which the remembered affect associated with a product influences subsequent choice of that product.[148]

Attitudes have long been recognized as having a strong evaluative component.[149] Pratkanis defined attitude as "a person's evaluation of an object of thought."[150] He went on to propose that attitudes serve as heuristics, with positive attitudes invoking a favoring strategy toward an object and negative attitudes creating disfavoring response.[151] More specifically, he defined the "attitude heuristic" as the use of the evaluative relationship as a cue for assigning objects to a favorable class or an unfavorable class, thus leading to approach or avoidance strategies appropriate to the class.[152] Pratkanis described numerous phenomena that could be explained by the attitude heuristic, including halo effects not unlike the consistency described earlier between risk and benefit judgments.[153]

Other important work within the field of social cognition includes studies by Fazio[154] on the accessibility of affect associated with attitudes and by Schwarz and Clore on the role of affect as information.[155]

Hsee and Kunreuther have demonstrated that affect influences decisions about whether or not to purchase insurance.[156] In one study, they found that people were willing to pay twice as much to insure a beloved antique clock (that no longer works and

148. *See* Peter Wright, *Consumer Choice Strategies: Simplifying Versus Optimizing*, 12 J. Marketing Res. 60 (1975); Michel T. Pham, *Representativeness, Relevance, and the Use of Feelings in Decision Making*, 25 J. Consumer Res. 144 (1998).

149. *See, e.g.*, Edwards, *supra* note 7.

150. Anthony R. Pratkanis, *The Cognitive Representation of Attitudes, in* Attitude Structure and Function 72 (Anthony R. Pratkanis et al. eds., 1989).

151. *See id.*

152. *See id.*

153. *See* Finucane et al., *supra* note 39.

154. *See* Russell H. Fazio, *Attitudes as Object–Evaluation Associations: Determinants, Consequences, and Correlates of Attitude Accessibility, in* Attitude Strength: Antecedents and Consequences 247 (Richard F. Petty & Jon A. Krosnick eds., 1995).

155. *See* Norbert Schwarz & Gerald L. Clore, *How Do I Feel About It? Informative Functions of Affective States, in* Affect, Cognition, and Social Behavior: New Evidence and Integrative Attempts (Klaus Fiedler & Joseph P. Forgas eds., 1988).

156. *See* Christopher K. Hsee & Howard Kunreuther, *The Affection Effect in Insurance Decisions*, 20 J. Risk & Uncertainty 141, 153-54 (2000).

cannot be repaired) against loss in shipment to a new city than to insure a similar clock for which one does not have any special feeling.[157] In the event of loss, the insurance paid $100 in both cases.[158] Similarly, Hsee and Menon found that students were more willing to buy a warranty on a newly purchased used car if it was a beautiful convertible than if it was an ordinary looking station wagon, even if the expected repair expenses and cost of the warranty were held constant.[159]

A study by Loewenstein and others provides a particularly thorough review and analysis of research that supports their "risk-as-feelings hypothesis," a concept that has much in common with the affect heuristic.[160] They present evidence showing that emotional responses to risky situations, including feelings such as worry, fear, dread or anxiety, often diverge from cognitive evaluations and have a different and sometimes greater impact on risk-taking behavior than do cognitive evaluations.[161] Among the factors that appear to influence risk behaviors by acting on feelings rather than cognitions are background mood,[162] the time interval between decisions and their outcomes,[163] vividness,[164] and evolutionary preparedness. Loewenstein and others invoke the evolutionary perspective to explain why people tend to react with little fear to certain types of objectively dangerous stimuli that evolution has not prepared them for, such as guns, hamburgers, automobiles, smoking and unsafe sex, even when they recognize the threat at a cognitive level.[165] Other types of stimuli, such as caged spiders, snakes or heights, which evolution may have prepared us to fear, evoke strong visceral responses even when we recognize them, cognitively, to be harmless.[166]

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157. *See id.* at 150-51.

158. *See id.* at 151.

159. *See* Christopher K. Hsee & S. Menon, *Affection Effect in Consumer Choices* (1999) (unpublished study).

160. *See* Loewenstein et al., *supra* note 102.

161. *See id.*

162. *See, e.g.*, Eric J. Johnson & Amos Tversky, *Affect, Generalization, and the Perception of Risk*, 45 J. Personality & Soc. Psychol. 20 (1983); Alice M. Isen, *Positive Affect and Decision Making*, *in* Handbook of Emotions 261 (Michael Lewis & Jeannette M. Haviland eds., 1993).

163. *See* George Loewenstein, *Anticipation and the Valuation of Delayed Consumption*, 97 Econ. J. 666 (1987).

164. *See* Hendrickx, *supra* note 141, at 55-56.

165. *See* Loewenstein et al., *supra* note 102.

166. *See id.*

Individual differences in affective reactivity also are informative. Damasio relied upon brain-damaged individuals, apparently lacking in the ability to associate emotion with anticipated outcomes, to test his somatic-marker hypothesis.[167] Similar insensitivity to the emotional meaning of future outcomes has been attributed to psychopathic individuals and used to explain their aberrant behaviors.[168] Using the Damasio card-selection task, Peters and Slovic found that normal subjects who reported themselves to be highly reactive to negative events made fewer selections from decks with large losing payoffs.[169] Conversely, greater self-reported reactivity to positive events was associated with a greater number of selections from high-gain decks.[170] Thus individual differences in affective reactivity appear to play a role in the learning and expression of risk-taking preferences.

IV. Implications for Law: The Rationality of Cigarette Smoking

I have, in Section II, provided a brief description of the experiential mode of thinking and its embodiment in "the affect heuristic." A large number of theoretical and empirical studies, conducted by a multidisciplinary cadre of scientists (from neurologists to social psychologists), have created a view of human rationality that is much more complex than the standard economic model. One might expect that such a broad theory of human thinking and rationality would relate to the law in many important ways and this, indeed, is being demonstrated. For example, Kahneman and colleagues have shown that monetary judgments as diverse as willingness to pay for the provision of a public good (e.g., protection of an endangered species) or a punitive damage award in a personal injury lawsuit seem to be derived from atti-

167. *See* Damasio, *supra* note 29.

168. *See* Robert D. Hare, *Psychopathy, Fear Arousal and Anticipated Pain*, 16 Psychol. Rep. 499 (1965); Christopher J. Patrick, *Emotion and Psychopathy: Startling New Insights*, 31 Psychophysiology 415 (1994).

169. *See* Ellen Peters & Paul Slovic, *The Springs of Action: Affective and Analytical Information Processing in Choice*, 26 Personality & Soc. Psychol. Bull. 1465 (2000).

170. *See id.*

tudes based on emotion rather than on indicators of economic value.[171]

In this section I shall discuss another important activity, cigarette smoking, the rationality of which has been under scrutiny by the law. For many years, law and economics have been brought to bear on this activity in a rather standard way. I shall draw upon our understanding of experiential thinking and the affect heuristic to document the inadequacies of the standard account.

A. *Do Cigarette Smokers Know the Risks?*

In numerous legal battles around the country, lawyers for the cigarette industry have been relying heavily on the argument that smokers know the health risks of cigarettes and are making a rational decision to smoke because the benefits to them outweigh the risks. Such "informed consumers," the lawyers claim, have no cause for complaint if they become ill.

Do individuals really know and understand the risks entailed by their smoking decisions? This question is particularly important in the case of young persons, because most smokers start during childhood and adolescence. After many years of intense publicity about the hazards of smoking cigarettes, it is generally believed that every teenager and adult in the United States knows that smoking is hazardous to one's health. Perhaps the most enthusiastic empirical demonstration of this "fact" comes from research on perceptions of risk from smoking reported in two papers and in a book by Viscusi.[172]

Viscusi aimed to address the following question: "at the time when individuals initiate their smoking activity, do they understand the consequences of their actions and make rational decisions?"[173] Viscusi further defined the appropriate test of rationality in terms of "whether individuals are incorporating the available information about smoking risks and are making sound

171. *See* Daniel Kahneman & Ilana Ritov, *Determinants of Stated Willingness to Pay for Public Goods: A Study in the Headline Method*, 9 J. Risk & Uncertainty 5 (1994); Daniel Kahneman et al., *Shared Outrage and Erratic Awards: The Psychology of Punitive Damages*, 16 J. Risk & Uncertainty 49, 49-51 (1998).

172. *See* W. Kip Viscusi, Smoking: Making the Risky Decision (1992) [hereinafter Viscusi I]; W. Kip Viscusi, *Do Smokers Underestimate Risk?*, 98 J. Pol. Econ. 1253 (1990); W. Kip Viscusi, *Variations in Risk Perceptions and Smoking Decisions*, 73 Rev. Econ. & Stat. 577 (1991).

173. Viscusi I, *supra* note 172, at 11.

decisions, given their own preference . . . ."[174] Viscusi even questioned whether one's future self may have different preferences, though he never tested this possibility: "Does the 20-year old smoker fully recognize how his or her future self will value health as compared with smoking?"[175] In keeping with the analytic mode of thinking, Viscusi's beginning smoker is portrayed as a young economist, weighing the benefits against the risks before making the fateful decision to light up: "one might expect some individuals to rationally choose to smoke if the weight they place on the benefits derived from smoking exceeds their assessment of the expected losses stemming from the risks . . . ."[176]

The data relied upon by Viscusi consisted of a national survey of more than 3,000 persons age 16 or older in which respondents were asked: "Among 100 cigarette smokers, how many do you think will get lung cancer because they smoke?"[177] Analyzing responses to this question, Viscusi found that people greatly overestimated the risks of a smoker getting lung cancer.[178] They also overestimated overall mortality rates from smoking and loss of life expectancy from smoking.[179] Moreover, young people (age 16–21) overestimated these risks to an even greater extent than did older people.[180] Perceptions of risk from smoking were also found to be predictive of whether and how much people smoked, for young and old alike.[181]

Viscusi argued that those data support a rational learning model in which consumers respond appropriately to information and make reasonable tradeoffs between the risks and benefits of smoking.[182] With respect to youth, he concluded that his findings "strongly contradict the models of individuals being lured into smoking at an early age without any cognizance of the risks . . . ."[183] Viscusi further concluded that young people are so well-

174. *Id.* at 12.
175. *Id.* at 119.
176. *Id.* at 139.
177. *Id.* at 64.
178. *See id.* at 68. The mean estimate was 43 of 100, compared to an actuarial value that Viscusi claimed was only 5-10 of 100. Similar overestimation was found in subsequent studies asking about lung cancer mortality rather than incidence.
179. *See* Viscusi I, *supra* note 172, at 77.
180. *See id.* at 72.
181. *See id.* at 99-100.
182. *See id.* at 100.
183. *Id.* at 143.

informed that there is no justification for informational campaigns designed to boost their awareness.[184] Finally, he observed that social policies that allow smoking at age eighteen "run little risk of exposing uninformed decision-makers to the potential hazards of smoking . . . ."[185] Viscusi's data and conclusions thus appear to lend support to the defense used by cigarette companies to fend off lawsuits from diseased smokers: These people knew the risks and made an informed, rational choice to smoke.[186]

Viscusi's arguments would seem, at first glance, to have merit from the standpoint of experiential thinking as well as from his analytic perspective. On experiential grounds, the well-known association of cigarettes with cancer, a dreaded disease, should create enough negative affect to stimulate a powerful drive to avoid this harmful behavior. Consistent with this view, many people do decide not to smoke or to quit smoking. The minority who initiate smoking or maintain the habit may also be doing so on the basis of informed experiential or analytic thinking that has led them to conclude that the benefits outweigh the risks.

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184. *See id.* at 143-44.

185. Viscusi I, *supra* note 172, at 149.

186. Viscusi interpreted his findings as follows: "there is substantial evidence that individuals make tradeoffs with respect to smoking risks and other valued attributes. This behavior is consistent with . . . models of rational behavior . . . ." *Id.* at 144; "it is unlikely that smoking rates greatly exceed what would prevail in a fully informed market context." *Id.*

Other scholars, quoted on the dust jacket of the book, bought Viscusi's argument. For example, Alan Schwartz of Yale Law School stated:

> This book combines two disciplines, cognitive psychology and the economics of risk, to make an important contribution to the smoking debate. Viscusi shows that persons in all age groups overestimate smoking risks, as theory predicts, and that persons behave rationally respecting the smoking decision given their perception of the facts. After these findings, the smoking decision can justifiably be regulated only in consequence of third party effects, not because consumers make poor health choices.

Id. Also, Robert D. Tollison of George Mason University stated:

> Viscusi's book will provide the intellectual basis and framework for a long overdue reassessment of the role of government in protecting consumers and workers from certain types of risky behavior. It should come as no surprise that the government has once again been overzealous in their protection of consumers and workers from the dangers of smoking by mandating hazard warnings on packages, restricting television advertising and imposing restrictions on where smoking is permitted. Viscusi analyzes the government's actions and offers us some interesting routes out of the swamp of overprotection.

Id.

On the other hand, there appear to be a number of ways in which reliance on experiential thinking might lead smokers to fail to appreciate risks and to act in ways that are not in their best interests. In particular, the exposure to information that Viscusi believes causes overestimation of risk cuts both ways. The major exposure comes from massive advertising campaigns designed to associate positive imagery and positive affect with cigarette smoking. A recent ad for Kool Natural Lights, for example, featured a picture of a beautiful waterfall on the cigarette package. In addition, the word "natural" appears 13 times in the ad.

More subtle than the content of cigarette ads is the possibility that the "mere exposure effect" resulting from viewing them repeatedly also contributes to positive affect and liking for smoking in general and for specific brands of cigarettes in particular.[187] Through the workings of the affect heuristic, this positive affect would be expected not only to enhance one's attraction to smoking but also to depress the perception of risk.[188]

Within the experiential mode of thinking, "seeing is believing," and young people in particular are likely to see little or no visible harm from the smoking done by their friends or themselves. In this sense, smoking risks are not "available."[189]

Viscusi's arguments are also lacking in a number of other respects, as I have indicated in several previous studies.[190] Here I shall focus on two failings, both of which relate to experiential thinking. The first reflects the repetitive nature of cigarette smoking and the cumulation of risk over a long period of time. The second reflects young people's failure to appreciate the risks of becoming addicted to smoking.

"Cigarette smoking is a behavior that takes place one cigarette at a time."[191] A person smoking one pack of cigarettes every day

187. *See* Bornstein, *supra* note 42; Zajonc, *supra* note 41.

188. *See* Finucane et al., *supra* note 39.

189. *See* Tversky & Kahneman, *supra* note 146.

190. *See* Paul Slovic, *Do Adolescent Smokers Know the Risks?*, 47 Duke L.J. 1133 (1998); Paul Slovic, *What Does it Mean to Know a Cumulative Risk? Adolescents' Perception of Short-Term and Long-Term Consequences of Smoking*, 13 J. Behav. Decision Making 259 (2000) [hereinafter Slovic I]; Paul Slovic, *Rejoinder: The Perils of Viscusi's Analysis of Smoking Risk Perceptions*, 13 J. Behav. Decision Making 273 (2000).

191. Slovic I, *supra* note 190, at 261.

for forty years "lights up" about 300,000 times.[192] Although most smokers acknowledge a high degree of risk associated with many years of smoking, many believe they can get away with some lesser amount of smoking before the risk takes hold.[193] Many young smokers, in particular, believe that smoking for only a few years poses negligible risk.[194] They are more prone to believe in the safety of short-term smoking than are young nonsmokers.[195]

Belief in the near-term safety of smoking combines in an insidious way with a tendency for young smokers to be uninformed about, or underestimate, the difficulty of stopping smoking.[196] Recent research indicates that adolescents begin to show evidence of nicotine dependence within days to weeks of the onset of occasional use of tobacco.[197] Many young people regret their decision to start smoking and attempt to stop unsuccessfully.[198] The 1989 Teenage Attitudes and Practices Survey found that 74% of adolescent smokers reported that they had thought seriously about quitting and 49% had tried to quit in the previous six months.[199] A longitudinal survey conducted as part of the University of Michigan's Monitoring the Future Study found that 85% of high school seniors who occasionally smoked predicted that they probably, or definitely, would not be smoking in five years.[200] Thirty-two percent of high school seniors who smoked one pack of cigarettes per day made the same prediction.[201] However, in a follow-up study five to six years later, of those who had smoked at least one pack per day as seniors, only 13% had quit and 69% still smoked one pack or more per day.[202] Of those who smoked one to five cigarettes per day as

192. *See id.* at 1137.

193. *See id.* at 1137-38.

194. *See id.* at 1141.

195. *See id.* at 1138.

196. *See* Slovic I, *supra* note 190, at 264.

197. *See* Joseph R. DiFranza et al., *Initial Symptoms of Nicotine Dependence in Adolescents*, 9 Tobacco Control 313 (2000).

198. *See* Slovic I, *supra* note 190, at 264.

199. *See* Karen F. Allen et al., *Teenage Tobacco Use: Data Estimates from the Teenage Attitudes and Practice Survey, United States, 1989*, 14 Advance Data, No. 224 (1993).

200. *See* Slovic I, *supra* note 190, at 264.

201. *See id.*

202. *See id.* (citing Lloyd Johnston et al., National Survey Results on Drug Use From the Monitoring the Future Study (National Institute on Drug Abuse ed., 1993)); Centers for Disease Control and Prevention, Preventing Tobacco Use

seniors, only 30% had quit (60% had expected to do so) and 44% had actually increased their cigarette consumption.[203]

The belief pattern that emerges from these and various other studies is one in which many young smokers perceive themselves to be at little or no risk from each cigarette smoked because they expect to stop smoking before any damage to their health occurs.[204] In reality, a high percentage of young smokers continue to smoke over a long period of time despite the fact that they are certainly placed at risk by their habit.[205]

B. *New Data: The Dominance of Experiential Thinking*

Viscusi's arguments about perceptions of risk and the informed, choices made by smokers assume the preeminence of the analytic mode of thinking. Viscusi's beginning smoker is portrayed as a young economist, rationally weighing the benefits against the risks before making the fateful decision to start smoking. But the evidence for smokers' short-term perspectives and underestimation of the grip of addiction suggests that experiential and affective forces are leading many young people to make smoking decisions that they later regard as mistakes.

Evidence for this view comes from data recently collected in a national telephone survey of more than 3,500 individuals conducted on behalf of The Annenberg School for Communication in the Fall of 1999 and Winter of 2000.[206] Households were selected through random-digit dialing and, within the household, a resident aged 14 and older was selected randomly for the interview.[207] Young people were oversampled. Completed interviews were obtained for 2002 members of a "youth sample" ages 14-22 and 1504 members of an adult sample, ranging in age from 23-95.[208] Within the youth sample, there were 478 smokers and 1524 non-

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Among Young People: A Report of the Surgeon General, S/N 017-001-004901-0, U.S. Dep't of Health & Hum. Res. (1994).

203. *See id.*

204. *See* Slovic I, *supra* note 190, at 264.

205. *See id.*

206. *See infra* app., tbl.5.

207. *See id.*

208. *See id.*

smokers.[209] Among adults there were 310 smokers and 1194 nonsmokers.[210]

Recall that the experiential mode is automatic, feeling based and not always accessible to conscious awareness. People acting experientially may not sense that they are consciously deliberating. Experiential thinking is evident throughout the survey.[211] Almost 80% of the adult smokers surveyed answered "not at all" when asked if they thought about how smoking might affect their health when they first began to smoke.[212] Young smokers appeared more likely to have thought about health when they began to smoke, but their most frequent answer was still "not at all."[213] However, now that they smoke, most of these individuals say they do think about the health effects.[214] A substantial proportion of smokers also say that, since they have started smoking, they have heard of health risks they did not know about when they started.[215]

Most telling are the answers to questions 19e and 19f. Far more beginning smokers were thinking about "trying something new and exciting" than were thinking about health.[216] When asked how long they thought they would continue to smoke when they first started, the majority of young and older smokers said that they did not think about it.[217]

Our data indicate that most smokers neither want to continue smoking nor expect to do so.[218] The majority of adult and youth smokers have made more than one attempt to quit[219] and about 65% of the adults and 84% of the youth say they plan to quit.[220] Of those who plan to quit, about 78% of the adults and 72% of the youth plan to do so within the next year.[221] When asked whether

209. *See id.* A "smoker" was defined as someone who said they had smoked at least one cigarette within the past 30 days.
210. *See id.*
211. *See id.*
212. *See infra* app., tbl.5. (referring to question 19a).
213. *See id.*
214. *See id.* (referring to question 19c).
215. *See id.* (referring to question 19d).
216. *See id.* (referring to question 19e).
217. *See id.* (referring to question 19f).
218. *See infra* app., tbl.5.
219. *See infra* app., tbl.6.
220. *See infra* app., tbl.7 (referring to question 29).
221. *See id.* (referring to question 29a).

they would have successfully quit smoking if they were called again in a year, 78% of the adults and 83% of the teens said "yes."[222]

Tables 8 and 9 present the responses to these same three questions about quitting, conditioned by the number of past attempts to quit[223] and by the length of time the individual has been smoking.[224] In Table 8, we see that, except for adults who had never tried to quit, a substantial majority of smokers planned to quit[225] and to do so within the next year,[226] even though they had unsuccessfully attempted to quit a number of times before. Thus we see that, among youth who had attempted to quit ten or more times, 91.3% still planned to quit and 85.7% of those expected to do so in the first year.[227] This estimated one-year time line was lower (61.1%) when elicited in Question 29b, but it was still far greater than the "no" response (16.7%).[228]

Similar optimism about quitting was evident among long-time smokers.[229] Even among those who had been smoking for more than five years, 64% of adults and 80% of teens planned to quit, and most of these individuals planned to do so within the next year.[230] The median age of the adults who had been smoking for more than five years was forty-one, which makes it likely that they have actually been smoking for more than twenty years.[231] It is noteworthy that these older smokers were as optimistic as young smokers about quitting within the next year.[232]

Although we have seen above that most smokers were not thinking about health risks when they first began to smoke, some of those who were may have been reassured by the thought that there is little or no harm to smoking in the short-run.[233] Slovic observed this in a sample of high-school age smokers and the pre-

222. *See id.* (referring to question 29b).
223. *See infra* app., tbl.8.
224. *See infra* app., tbl.9.
225. *See id.* (referring to question 29).
226. *See id.* (referring to questions 29a & 29b).
227. *See id.* (referring to question 29a).
228. *See id.*
229. *See id.*
230. *See infra* app., tbl.9.
231. *See id.* Note that the longest time in the response options presented by the interviewer was "more than 5 years."
232. *See id.*
233. *See* Slovic I, *supra* note 190.

sent findings replicate this result.[234] When asked to "Imagine someone who starts to smoke a pack of cigarettes a day at age 16," 29.7% of adult smokers and 26.4% of teen smokers agreed with the statement: "There is usually no risk to the person at all for the first few years." Agreement was less among non-smokers (18.8% for adults and 20.6% for teens).

When asked "How long, if ever, do you think it takes for smoking to seriously harm the health of a new smoker?," 44.8% of adult smokers and 32.0% of teen smokers answered five years or more.

C. *Addiction*

Loewenstein has proposed a theoretical perspective that portrays addiction as an extreme form of a class of behaviors that are controlled by "visceral factors."[235] Visceral factors include drive states such as hunger, thirst, sexual desire, moods and emotions, physical pain and, for addiction, intense craving for a drug or cigarette.[236] From the experiential perspective, it is very difficult, if not impossible, to appreciate one's own susceptibility to visceral influences. As Loewenstein observes: "Unlike currently experienced visceral factors, which have a disproportionate impact on behavior, delayed visceral factors tend to be ignored or severely underweighted in decision-making. Today's pain, hunger, anger, etc. are palpable, but the same sensations anticipated in the future receive little weight."[237]

The survey provides abundant evidence regarding the difficulties of stopping smoking. First, as shown earlier, in Table 6, the majority of adult and young smokers have attempted to quit, usually more than once.[238] Second, despite their lack of success in quitting, most of these individuals plan to stop smoking in the near future.[239]

Another indication of the short-term perspective of smokers and their misperception of the ease of quitting comes from the finding that only 7.4% of the adult smokers and 4.8% of the teens ex-

234. *See id.* at 261-65.
235. *See* George Loewenstein, *A Visceral Account of Addiction*, *in* Getting Hooked: Rationality and Addiction (1999).
236. *See id.* at 239.
237. *Id.* at 240.
238. *See infra* app., tbl.6.
239. *See infra* app., tbls.7, 8 & 9.

pected to smoke for more than 5 years when they began,[240] yet 87.1% of these adults and 26.4% of these teens reported that they had now been smoking for more than 5 years.

When asked whether they consider themselves addicted to cigarettes, 76.4% of the adult smokers and 58.8% of the teens said yes.[241] The proportion of adults and teens who felt addicted increased sharply with the number of attempts to quit and length of time smoking.[242]

D. *Viscusi's Quantitative Risk Estimates Are Unreliable*

Viscusi has placed great weight in the validity of his quantitative questions about smoking risk perceptions. However, there are a number of reasons to be suspicious about the reliability of answers to his questions about the relative frequency of lung cancer among 100 smokers. First, he asks the respondent to estimate the risks to 100 smokers, not to oneself. Answers for oneself would likely be lower, as a result of optimism bias.[243] Second, Tversky and Koehler developed and tested a theoretical model, *support theory,* showing that respondents asked to judge the likelihood for one focal event (e.g., lung cancer) produce higher probabilities than respondents asked for judgments of the same event in the context of other alternative events.[244]

Third, we would expect that young smokers, as experiential rather than analytical thinkers who do not expect to be smoking much longer, would not be paying careful attention to tracking lung cancer rates among smokers. Hence they would not have a firm, quantitative estimate in their heads.

We tested these suspicions by first replicating Viscusi's line of questioning and then adding a variation in the question format along the line suggested by Tversky and Koehler's theory. Early in the survey, respondents were asked to "Imagine 100 cigarette smokers, both men and women, who smoked cigarettes their entire adult lives. How many of these 100 people do you think will die

240. *See infra* app., tbl.5.

241. *See infra* app., tbl.10 (referring to bottom row).

242. *See id.* (referring to questions 30 & 31).

243. *See* Neil D. Weinstein, *Accuracy of Smokers' Risk Perceptions*, 20 Annals Behav. Med. 135 (1998).

244. *See* Amos Tversky & Derek J. Koehler, *Support Theory: A Nonextensional Representation of Subjective Probability*, 101 Psychol. Rev. 547, 547-65 (1994).

from lung cancer?" This question was immediately followed by a similar question asking about the number of lung cancer deaths among 100 *non*-smokers. Next, a third question was presented, which asked for estimates of the number of deaths among the same 100 smokers from: a) automobile accidents; b) heart disease; c) stroke; d) lung cancer; and e) all other causes combined.

Table 11 presents the means and standard deviations of the estimates for lung cancer among the 100 smokers in the first and third questions.[245] The answers to the first question, about lung cancer alone, were in the range obtained in Viscusi's surveys, with estimates by the youth sample being larger than estimates by the adults (60.4 vs. 48.5).[246] However, the estimates for lung cancer decrease by more than 50% when made in the context of the other causes.[247] The proportion of respondents who reduced their first answer when given a small number of alternative causes of death in Question 3 was 72.6% (adults) and 80.9% (youth).[248] Furthermore, the correlation between the two estimates, a form of reliability, was very low; only .33 for the adults and .19 for the younger respondents.[249] These results thus replicate and extend findings obtained earlier with a sample of university students.[250]

These data indicate that our respondents, young and old alike, do not have reliable quantitative knowledge about smoking risks. One can get almost any estimate one wishes for lung cancer (or other smoking-induced causes of death) simple by varying the number of other causes that are also being judged. This conclusion is consistent with other theoretical and empirical research demonstrating the dependence of quantitative judgments such as these on the form of the question and response scale.[251] It is also consistent with the view that smokers are not thinking analytically about the risks they are taking.

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245. *See infra* app., tbl.11.

246. *See id.*

247. *See id.*

248. *See id.*

249. *See infra* app., figs.4 & 5.

250. *See* Paul Slovic, *Rejoinder: The Perils of Viscusi's Analysis of Smoking Risk Perceptions*, 13 J. Behav. Decision Making 273 (2000).

251. *See, e.g.*, Tversky & Koehler, *supra* note 244; Slovic et al., *supra* note 22.

E. *The Failure of Rationality*

Viscusi argued that smokers were making an informed, rational decision to smoke.[252] Viscusi asserted that the key question pertaining to the failure of the rational model is one in which an individual, asked to go back in time to the moment of decision and repeat the choice, would not make the same choice again.[253]

Slovic asked that question in a small survey of smokers at the University of Oregon and in a poll of Oregon residents. The new telephone survey asked it as well of all smokers: "If you had it to do over again, would you start smoking?"[254]

The results, shown in Table 12, are clear. More than 85% of adult smokers and about 80% of teen smokers answered "no."[255] Moreover, the pattern of responses shown in the table was similar for both young and old smokers.[256] The more they felt addicted to cigarettes, the more often they had tried to quit, the longer they had been smoking, and the more cigarettes they were smoking per day, the more likely they were to say "no."[257]

Recall Viscusi's central question: "at the time when individuals initiate their smoking activity, do they understand the consequences of their actions and make rational decisions?"[258] The data presented here indicate that the answer to this question is "no."[259] Most beginning smokers do not appreciate how their future selves will perceive the risks from smoking and value the tradeoff between health and the need to smoke.[260]

This is a strong repudiation of the model of informed rational choice. It fits well with the findings indicating that smokers give little conscious thought to risk when they begin to smoke.[261] They appear to be lured into the behavior by the prospects of fun and

252. *See* Viscusi I, *supra* note 172.

253. *See* W. Kip Viscusi, *Deposition in the Matter of R. J. Reynolds Tobacco Matter*, No. D09285, Sept. 24, 1998.

254. Slovic, *supra* note 250.

255. *See infra* app., tbl.12.

256. *See id.*

257. The perception that smoking was risky to one's health also correlated significantly with the "no" response for both young and adult smokers.

258. Viscusi, *supra* note 172.

259. *See id.*

260. *See id.*

261. *See id.*

excitement.[262] Most begin to think of risk only after starting to smoke and gaining what to them is new information about health risks.[263]

The increased likelihood of repudiating the earlier decision, exhibited by those who have been smoking for the longest time, those who are currently smoking the most cigarettes, those who perceive themselves at high risk from smoking, those who have tried most often to quit, and those who acknowledge their addiction, paints a sad portrait of individuals who are unable to control a behavior that they have come to recognize as harmful.

These disturbing findings underscore the distinction that behavioral decision theorists now make between decision utility and experience utility.[264] This distinction arises from numerous studies of persons experiencing very good outcomes (e.g., winning the lottery) or very bad ones (e.g., becoming paraplegic, testing positive for HIV). Winning the lottery leaves people much less happy than expected and people adjust to being paraplegic or HIV positive much better than expected.[265] In the case of smoking, the discrepancy between decision utility and experience utility underscores the veracity of Loewenstein's visceral account of addiction.

V. Conclusion: Rational Actors and Rational Fools

We can see now that the central question underlying this Symposium: "Rational Actors or Rational Fools?" was oversimplified. Rationality is not only a product of the analytical mind, but of the experiential mind as well. As Damasio observed:

> The strategies of human reason probably did not develop, in either evolution or any single individual, without the guiding force of the mechanisms of biological regulation, of which emotion and feeling are notable expressions. Moreover, even after reasoning strategies became established . . . their ef-

262. *See id.*

263. *See id.*

264. *See* Daniel Kahneman, *New Challenges to the Rationality Assumption*, 3 Legal Theory 105 (1997); Daniel Kahneman & Jackie Snell, *Predicting a Changing Taste: Do People Know What They Like?*, 5 J. Behav. Decision Making 187 (1992); George Lewenstein & David Schkade, *Wouldn't It Be Nice? Predicting Future Feelings*, *in* Well-Being: The Foundations of Hedonic Psychology 85-105 (Daniel Kahneman et al. eds., 1999).

265. *See* Philip Brickman et al., *Lottery Winners and Accident Victims: Is Happiness Relative?*, 36 J. Personality & Social Psychol. 917 (1978).

> fective deployment probably depends, to a considerable extent, on a continued ability to experience feelings.[266]

Ironically, the perception and integration of affective feelings, within the experiential system, may be the kind of high-level maximization process postulated by economic theories since the days of Jeremy Bentham. These feelings form the neural and psychological substrate of utility. In this sense, the affect heuristic enables us to be rational actors in many important situations. But not in all situations. It works beautifully when our experience enables us to anticipate accurately how much we will like the consequences of our decisions. It fails miserably when the consequences turn out to be much different in character than we anticipated.

In the latter situations, the Rational Actor becomes the Rational Fool.

266. Damasio, *supra* note 29, at xii.

APPENDIX

TABLE 1
TWO MODES OF THINKING. COMPARISON OF THE EXPERIENTIAL AND RATIONAL SYSTEMS[267]

Experiential System	Rational System
1. Holistic	1. Analytic
2. Affective: Pleasure-pain oriented	2. Logical: Reason oriented (what is sensible)
3. Associationistic connections	3. Logical connections
4. Behavior mediated by "vibes" from past experiences	4. Behavior mediated by conscious appraisal of events
5. Encodes reality in concrete images, metaphors, and narratives	5. Encodes reality in abstract symbols, words, and numbers
6. More rapid processing: Oriented toward immediate action	6. Slower processing: Oriented toward delayed action
7. Self-evidently valid: "experiencing is believing"	7. Requires justification via logic and evidence

TABLE 2
IMAGES, RATINGS AND SUMMATION SCORES FOR ONE RESPONDENT[268]

Stimulus	Image number	Image		Image rating
SAN DIEGO	1	very nice		2
SAN DIEGO	2	good beaches		2
SAN DIEGO	3	zoo		2
SAN DIEGO	4	busy freeway		1
SAN DIEGO	5	easy to find way		1
SAN DIEGO	6	pretty town		2
			Sum =	10
DENVER	1	high		2
DENVER	2	crowded		0
DENVER	3	cool		2
DENVER	4	pretty		1
DENVER	5	busy airport		-2
DENVER	6	busy streets		-2
			Sum =	1

Note. Based on these summation scores, this person's predicted preference for a vacation site would be San Diego.

267. *See* Epstein, *supra* note 25.
268. *See* Slovic et al., *supra* note 58.

TABLE 3
ATTRIBUTES OF TWO DICTIONARIES IN HSEE'S STUDY[269]

	Year of publication	Number of entries	Any defects?
Dictionary A	1993	10,000	No, it's like new
Dictionary B	1993	20,000	Yes, the cover is torn; otherwise it's like new

TABLE 4
PROPORTION DOMINANCE AND AIRPORT SAFETY

Saving a percentage of 150 lives receives higher support ratings than does saving 150 lives.

	Potential Benefit				
	Save 150 lives	Save 98%	Save 95%	Save 90%	Save 85%
Mean support[a]	10.4	13.6	12.9	11.7	10.9
Median[a]	9.8	14.3	14.1	11.3	10.8
% of ratings ≥ 13	37	75	69	35	31

[a] cell entries in these rows describe mean and median responses to the question: "How much would you support this proposed measure to purchase the new equipment?" (Critics argue that the money spent on this system could be better spent enhancing other aspects of airport safety). The response scale ranged from 0 (would not support at all) to 20 (very strong support). An overall ANOVA resulted in $F_{4,200} = 3.36$, $p = .01$. The save 98% and save 95% conditions were both significantly different from the save 150 lives condition at $p < .05$, Tukey HSD test.

269. *See* Hsee I, *supra* note 78.

TABLE 5
PERCEPTIONS AND EXPECTATIONS OF THE BEGINNING SMOKER

			Adult Smokers N = 310	Young Smokers N = 478
19a.	When you first started to smoke, how much did you think about how smoking might affect your health?	A lot	5.8	13.8
		A little	15.5	38.9
		Not at all	78.4	46.9
		Don't Know/refuse	0.3	0.4
19c.	How much do you think about the health effects of smoking now?	A lot	53.9	54.6
		A little	32.9	36.0
		Not at all	12.3	8.6
		Don't Know/refuse	1.0	0.8
19d.	Since you started smoking, have you heard of any health risks of smoking that you didn't know about when you started?	Yes	54.8	33.5
		No	43.9	66.3
		Don't Know/refuse	1.3	0.2
19e.	When you first started smoking, did you think more about how smoking would affect your future health or about how you were trying something new and exciting?	Thought about future health	4.5	21.1
		Thought about trying something new and exciting	67.4	58.0
		Other	18.1	11.5
		Don't know/refuse	10.0	9.4
19f.	When you first started smoking, how long did you think you would continue to smoke?	A few days	3.9	9.4
		A few months	4.5	6.5
		Less than 1 year	3.2	7.7
		1-5 years	4.8	10.2
		More than 5 years	7.4	4.8
		Didn't think about it	75.8	61.3
		Don't know/refuse	0.3	0.0

TABLE 6
ABOUT HOW MANY TIMES, IF ANY, HAVE YOU TRIED TO QUIT SMOKING?

	Adult Smokers (N = 310)	Young Smokers (N = 478)
0	21.3	38.1
1	16.8	21.8
2-4	38.4	30.1
5-9	11.6	4.0
10+	9.4	4.8
Don't know/refuse	2.6	1.3

TABLE 7
PERSPECTIVES ON QUITTING SMOKING

		Adult Smokers N = 310	Young Smokers N = 478
29. Do you plan to quit smoking?	Yes	65.5	83.7
	No	30.6	13.2
	Don't Know/refuse	3.9	3.1
29a. When are you planning to quit?	Next 6 months	49.3	57.0
	6 months to 1 year	24.1	19.5
	More than 1 year from now	15.8	18.2
	Don't Know/refuse	10.8	5.2
29b. If we called you in a year, would you guess that you would have successfully quit smoking?	Yes	77.8	83.3
	No	11.4	9.8
	Don't Know/refuse	10.7	6.9

TABLE 8
PLANS TO QUIT SMOKING BY NUMBER OF PAST ATTEMPTS TO QUIT

			Number of Attempts to Quit							
			0		1-4		5-9		10+	
			AS	YS	AS	YS	AS	YS	AS	YS
Q29	Do you plan to quit smoking?	Yes	39.4	74.7	67.8	89.5	88.9	100.0	79.3	91.3
		No	54.6	22.0	28.1	7.7	11.1	0.0	20.7	8.7
		Don't know	6.1	3.3	4.1	2.8	0.0	0.0	0.0	0.0
Q29a	When are you planning to quit?	Next 6 mo.	38.5	56.6	46.6	55.0	62.5	57.9	52.2	76.2
		6 mo – 1 yr	26.9	15.4	27.6	23.0	18.8	21.0	17.4	9.5
		> 1 yr from now	15.4	23.5	17.2	16.3	15.6	15.8	8.7	9.5
		Don't know	19.2	4.4	8.6	5.9	3.1	5.3	21.7	4.8
Q29b	If called in a year, would you have quit?	Yes	88.2	86.7	81.4	85.0	69.2	66.7	56.2	61.1
		No	0.0	7.1	9.3	9.2	19.2	26.7	25.0	16.7
		Don't know	11.8	6.1	9.3	5.8	11.5	6.7	18.8	22.2

Note: AS represents adult smokers and YS represents young smokers.

TABLE 9
PLANS TO QUIT SMOKING BY LENGTH OF TIME SMOKING

			Length of time smoking							
			For month or less		About 1 year		1-5 years		> 5 years	
			AS	YS	AS	YS	AS	YS	AS	YS
Q29	Do you plan to quit smoking?	Yes	—	81.4	—	82.5	74.2	87.3	63.7	80.2
		No	—	15.2	—	14.3	25.8	11.0	32.2	15.9
		Don't know	—	3.4	—	3.2	0.0	1.8	4.1	4.0
Q29a	When are you planning to quit?	Next 6 mo.	—	85.4	—	55.8	39.1	51.8	50.0	54.5
		6 mo – 1 yr	—	6.2	—	28.8	17.4	21.6	25.6	16.8
		> 1 yr from now	—	2.1	—	7.7	17.4	22.1	15.7	23.8
		Don't know	—	6.2	—	7.7	26.1	4.5	8.7	5.0
Q29b	If called in a year, would you have quit?	Yes	—	90.9	—	86.4	92.3	81.5	75.4	80.6
		No	—	6.8	—	6.8	7.7	10.3	12.3	12.5
		Don't know	—	2.3	—	6.8	0.0	8.2	12.3	6.9

Note: AS represents adult smokers and YS represents young smokers.

TABLE 10
DO YOU CONSIDER YOURSELF ADDICTED TO CIGARETTES OR NOT?

			Adult Smokers			Young Smokers		
			Yes	No	Don't know	Yes	No	Don't know
Q30.	About how many times, if any, have you tried to quit smoking?	0	59.1	37.9	3.0	41.2	57.7	1.1
		1	76.9	23.1	0.0	56.7	43.3	0.0
		2-4	78.2	21.0	0.8	75.7	24.3	0.0
		5-9	91.7	8.3	0.0	73.7	26.3	0.0
		10+	93.1	6.9	0.0	91.3	8.7	0.0
Q31.	How long have you smoked?	Few months or less	—	—	—	3.4	96.6	0.0
		~ 1 year	—	—	—	33.3	65.1	1.6
		1-5 years	64.5	35.5	0.0	64.5	35.5	0.0
		> 5 years	79.6	19.6	0.7	88.1	11.1	0.8
	All Respondents		76.4	22.6	1.0	58.8	40.4	0.8

TABLE 11
JUDGED DEATHS FROM LUNG CANCER AMONG 100 SMOKERS

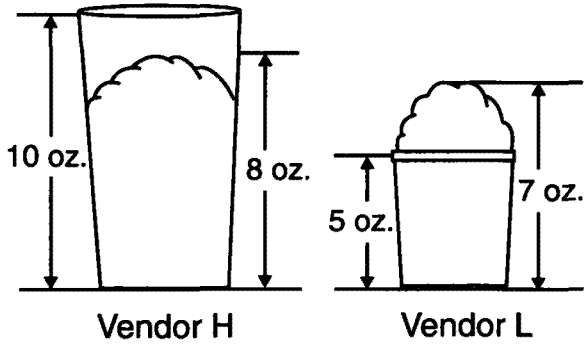
	Adult sample (N = 1416)			Youth sample (N = 2002)		
	Mean	s.d.		Mean	s.d.	
Question 1	48.5	27.4	r_{13} = .33	60.4	25.1	r_{13} = .19
Question 3	23.5	17.5		28.3	19.4	
% Q3 < Q1	72.6			80.9		

TABLE 12
SMOKING: WOULD YOU START AGAIN?

	Adult Smokers (N = 310)		Young Smokers (N = 478)	
	Yes	No	Yes	No
Overall	11.9	85.5	17.0	80.1
Do you consider yourself addicted to cigarettes?				
Yes	11.4	86.9	13.9	84.3
No	14.3	81.4	21.8	74.6
More than average	7.7	90.4	7.1	92.9
Same as average	11.1	85.6	15.3	80.9
less than average	16.2	83.8	20.4	77.0
Number of times tried to quit?				
0	27.3	66.7	22.5	73.1
1-4	9.4	88.3	14.5	83.9
5-9	8.3	91.7	10.5	84.2
10+	0.0	100.0	4.4	95.6
How long have you smoked?				
≤ few months	—	—	22.0	74.6
≈ 1 year	—	—	20.6	76.2
1-5 years	19.4	80.7	16.7	79.4
> 5 years	11.1	86.3	13.5	86.5
Cigarettes smoked per day last 30 days?				
< 1	16.1	83.9	25.3	69.5
1-5	10.5	89.5	18.9	77.5
6-10	10.0	88.0	19.4	79.6
11-14	11.1	86.1	13.4	83.6
15-19	15.4	82.0	5.9	91.2
20	10.4	85.1	7.0	93.0
> 20	11.4	86.4	12.1	87.9

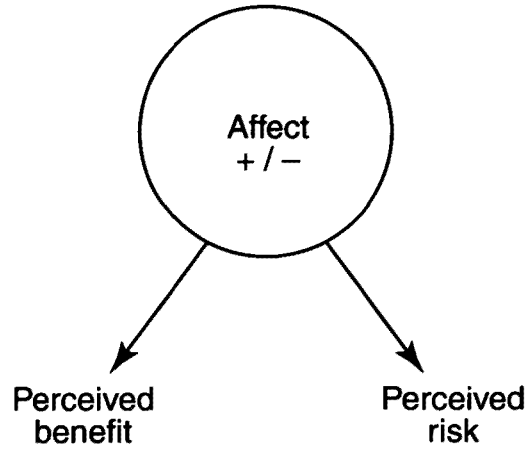
Notes: Same patterns for adults and teens with sense of being addicted, trying unsuccessfully to quit, having smoked for longer time, smoking more cigarettes/day. Sense of being addicted goes with trying unsuccessfully to quit, length of time smoking, and amount smoked per day.

FIGURE 1[270]



Stimuli in ice cream study by Hsee (1998). Participants were given the sizes of the cups and the amounts of ice cream.

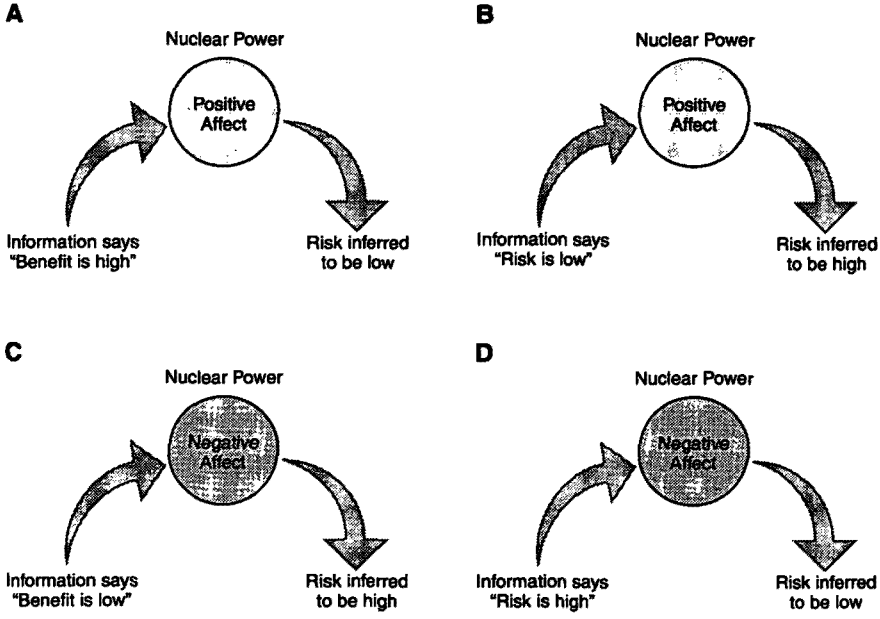
FIGURE 2[271]



A model of the affect heuristic explaining the risk/benefit confounding observed by Alhakami and Slovic (1994). Judgments of risk and benefit are assumed to be derived by reference to an overall affective evaluation of the stimulus item.

270. *See* Hsee I, *supra* note 78.
271. *See* Finucane et al., *supra* note 39.

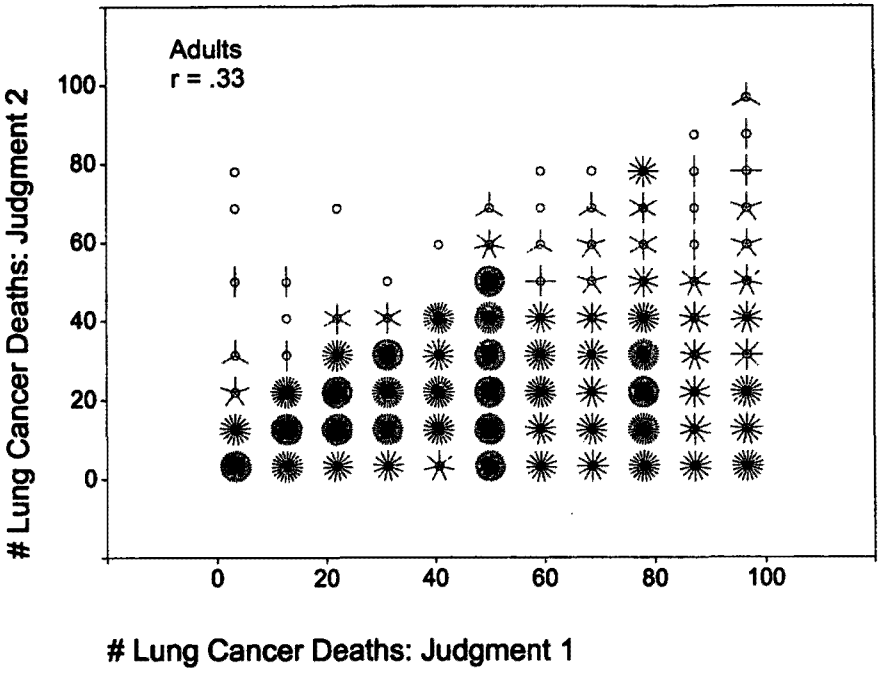
FIGURE 3[272]



Model showing how information about benefit (A) or information about risk (B) could increase the overall affective evaluation of nuclear power and lead to inference about risk and benefit that coincide affectively the information given. Similarly, information could decrease the overall affective evaluation of nuclear power as in C and D resulting in inferences that are opposite those in A and B.

272. *See id.*

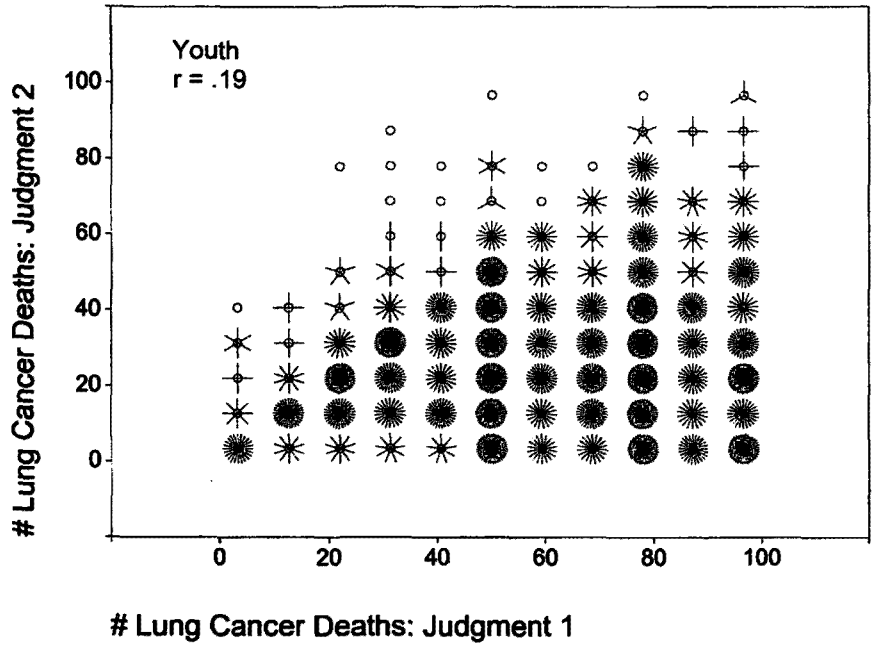
FIGURE 4



Sunflower plot showing the relationship between adult respondents' estimates of lung cancer deaths among 100 smokers. Judgment 1 asked only about lung cancer. Judgment 2 asked about lung cancer and other causes of death. Open circles represent 1 respondent. Multiple cases at a point are represented by the number of petals on the sunflower.


N = 39

FIGURE 5



Sunflower plot showing the relationship between young respondents' estimates of lung cancer deaths among 100 smokers. Judgment 1 asked only about lung cancer. Judgment 2 asked about lung cancer and other causes of death. Open circles represent 1 respondent. Multiple cases at a point are represented by the number of petals on the sunflower.

 N = 39