

# THE FEELING OF RISK

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New Perspectives on Risk Perception

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**Paul Slovic**



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*Paul Slovic*



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# Acronyms and Abbreviations

ANOVA	analysis of variance
ATSDR	Agency for Toxic Substances and Disease Registry
CA	completely avoidant
FDA	Food and Drug Administration
FTP	future time perspective
GMO	genetically modified organism
IRSA	Industrial Relations and Social Affairs
LULU	locally unwanted land-use
MANOVA	multivariate analysis of variance
NCA	not completely avoidant
NIMBY	not in my back yard
NIMTOF	not in my term of office
NRC	National Research Council
ppm	parts per million
RT	response time
SARF	social amplification of risk framework
SWL	subjective well-being
SUNY	State University of New York
UEA	University of East Anglia
USDHHS	US Department of Health and Human Services
USEPA	US Environmental Protection Agency





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Once again, I dedicate this book to Roz Slovic, a remarkable woman who has been at my side since 1959, and to our children, Scott, Steven, Lauren, and Daniel. Scott and Lauren have even written papers with me, one of which appears in this volume.

Paul Slovic  
Eugene, Oregon  
June, 2010



# Introduction and Overview

My earlier book, *Perception of Risk* (Slovic, 2000a), presented a selection of articles describing a 25-year programme of research that took place during the latter part of the 20th century. The present book, *The Feeling of Risk*, picks up where the last one left off, and describes the extension of risk-perception research into the first decade of the new century.

## Risk as feelings

Although the present book follows in the same tradition as the first book, centred around the ‘psychometric paradigm,’ there are clear new paths with both theoretical and practical implications. The last chapter of Slovic (2000a) by Finucane et al introduced the *affect heuristic*, a cognitive process in which people look to their positive and negative feelings as a guide to their evaluation of an activity’s risks and benefits. According to this view, information must convey emotion or feeling to be meaningful. This general notion, ‘risk as feelings,’ has continued to play an important role in research and has been highlighted in the title of the present volume and in the first section of the book.

Before launching into the specific contents of *The Feeling of Risk*, I would like to reminisce a bit about the long journey that led to my interest in this topic.

I was enticed to begin my study of risk in 1959. My first mentor, Clyde Coombs, gave me a draft of his paper using choices among gambles as a way to test the theory that people choose the gamble with the highest expected value (the sum over outcomes of the probability times the value of the outcome; Coombs and Pruitt, 1960). I was captivated by the idea that psychologists could do research with gambles and my first study was designed to replicate and extend Coombs’ experiment. Close to 50 years later, I find myself still doing research on simple gambles (see Chapter 1).

In 1959, there was little consideration of the possibility that feelings might play a role in people’s judgements and decisions about risk. An important paper by my second mentor, Ward Edwards, introduced psychologists to the ‘theory of decision making’ (Edwards, 1954). The focus was on an ideal decision maker, ‘economic man,’ who was completely informed, infinitely sensitive, and rational in the sense of making choices that maximized expected value (what Coombs was

testing) or a subjective version of value, expected utility. Edwards, like Coombs, questioned these assumptions as accurate descriptions of how people actually behave and he encouraged psychologists to conduct empirical research to test the economic theories. To be sure, Edwards pointed out that the concept of utility, as originally conceived by Jeremy Bentham (1789/1823), centred around the pleasure or pain-giving properties of an object. Edwards also noted the similarity of the notion of utility to the notion of valence espoused by social psychologist Kurt Lewin (1946). Thus, said Edwards (1954), ‘psychologists might consider the experimental study of utilities to be the experimental study of valences’ (p389).

Researchers inspired by Edwards began to study utility as an expression of value that could be measured by observing choices, with little regard for the underlying psychological processes. The theories of this era described conscious, deliberate and rather mechanical processing of probabilities and payoffs.

A major change in direction occurred around 1970, when pioneering studies by Amos Tversky and Danny Kahneman began to shed light on fascinating mental strategies called ‘heuristics’ that could explain people’s judgements of probability and their risk-taking decisions (Kahneman et al, 1982). For example, in some situations people seemed to be judging the probability of an event by the ease with which past instances of the event could be recalled or the ease with which the event could be imagined, a process named the *availability heuristic*. Further studies uncovered situations in which people judged probability by the extent to which an event was similar to its parent population, a process named the *representativeness heuristic*. Studies of choice uncovered other mental strategies; elimination by aspects, choosing according to the most important attribute, and so on.

I recall, in the midst of this growing collection of heuristic strategies, wondering how people decided when it was safe to cross a busy street. Certainly they were not calculating probabilities and utilities or their summed products, and the known judgement heuristics did not seem to offer any insight.

Some years later, I think I know the answer. The information available to us conveys positive and negative feelings that we rely upon when deciding when to cross the street or, indeed, when making any decisions involving risk. My first glimmer of this occurred one day when my car ran out of gas on a busy freeway. I had to cross the freeway on foot to get to the gas station. I surveyed the traffic coming toward me at high speed, trying to assess a safe distance to begin the crossing. Several times I took a few steps into the road only to jump back to the curb when the distance to the nearest car closed so fast as to send a chilling fear through my body. Only when my emotions remained calm as I began and continued the crossing did I proceed the whole way. No numerical calculations aided me; only my feelings.

Although this experience may have primed me to be receptive to the idea of risk as feelings at some later date, it did little to change my research, which continued to examine rather deliberate, mechanistic strategies for processing information.

The change in my thinking came gradually. My colleagues and I were asked by officials of the State of Nevada to advise them about the potential for adverse

economic impacts to occur in southern Nevada if the government decided to locate a repository for storing high-level nuclear waste 90 miles from Las Vegas. We knew we could ask people whether such a facility would deter them from coming to Nevada for recreation, or to retire or start a business. We also knew that the answers might not be trustworthy. A previous survey had found that people insisted they would stop swimming at a popular beach if a nuclear power plant were located nearby. The plant was built. No decline was observed in attendance at the beach.

Clearly survey questions are limited in their ability to forecast actual behaviours, especially with regard to a unique facility with which no one has had any experience, and in response to events that will take place far into the future. For several decades marketers had been assessing imagery and associations to consumer products to figure out how to make their products maximally appealing. Following the marketing approach and borrowing a method for studying imagery developed by Szalay and Deese (1978), we first tested whether we could predict people's preferences for visiting cities and states by eliciting images and associations to those places along with the feelings attached to those responses: for example, What word or phrase comes to mind when you hear the word 'Colorado'? It worked: we could predict a person's location preferences by the rated favourability or unfavourability of the images and associations linked to those places. We also found that a nuclear waste repository evokes many strongly negative images, consistent with perceptions of extreme risk and stigmatization. We advised the state that there was a real possibility that, to the extent that adverse events and publicity linked Nevada with nuclear waste (highly negative imagery), visitation to the state would probably be reduced.

We also began appreciating the link between risk and feelings that was being demonstrated in other studies. Our earliest perception studies had found that perceived risk and acceptable risk were most closely associated with the feelings of dread evoked by a hazard (Fischhoff et al, 1978). Another important early finding was that perceived risk and perceived benefit were inversely correlated across diverse hazards. The relevance of this inverse relationship for risk as feelings became clear to us only some 15 years later when my student, Ali Alhakami, decided to investigate it for his doctoral thesis. He found that the extent of this inverse relationship was related to the degree to which people judged an activity as good or bad (Alhakami and Slovic, 1994). This insight, supported further by controlled laboratory experiments (Finucane et al, 2000a), became the basis for the affect heuristic (Slovic et al, 2002), a model asserting that feelings serve as an important cue for risk/benefit judgements and decisions. If we like an activity, we tend to judge its benefits as high and its risks as low; if we dislike it, we judge it the opposite – low benefits and high risk. These inversely structured judgements may not correspond at all to the environment where risks and benefits tend to be positively correlated across activities.

Another important step in the development of risk as feeling came from a dissertation by Alida Benthin (Benthin et al, 1993), who used imagery and associations to study adolescents' perceptions of risk and benefit associated with a

variety of behaviours known to be dangerous to youth, such as smoking, drinking, marijuana and sexual intercourse, or health-enhancing (exercise and seat belts). Positive and negative image scores were found to be highly predictive of engagement in the target behaviours. Images and associations produced by frequent participants in an activity were much more favourable than associations produced by non-participants.

These ideas and findings were the scaffolding upon which the notion of risk as feelings was constructed. We soon began seeing links to many other findings in the risk and decision-making literature, such as the discovery by Chris Hsee and colleagues that information had to be evaluable (in the sense of conveying feelings) in order to be useful for judgements and decisions (Hsee, 1996b). An earlier finding by Slovic et al (2000b), regarding the different response to risk expressed as a frequency such as 1 in 10 vs. a risk expressed as a percentage such as 10 per cent, could be linked to images and feelings created by the frequency format: ‘Who is the 1 in the 1 of 10? Is she doing something bad?’

Important influences also came from connecting the work of many other theorists during the past half century. Charles Osgood (Osgood et al, 1957) demonstrated the importance of positive and negative affect for understanding the meaning of words. Affect was shown to be an important factor for explaining animal learning studies (Mowrer, 1960a, b), for motivating and guiding all rational human behaviour (Damasio, 1994), and for helping to explain the very nature of human thinking (Berkowitz, 2000). At about the same time that my colleagues and I were integrating much of this work into our review paper ‘The Affect Heuristic’ (Slovic et al, 2002), George Loewenstein and colleagues crafted a similar story and gave us the rubric ‘Risk as Feelings’ in their excellent review article (Loewenstein et al, 2001).

So, in this way, over many years, stimulated by personal experiences and by the findings from diverse studies, I have come to appreciate the important role that feelings play in guiding human behaviour in general and risk perceptions and risk decisions in particular.

With this as background, let’s examine Part I of the present book, illustrating the variety of risk judgements and decisions that have been investigated recently through the lens of the affect heuristic and risk as feelings. The first chapter, by Bateman et al, shows that 50 years after beginning to study people’s judgements of gambles, my colleagues and I found that there is still something that can be learned from this experimental paradigm. We focus on a very simple prospect, offering a 7/36 chance to win \$9, otherwise win nothing. We find, consistent with Hsee’s notion of evaluability, that even a very familiar outcome such as winning \$9 is not very evaluable. We lack a firm feeling of how good or bad \$9 is in this context. As a result, it carries little weight in the judgement of the gamble. But we can inject positive feeling into the \$9 by changing the other outcome in the gamble to lose 5¢. The \$9 win now ‘comes alive with feeling,’ looking very good in comparison to the small loss. It is evaluable (good) and carries weight in the judgement, thus making the gamble with a small loss more attractive than the gamble with no loss.

The second chapter demonstrates that feelings are important in determining our reactions to risks from a broad range of personal or societal threats. Building on the distinction between experiential and analytic thinking about risk, Slovic et al demonstrate ways that emotional reactions (risk as feelings) are associated with vividness of imagery, proximity in time, and other variables that play a minimal role in analytic evaluations. The difference between analytic and experiential reactions poses a dilemma for policy makers who are urged to follow deliberative approaches (e.g. cost–benefit analysis) that act as a check against unwarranted fears (e.g. Sunstein, 2005) but are also advised to respect the public’s sensitivity to important value-laden considerations that are often ignored in expert deliberations (e.g. National Research Council [NRC], 1996). This dilemma is explored in depth in Chapter 12 by Kahan et al.

An important chapter in Slovic (2000a) by Fetherstonhaugh et al (1997) documented a form of insensitivity to the value of human life that parallels the insensitivity observed in early psychophysical studies of sensory perceptions. Just as a fixed increase in light energy leads to a greater increase in perceived brightness when the original intensity is small than when it is large, saving a fixed number of lives seems more valuable when fewer lives are at risk to begin with – a form of ‘psychophysical numbing.’ Subsequent research has linked this numbing to a limitation in our ability to ‘feel the meaning’ in large numbers. Chapters 3, 4, 5 and 6 describe studies attempting to better understand the importance of feelings in motivating decisions to help people in need.

The study by Dickert and Slovic (Chapter 3) demonstrates the role that attention plays in the generation of feelings toward people who are at risk. One experiment shows that sympathy toward a child in need is reduced when that child’s image is presented in the context of distracting images. A second study finds that sympathy judgements made when the child’s image is in view are greater than those made from a memory of the child’s image.

The research described by Small, Loewenstein and Slovic in Chapter 4 shows that donations to a starving child in Africa were greatly reduced when potential donors were informed that this child was one of millions in need. Other research demonstrates that people help others, in part, to make themselves feel good (e.g. Andreoni, 1990). The data in Chapter 4 suggest that making donors aware of needy persons ‘out of reach’ may trigger negative feelings that counter the good feelings that come from giving aid. This is non-rational. We should not be deterred from helping those we can help by knowledge that there are others we cannot help.

Chapter 5 argues that our attitudes and behaviours towards saving lives are guided more by the feelings associated with our moral intuitions than by the reasoned actions that would result from a more deliberative form of thinking, moral judgement. Because moral intuition tends to be insensitive to large losses of life, moral judgement must be invoked to create laws and institutions dedicated to preventing and halting mass abuses of human beings, even when our feelings convey no sense of alarm.

Chapter 6 further explores the problem of insensitivity to mass tragedies. Paul Slovic describes the difficulties that people have in understanding the meaning of



large-scale human and environmental catastrophes represented numerically by dry statistics, ‘... human beings with the tears dried off.’ Scott Slovic, a writer and eco-critic, provides a brief introduction to ways that writers attempt to overcome this insensitivity and create feelings and meanings through stories. Stories have the power to help us understand larger, complex problems – including threats to the environment – that we cannot apprehend through quantitative information alone.

Chapter 7 argues that the initiation of cigarette smoking is based on experiential thinking (feelings) rather than an analytic evaluation of risk. It describes important ways in which young smokers fail to understand the risks they are taking. Chapter 8 applies the affect perspective to explaining the impact of the South Asia tsunami (in which 600 Swedes were killed) on the lives of the Swedish population. The study suggests that the negative affect elicited by thinking about a recent major natural disaster leads to a more pessimistic view of the future. The implications of this infusion of affect in everyday judgement are vast, perhaps influencing decisions about consumption, health, social interactions and finance.

## **Culture, cognition and risk**

Part II highlights another important perspective on risk, documenting the interplay between cultural factors and cognition. The first three chapters (9, 10 and 11) take the ‘white male effect’ as a starting point for deeper analysis of race, gender and cognition. The original study of this effect by Flynn et al (1994) found that 30 per cent of the white male population in the United States had extremely low perception of risk across a diverse array of hazards. In Chapter 9, Finucane and colleagues replicate and extend the original study, finding sizeable differences between white males and other respondents on a variety of sociopolitical attitudes. Finucane et al speculate that the world seems safer and hazardous activities seem more beneficial to white males than to others. Using the same National Survey data, Satterfield et al (Chapter 10) show that feelings of vulnerability, linked to experience with discrimination and injustice, are important drivers of the effect such that even white males have relatively high perceptions of risk if they, too, have had these experiences. Chapter 11, by Kahan and colleagues, proposes a new explanation for why white men fear risks less than women and minorities. According to this view, individuals selectively acknowledge or dismiss associated dangers in a manner supportive of their cultural identities. Thus the white-male effect can be seen as a reflection of the scepticism that hierarchist and individualistic white males display when activities integral to their cultural identities are challenged as harmful.

Much of the early research on risk perception documented striking differences of opinion between experts and the public that were quite resistant to change (Slovic, 2000a). In 2005, Cass Sunstein published a careful and comprehensive analysis of this literature and its implications for a normative account of how the law should respond to public risk perceptions (Sunstein, 2005).

Concerned that numerous social and cognitive mechanisms drive members of the public to exaggerate risks, Sunstein proposed a number of important institutional mechanisms designed to shield 'deliberative democracy' from the influence of risk panics. Chapter 12 by Kahan et al, written as a review of Sunstein's work, critiques his arguments from the perspective of cultural cognition. A model is proposed whereby individuals behave neither as rational nor irrational judges but rather as cultural evaluators of risk.

Chapter 13 by Satterfield et al examines culture in a different way, documenting the despair and life-disruption that took place when a close-knit African-American community in Georgia was told by the Environmental Protection Agency that their neighbourhood was severely contaminated by chemical releases from a nearby pesticide manufacturing factory. One of the well-documented effects on technologies, products and places that have become associated with an abnormal degree of risk is stigmatization (Gregory et al, 1995). Satterfield et al convey what it feels like to be forced to live in a risk-stigmatized community.

## **New psychometric studies**

Much of the research presented in Slovic (2000a) and the present volume grew out of what was called the 'psychometric paradigm.' This paradigm encompasses a theoretical framework that assumes risk is subjectively defined by individuals who may be influenced by a wide array of psychological, social, institutional and cultural factors. The paradigm assumes that, with appropriate design of survey instruments, many of these factors and their interrelationships can be quantified and modelled in order to illuminate the responses of individuals and their societies to the hazards that confront them.

Part III of the present volume presents a short selection of recent studies that have applied the psychometric paradigm to specific, and sometimes new, hazard domains.

Finucane, Slovic and Mertz (Chapter 14) examined American attitudes toward blood transfusion. At the time of data collection, 1997, it was clear that transfusion was a stigmatized activity, with a substantial proportion of people believing that the US blood supply was unsafe. The authors conclude that perceptions of risk from blood transfusion need to be monitored and the study methodology provides a guideline for doing this.

Savadori et al (Chapter 15) compared experts and a public sample on perceptions of risk associated with medical and food applications of biotechnology. Compared to the public, experts perceived less risk for every biotech application, but both groups judged the risk from food-related applications as higher than the risk from medical applications.

During the period 1987–1991, national surveys in Sweden and Canada examined public attitudes and perceptions regarding the risks and benefits of prescription drugs. Chapter 16 by Slovic et al describes similar results from a national study in the United States, more than a decade later. Prescription

medicines were perceived to be high in benefit and low in risk and were sharply differentiated from other chemicals.

Burns and Slovic (Chapter 17) demonstrate how basic psychometric surveys can provide insights vital to modelling the consequences of a terrorist attack in an urban area. Not surprisingly, a terrorist act is much more alarming than non-terrorist events (e.g. accidents, diseases) that cause equivalent direct harm. But not all terrorism is equivalent. Disease agents (e.g. anthrax) are more scary than bombs and the motives of the terrorists matter to risk perception. But, consistent with the findings described in Chapters 4, 5 and 6, the number of victims (ranging from 0 to 495) did not seem to matter. The study, while exploratory, provides a model for research that can inform policy decisions in this important risk domain.

Kahan et al (Chapter 18), working within the framework of ‘cultural cognition,’ find that members of the public who hold relatively egalitarian and communitarian worldviews perceive the risks from nanotechnology to be greater and its benefits smaller than do persons who hold hierarchist and individualistic worldviews.

## **Risk knowledge and risk communication**

Part IV examines the role of risk perception within a broader context of knowledge and communication.

One of the most important theoretical frameworks to emerge out of the study of risk perception is that of the ‘social amplification of risk.’ This framework attempts to integrate findings from media and communication research, from the psychometric and cultural schools of risk-perception research, and from studies of organizational responses to risk. In Chapter 19, Kasperson et al review research on the framework that took place during the 15 years subsequent to its introduction in 1988. Among various applications, social amplification appears to have been particularly useful for studying risk-induced stigma and its policy implications.

Much information about risk comes to us in the form of statistics and probabilities. In Chapter 20, Peters et al introduce the important concept of numeracy, showing that individuals who differ in their ability to understand numbers often fail to comprehend risk information adequately. Those who design health risk communications need to consider what can be done to help less-numerate people make better health care decisions.

But even more basic than understanding risk numbers is understanding the consequences being quantified by the numbers. Risk perception has been shown to be a layered process starting with superficial knowledge (e.g. smoking is harmful) and progressing (sometimes) to deeper levels of understanding (e.g. what forms of harm are caused by smoking and how does it feel to experience them?). In Chapter 21, Weinstein et al demonstrate that, although people may recognize that smoking can lead to adverse health effects, they do not have even a

basic understanding of the nature and severity of these harmful consequences. Graphic images of smoking-induced disease have been assumed to boost knowledge and produce negative affective reactions that may counter the positive images conveyed by billions of dollars in tobacco advertising. In support of this assumption, Chapter 22 by Peters et al shows, by means of controlled experiments, that putting graphic images on cigarette packages may help to reduce smoking initiation and increase quit attempts.

## **Where do we go from here?**

It is exciting to view the profound improvement in our understanding of judgement and decision making under risk that has occurred during the past 50 years. If anything, new technological advances involving computers, Internet testing, high-fidelity simulations, and neuroimaging, coupled with the ability to easily communicate and collaborate with others around the world, have speeded up innovation and discovery.

In particular, I hope that 50 years from now we will have found ways to overcome insensitivity to large-scale tragedies. Perhaps new methods of education, starting in the early years of school, will teach us how to understand the reality underlying large numbers, so we can act effectively to prevent and halt mass destruction of people and nature. I also hope that a vastly improved understanding of the feeling of risk will enable us to integrate feelings with technical analysis so that we can communicate about risk more effectively and make wiser decisions, even when dealing with people of different worldviews and cultures. Certainly sophisticated methods of neuroimaging will add valuable new insights into risk perception. But will the study of simple gambles still be part of our methodological toolkit a half-century from now? I wouldn't bet against it.

*Paul Slovic  
Eugene, Oregon*



*Part I*

# **Risk as Feelings**



## Chapter 1

# The Affect Heuristic and the Attractiveness of Simple Gambles

*Ian Bateman, Sam Dent, Ellen Peters, Paul Slovic  
and Chris Starmer\**

## Introduction

The gamble has been to decision research what the fruit fly has been to biology – a vehicle for examining fundamental processes with presumably important implications outside the laboratory. Judgement and decision researchers have been studying people's preferences among gambles for more than 50 years. This chapter will describe a series of experiments with gambles that add to the growing literature on preference construction (Lichtenstein and Slovic, 2006) and provide what we hope are useful insights about the interplay of affect, reason, risk and rationality in life's most important gambles.

In recent years there has been much interest in using the concept of affect to understand a wide range of decision behaviours (Loewenstein et al, 2001; Slovic et al, 2002; Peters et al, 2006a). In this chapter, experimental studies with simple gambles are used to examine the roles of affect and the related concept of evaluability in determining judgements and decisions. We begin by providing some theoretical background on the key concepts. We next describe experiments demonstrating an anomalous finding: introducing a small loss as a component of a gamble increases its attractiveness. We then hypothesize an explanation for this anomaly based upon affect and describe several experiments that test and confirm this hypothesis. Finally, we discuss evidence that the subtle, context-dependent valuations we have observed with gambles in simple laboratory experiments appear to occur as well in many types of important decisions outside the laboratory.

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## **Background and theory: The importance of affect**

In this chapter, following Slovic et al (2002), we use the term affect to refer to experienced feeling states associated with positive or negative qualities of a stimulus. Slovic et al (2002) present a wide range of evidence supporting the notion that images, marked by positive and negative affective feelings, guide judgement and decision making. In light of this evidence, they propose that people use an affect heuristic to make judgements. That is, in the process of making a judgement or decision, people consult or refer to the positive and negative feelings consciously or unconsciously associated with the mental representations of the task. Then, just as imaginability, memorability and similarity serve as cues for probability judgements (e.g. the availability and representativeness heuristics), affect may also serve as a cue for many important judgements and decisions (Kahneman, 2003). Affective responses tend to occur rapidly and automatically. As such, using an overall, readily available affective impression can be quicker and easier – and thus sometimes more efficient – than weighing the pros and cons or retrieving relevant examples from memory, especially when the required judgement or decision is complex or cognitive resources are limited.

The concept of evaluability has been proposed as a mechanism mediating the role of affect in decision processes. Affective impressions vary not only in their valence, positive or negative, but in the precision with which they are held. There is growing evidence that the precision of an affective impression substantially impacts judgements. In particular, Hsee (1996a, b, 1998) has proposed the notion of evaluability to describe the interplay between the precision of an affective impression and its meaning or importance for judgement and decision making. Evaluability is illustrated by an experiment in which Hsee (1996b) asked people to assume they were looking for a used music dictionary. In a joint-evaluation condition, participants were shown two dictionaries, A (with 10,000 entries in 'like new' condition) and B (with 20,000 entries and a torn cover), and were asked how much they would be willing to pay for each. 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, in separate evaluation, without a direct comparison, the number of entries is hard to evaluate, because the evaluator does not have a precise notion of how good 10,000 (or 20,000) entries is. 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' dictionary attractive. Under joint evaluation, the buyer can see that B is far superior on the more important attribute, number of entries. Thus the number of entries becomes evaluable through the comparison process.

According to the evaluability principle, the weight of a stimulus attribute in an evaluative judgement or choice is proportional to the ease or precision with which the value of that attribute (or a comparison on the attribute across alternatives)

can be mapped into an affective impression. In other words, affect bestows meaning on information (cf. Osgood et al, 1957; Mowrer, 1960a, b) and the precision of the affective meaning influences our ability to use information in judgement 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 (Mellers et al, 1992).

Hsee's work on 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. The implications of these findings may be quite wide-ranging: Hsee (1998) demonstrates evaluability effects even with familiar attributes such as the amount of ice cream in a cup. Slovic et al (2002) demonstrate similar effects with decisions about options saving different numbers of human lives.

## **Evaluability and the attractiveness of gambles**

In this section we propose evaluability as an explanation for some early findings in the judgement and decision literature pertaining to gambles. In subsequent sections we shall discuss a series of newer studies, also conducted with gambles, which test this explanation.

A number of studies have found that attractiveness ratings of simple gambles are influenced more by probabilities than by payoffs. Evidence for this claim can be found in Slovic and Lichtenstein (1968a), Goldstein and Einhorn (1987), Schkade and Johnson (1989) and, more recently, in data from a pilot study conducted by the present authors at the University of Oregon. In this pilot study, the relative importance of probabilities and payoffs was evaluated with 16 gambles, created by crossing four levels of winning probability (7/36, 14/36, 21/36 and 28/36) with four levels of payoff (\$3, \$6, \$9, \$12). University of Oregon students ( $N = 297$ ) were randomly assigned to one of the 16 gambles and were asked to rate its attractiveness on a 0 (not at all attractive) to 20 (extremely attractive) scale. The mean ratings, shown in Table 1.1, indicated that attractiveness increased monotonically as probability increased, with the largest (and statistically significant differences) occurring when the two highest probabilities (21/36 and 28/36) were compared with the two lowest (7/36 and 14/36). Mean attractiveness varied little across a fourfold increase in payoffs (no column mean differences were significant statistically). A subsequent study using the same probabilities but increasing the payoffs to \$30, \$60, \$90, and \$120 showed essentially the same weak influence of payoff.<sup>1</sup>

The concept of evaluability provides one possible interpretation of these results. Following Hsee's reasoning one may argue that, because probabilities are represented on a fixed scale from 0 to 1, they can be more readily mapped into a relatively precise affective response: a probability close to zero can readily be interpreted as a 'poor' chance to win. By contrast, payoff outcomes such as those in Table 1.1 have less obvious affective connotations, at least in the absence of

**Table 1.1** Mean attractiveness ratings in the pilot study

Probability	Payoff				Mean
	\$3	\$6	\$9	\$12	
7/36	5.3	5.3	8.9	6.2	6.4
14/36	6.5	7.8	8.4	9.0	7.9
21/36	12.8	13.8	11.9	12.2	12.7
28/36	13.2	13.3	15.0	14.5	14.0
Mean	9.5	10.1	11.2	10.8	

Note: Each respondent saw one probability/payoff combination (e.g. 14 chances out of 36 to win \$6) and was asked to rate the attractiveness of playing this gamble on a 0 (not at all attractive) to 20 (extremely attractive) scale.

further context. To illustrate the point, ask yourself the question ‘how good is \$9’? This \$9 question, we contend, has no clear answer without further context. For instance, while it may be difficult to evaluate the goodness of an abstract and context-free \$9, when further context is provided, the same amount of money may then ‘come alive with feeling’ (Slovic et al, 2002). For instance, although a \$9 tip on a \$30 restaurant bill may immediately be judged good by a waiter, a \$9 increase on a monthly salary of \$2000 may be judged quite negatively by an employee. If it is accepted that, in the context of these studies, probabilities are more evaluable than monetary outcomes, evaluability implies that attractiveness ratings will be relatively more sensitive to probabilities than to payoffs.<sup>2</sup>

In what follows, we seek to construct a test of the hypothesis that context may influence the evaluability of a stimulus and hence the affect and importance of that stimulus to judgements and decisions about simple gambles.

## Testing the evaluability principle: The base task

Consider the decision task described in Figure 1.1. In this task, an individual is required to rate the attractiveness of a bet offering a probability of 7/36 to win \$9 (otherwise win nothing). We shall refer to this as the USbase task (when data are collected in the US). The bet is described in terms of winning numbers on a roulette wheel and subjects respond on an attractiveness scale having 20 intervals ranging from 0 (‘not at all an attractive bet’) to 20 (‘extremely attractive bet’). Applying the reasoning of the previous section, we should expect the winning probability (7/36) to produce a fairly precise affective impression. It is an unattractive chance; one is much more likely to not win than to win. In contrast, the affective impression of \$9 may be diffuse, reflecting the difficulty of evaluating this sum of money without any particular context in which to place it apart from this novel gamble. Thus, the impression formed by the gamble offering \$9 to win with no losing payoff is expected to be dominated by the relatively precise and unattractive impression produced by the 7/36 probability of winning.

Now consider a variant of this task, modified so that the stated gamble below the first sentence in Figure 1.1 reads instead:

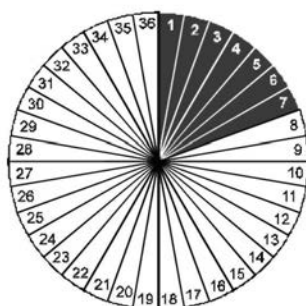
## Evaluating the Attractiveness of a Bet

We would like you to rate how attractive the prospect of playing the following bet is to you.

7/36 to win \$9.00

This means that there are 7 chances out of 36 that you will win the bet and receive \$9.00 and 29 chances out of 36 that you will win nothing.

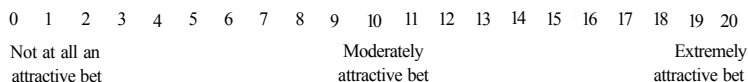
Visualize a roulette wheel on the left with 36 numbers along the



circumference. If a ball lands on any of the 7 numbers between 1 and 7 inclusive, you win \$9.00. If it lands on numbers 8-36, you win nothing.

Indicate your opinion of this bet's attractiveness by **circling** one number on the rating scale below:

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of playing this bet.



**Figure 1.1** Instructions for the attractiveness rating task

7/36 to win \$9

29/36 to lose 5¢

The text alongside the gamble is changed from ‘you win nothing’ to ‘you lose 5¢.’ We shall refer to this task as US-5. Notice that this new task is identical to the baseline task except that the zero outcome associated with the 29/36 probability has been replaced by a very small loss of 5¢. Consequently, the modified gamble is dominated by the base gamble and so any preference theory embodying the principle of monotonicity would imply that the modified gamble is strictly worse.

The evaluability principle, however, suggests a contrary implication because adding a very small loss to the payoff dimension provides new context for evaluating the \$9. For instance, notice that the combination of a possible \$9 gain and a 5¢ loss is a very attractive win/loss ratio. Hence introducing the small loss provides new perspectives from which the gamble can be evaluated. Whereas the imprecise mapping of the \$9 carries little weight in the averaging process, the more precise and now favourable impression of (\$9; -5¢) potentially carries more weight. Hence following the logic of evaluability, the modified gamble could, in principle, receive a higher rating.

Over a period of years, we have conducted numerous studies in the US and the UK exploring behaviour in relation to this and related tasks. We now bring these results together here for the first time.<sup>3</sup>

**Table 1.2** *Baseline studies of the attractiveness of three gambles on a 0–20 rating scale*

Group	Gamble	Mean rating
USbase	(7/36, +\$9.00; 29/36, win nothing)	9.4
US–5	(7/36, +\$9.00; 29/36, –\$0.05)	14.9
US–25	(7/36, +\$9.00; 29/36, –\$0.25)	11.7

The original studies were conducted with three groups of subjects at the University of Oregon. Each group evaluated only one gamble, either USbase (7/36 win \$9; otherwise win nothing), US–5 (7/36 win \$9; otherwise lose 5¢), or US–25 (7/36 win \$9; otherwise lose 25¢). The gambles were rated on the 0–20 scale of attractiveness shown at the bottom of Figure 1.1. The results are shown in Table 1.2. The gamble US–5 was rated more attractive than the gamble with no loss ( $p < .001$ ) as was gamble US–25 ( $p < .05$ ). Gamble US–25 was rated less attractive than gamble US–5, but the difference was not statistically significant.

These findings have more recently been replicated in the UK with 105 students (three groups of approximately 35) from the University of East Anglia (UEA). One group faced a task (UKbase) identical to USbase task but with a payoff of £9 (UK pounds) instead of \$9. As in the Oregon experiments, the UEA experiments included a second task (UK–5) which replaced the otherwise win nothing outcome in the base task with a small loss (5 pence) and a third task (UK–25) which involved a larger (but still small) loss of 25 pence.

The mean attractiveness ratings for the three tasks are shown in Table 1.3. The overall pattern of results is almost identical to the results obtained earlier in the United States. Application of  $t$ -tests and Mann-Whitney tests (these always agreed) showed that bets UKbase and UK–5 differed at  $p < .01$ , UKbase and UK–25 differed at  $p < .05$  and UK–5 and UK–25 did not differ significantly (though the lesser attractiveness of the gamble with the 25p loss replicated the result found in the original US study).

### Joint evaluation

Perhaps the enhanced attractiveness of the gamble with the small loss is due, not to increased appreciation of the \$9 or £9 payoff but rather to the attractiveness of taking a small risk? An additional study in the UK speaks to this explanation. 44 subjects from the UEA saw both gambles, UKbase and UK–5 together. They rated each gamble on the 0–20 scale of attractiveness. The results were almost the

**Table 1.3** *Mean attractiveness ratings for three tasks*

Group	Gamble	Mean rating
UKbase	7/36 +£9; 29/36 win nothing	9.28
UK–5	7/36 +£9; 29/36 –£0.05	13.24
UK–25	7/36 +£9; 29/36 –£0.25	12.61

mirror-image of the between-groups findings described above. Under joint evaluation, the base gamble was judged far more attractive (mean rating 13.09) than the gamble with the small loss (mean rating 9.82). The difference was statistically significant ( $t = 2.50$ ;  $p < .02$ ). Much as Hsee (1996b) has demonstrated preference reversals in going from joint to separate evaluations, the same occurred here with these gambles. The results do not support the hypothesis that our subjects are attracted by the risk of a small loss. They also show that there are several ways to create a context to evaluate these gambles: by adding a small loss or by adding another gamble for comparison (see also Parducci, 1995) and Birnbaum, 1999) for further examples of these sorts of contextual effects).

## Other variations

A subsequent study was conducted at the State University of New York (SUNY) at Plattsburgh with five separate groups each comprising 50 subjects. Each subject was presented with just a single gamble to rate (Bateman et al, 2006). The gambles studied were analogues of USbase and US-5 (designated NYbase and NY-5) plus two new gambles: 'NY+5' replaced the small loss outcome with a small gain; 'NYbase\*10' is the base problem but with the winning outcome increased by a factor of 10. Participants in each group rated only one gamble. The results are shown in Table 1.4.

Comparing NYbase and NY-5 we see the now familiar effect of between-groups studies with these gambles: introducing a small loss increases the mean attractiveness rating ( $t = 3.31$ ,  $p < .001$ ). Interestingly, the mean for NY+5, offering the possibility of either \$9 or a 5¢ gain, was 11.40. Although this is still significantly higher than NYbase ( $t = 2.81$ ,  $p < .01$ ), it is slightly lower than the mean for NY-5 with the 5¢ loss. The difference between the mean rating of NY+5 and NY-5 is not statistically significant ( $t = 0.75$ ), but their relative ordering appears to stem from a small percentage of high ratings for NY+5 (only 24 per cent of subjects gave it a score of 16 or above) relative to those for NY-5 (which had 42 per cent of ratings at 16 or above). We can speculate that, relative to the positive affect of the NY-5 bet, the prospect of winning just 5¢ rather than \$9 causes the NY+5 bet to be viewed somewhat negatively; i.e. while NY-5 offers a 'good loss' relative to the possible payout, the \$0.05 outcome of NY+5 might be perceived as a 'bad gain.' However, as NY+5 has no possibility of loss, it also received fewer low ratings than NY-5 such that, the variance of the distribution of ratings for NY-5 is greater (33.0) than the variance for NY+5 (23.4),

**Table 1.4** *Mean attractiveness ratings for SUNY Plattsburgh tasks*

Group	Gamble	Mean rating
NYbase	7/36 + \$9; otherwise win nothing	8.66
NY-5	7/36 +\$9; 29/36 -\$0.05	12.20
NY+5	7/36 +\$9; 29/36 +\$0.05	11.40
NYbase*10	7/36 +\$90; 29/36 +\$0.05	10.48

though the difference is not statistically significant (Levene's test statistic is 1.89,  $p = .17$ ).

The mean rating for NYbase\*10 was only 10.48. This is not significantly higher than the rating for the base problem and it is lower than the ratings for NY-5 and NY+5 which feature a prize one-tenth as large. This result provides further evidence that the rating response scale is not particularly sensitive to variation of payoffs.

Taken together, these results show that very small changes (in terms of expected value) in the patterning of gamble payoffs can have very large effects in gamble evaluations, while large changes (in expected value) can have negligible effects. We also suggest that these effects have a natural interpretation as consequences of affective responses. The basis for this claim is that the hypothesis based on affect provides a way of making sense of what would otherwise appear perverse effects. In particular, why would the introduction of a small loss increase its attractiveness? The joint evaluability study in the UK did not support an explanation based on an attraction to the risk of a small loss. We suggest, instead, that affect and evaluability provide a credible explanation for this anomalous effect.

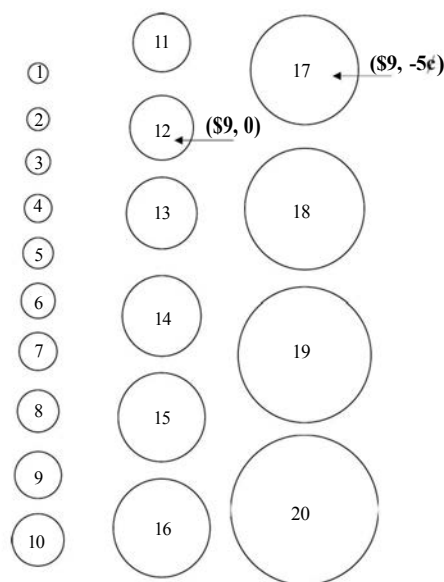
Later in this chapter we provide specific evidence supporting this interpretation based on affect. Before doing so, however, we turn to two additional studies, which address a possible criticism of our results so far.

## **Response mode robustness**

One limitation of the results we have provided so far is that they are all generated from rating tasks using a similar response mode. A natural question to ask, therefore, is whether our results are peculiar to that type of task? It seems at least possible that this could be so. For instance, recall that our response scale was bounded on the attractiveness interval 0–20 with its midpoint at 10. Notice that probabilities also have bounds and a midpoint at 0.5. Note also the jump in mean attractiveness going from 14/36 to 21/36 (crossing the midpoint) in Table 1.1. Maybe it is simply easier to map 7/36 onto this bounded, linear attractiveness scale (below the midpoint) than to map \$9 onto it, without the aid of a small loss? If so, it could be that the effect we are observing is a feature of this particular response scale and not a more general result of affective reactions to the gamble stimuli.

We provide a first test of this conjecture by replicating the study with a response mode that is unbounded and without a midpoint. Specifically, 201 students at the University of Oregon were asked to indicate the attractiveness of a gamble (either USbase, or US-5), by drawing a circle. According to the instructions, the more attractive the gamble, the larger the circle that should be drawn.<sup>4</sup> USbase was evaluated by 98 persons, and 103 judged the gamble US-5. A scoring template made up of different sized circles was constructed and placed over the responses in order to assign a number to each circle drawn. The median responses, presented in Figure 1.2, showed a strong and statistically significant difference in attractiveness favouring US-5 ( $p < .01$ ; median test). Thus, the \$6 loss effect does not depend upon the 0–20 scale of attractiveness.





**Figure 1.2** *Size of median circles indicating the attractiveness of two gambles*

While this replication is reassuring, the ‘circles’ response mode still has a generic similarity with the initial response modes: both are rating tasks requiring the responder to indicate the attractiveness of a single gamble. In view of this, a second robustness check was performed by testing for our original effect in a choice task rather than a rating task. Two studies, one in the US and one in the UK, used choice as the mode of response.

The choice experiments compare the attractiveness of the base gamble (USbase or UKbase) and the small-loss gamble (either US–5 or UK–5) against a sure gain. Of course, if the sure gain is large, many may choose it, thus obscuring any differential attractiveness of the two gambles. We therefore used two different values for the sure gain, one half the size of the other.

The US study asked 96 University of Oregon students to choose between playing a gamble and receiving a sure gain of \$4. For 45 (51) students, the gamble was USbase (US–5). Whereas only 29.9 per cent chose USbase over the \$4, 35.5 per cent chose US–5. This difference, however, was not statistically significant ( $\chi^2 = 1.83$ ;  $p < .20$ ). The same subjects made a second choice with \$2 as the sure gain. This again favoured the gamble with the small loss (US–5) which was chosen over the \$2 gain by 61.0 per cent participants, compared to 33.3 per cent who selected USbase over the sure gain. The difference was statistically significant ( $\chi^2 = 7.22$ ;  $p < .01$ ).

The UK study tested 120 adults in Aberdeen, Scotland, with essentially the same design, except for the payoffs being in pounds and pence. The results were quite similar to those in the US study. Against the sure gain of £4, UK–5 was selected by 36.7 per cent of the respondents compared with 33.3 per cent for UKbase. This difference was not statistically significant. However, as in the US



study, the gamble with the 5p loss (UK-5) was selected far more often against the sure gain of £2 (63.3 per cent) than the gamble without the loss (41.7 per cent;  $p < .02$ ).

Together, the studies employing circle responses and choices suggest that the increased attractiveness of the gamble with the small loss generalizes across response modes.

## Direct tests of the affect account

### Rating affect

The affect explanation of the 5¢ loss effect proposes that \$9 within the payoff combination (\$9, win nothing) is not evaluable, and that adding the 5¢ loss makes \$9 ‘come alive with feeling’ and causes it to become weighted in the judgement of attractiveness. In order to challenge this interpretation, more direct tests of the affect account were designed and conducted.

In these tests, subjects were asked to rate the affective valence of the stated probability and payoff as well as rating the overall attractiveness of the gamble. In the first of two experiments, 33 University of Oregon students rated the attractiveness of USbase and 34 rated US-5. The now familiar result was obtained: the gamble with the loss was rated more attractive ( $t = 1.82$ ;  $p < .05$ , one-tailed test). In addition to rating attractiveness, subjects were asked to judge the affective valence of the 7/36 probability and the valence of the payoff combination (either \$9, win nothing or \$9, -5¢) by indicating how many people out of 100 would like or dislike these attributes to varying degrees (see instructions in Figure 1.3). The seven response categories were coded -3 (dislike very much) to +3 (like very much) for the analysis. Means and correlations are shown in Table 1.5.

The results in Table 1.5 support the affect account of the 5¢ loss effect. First, the mean affect for the 7/36 probability was slightly negative for both gambles, and did not differ significantly between the gambles. However, the liking for the \$9, -5¢ payoff combination was much greater than liking for the \$9, win nothing combination ( $t = 2.71$ ;  $p < .01$ ). The correlations, across subjects, between attractiveness ratings and the valences are also revealing. Attractiveness was correlated primarily with liking for probability in the no-loss gamble and primarily with liking for payoff in the -5¢ loss condition. Thus, the -5¢ loss did seem to enhance the meaning and importance of the gamble payoffs.

In the second direct test, 285 University of Oregon students rated the attractiveness of one of three gambles: either USbase or US-5 or a new gamble US+5 (i.e. 7/36 win \$9; 29/36 win 5¢).

After making their rating, they were asked to indicate how they felt about the \$9 outcome on a nine-point scale going from very bad (-4) through neutral (0) to very good (+4). They were then asked to rate the other outcome of the gamble, either win nothing, lose 5¢ or win 5¢, depending upon which gamble they had seen. The results, presented in Table 1.6, again support the affect explanation. As

Now imagine 100 people like those who are participating in this experiment.  
Suppose these 100 people were looking at the bet you just rated:

7/36 to win \$9.00  
29/36 to lose 5¢

Think first about the 7/36 chance of winning. Of these 100 people, how many of them do you believe would dislike this probability, how many would feel neutral about it, how many would like it, etc.? Indicate your answers by putting numbers in the blank spaces below the 7/36.

**These numbers should add to 100.**

Next, do the same for the bet's possible payoffs: win \$9 or lose 5¢. How many of 100 would dislike these two payoffs, how many would feel neutral about them, how many would like them? Again, put the number of people in each blank space below the payoff.

Category Code	7/36	Number of people	\$9 or -5¢	Number of people
-3	dislike very much	_____	dislike very much	_____
-2	dislike moderately	_____	dislike moderately	_____
-1	dislike slightly	_____	dislike slightly	_____
0	neutral	_____	neutral	_____
1	like slightly	_____	like slightly	_____
2	like moderately	_____	like moderately	_____
3	like very much	_____	like very much	_____
	Total	_____	Total	_____
		(should =100)		(should =100)

**Figure 1.3** Instructions and coding for the first valence rating experiment

before, the 5¢ loss enhanced attractiveness relative to the (\$9, win nothing) gamble ( $t = 5.73$ ;  $p < .001$ ). Note that the gamble with the 5¢ gain was less attractive than the gamble with the loss. Although this difference was not statistically significant, it replicates prior findings. Table 1.6 also shows that the affect valence for \$9 was substantially more positive for US-5 compared with the other two conditions. When \$9 was paired with win nothing, 40 per cent of its affect ratings were neutral compared with 21 per cent when it was paired with -5¢. Similarly, the percentage of +3 and +4 (*very good*) ratings was only 9 per cent for USbase compared to 44 per cent for US-5. These results provide clear support for the hypothesis that that \$9 did indeed 'come alive with feeling' when paired with a small loss.<sup>5</sup>

Turning to the 'other outcome,' the valence was much more positive for the 5¢ loss than for the win nothing outcome ( $t = 7.3$ ;  $p < .001$ ). The 5¢ loss was even rated slightly more favourably than the 5¢ gain, though this difference was not statistically significant.

Affect ratings were correlated, across subjects, with attractiveness ratings. Affect for \$9 correlated positively with attractiveness in each condition, but the

**Table 1.5** Results of the first affect rating experiment

	USbase (7/36 \$9; otherwise win nothing)	US-5 (7/36 \$9; -5¢)
Liking for probability (7/36) <sup>a</sup>	-0.07	-0.16
Liking for payoff outcomes <sup>a</sup> (\$9; win nothing) or (\$9; -5¢)	0.16	0.92
Correlations with 0–20 ratings of attractiveness		
Liking for probability	0.52	0.10
Liking for payoff outcomes	0.21	0.60

Note: <sup>a</sup> Mean values: The 7-category affect ratings scale ran between *dislike very much* (coded -3) and *like very much* (coded +3).

highest correlation ( $r = 0.73$ ) occurred when \$9 was combined with the 5¢ loss. Affect toward the other outcome correlated most highly with attractiveness when that outcome was the 5¢ loss. Interestingly, that correlation was positive ( $r = 0.36$ ;  $p < .05$ ). The more attractive the 5¢ loss, the more attractive the gamble, consistent with our speculation that the 5¢ loss is a ‘good’ loss.

These results confirm that the combination of \$9 and -5¢ conferred a special affective quality on that gamble, enhancing the attractiveness and the importance of both the \$9 payoff and the 5¢ loss.

One hallmark of affect is the degree to which subtle features of a stimulus representation can manipulate feelings and thus influence judgements and decisions, especially when other attributes of the stimulus are low in evaluability. An example of this is the importance of the book’s condition (‘like new’ vs. ‘torn cover’) in Hsee’s dictionary example described earlier. We attempted a ‘torn cover’ type manipulation by varying the representation of the win nothing outcome for the \$9 gamble. Two rating conditions, each with 50 subjects, were run in Plattsburgh, comparing:

US-NoWin 7/36 win \$9; 29/36 you win nothing  
and US-NoLoss 7/36 win \$9; 29/36 you lose nothing

**Table 1.6** Results from the second affect rating study

	Condition		
	USbase (\$9; win nothing)	US-5 (\$9, -5¢)	US+5 (\$9; +5¢)
Attractiveness (0–20)	7.2	12.8	11.8
Affect for \$9	0.4	1.8	1.0
Affect for other outcomes (0, -5¢, or +5¢)	-1.5	0.4	0.3
N	72	72	141

Note: The rating scale for affect ranged from -4 (very bad) to +4 (very good).

We predicted that the more positive tone of 'you lose nothing' would cause US-NoLoss to be rated more attractive than US-NoWin where 'you win nothing.' This prediction was confirmed. The US-NoWin gamble received a mean rating of 9.0; but the US-NoLoss gamble, where the 0 outcome was reframed as 'you lose nothing,' received a much higher mean rating of 13.2 ( $t = 3.8$ ;  $p < .001$ ). Interestingly, the 'lose nothing' bet rating of 13.2 is significantly greater ( $t = 2.51$ ;  $p < .02$ ) than that for the bet with a potential \$90 payoff. This was the NYbase\*10 bet (7/36 + \$90; 29/36 win nothing), for which the mean rating was 10.48.

## Discussion

What have we learned from inflicting these few simple gambles on hundreds of individuals, on both sides of the Atlantic? At one level, we have learned that the rated attractiveness of the gamble in the base task (7/36 to win 9 (\$ or £); 29/36 to win nothing) is reliably enhanced when the second outcome is changed to a small loss. This effect occurred with attractiveness expressed as the size of a freely drawn circle as well as with a numerical rating scale. The effect also occurred with choices between a gamble and a sure gain. Though some may be tempted to dismiss the basic effect as merely making a gamble more interesting or exciting by adding the chance of loss, this explanation fails because side-by-side comparison showed a clear attractiveness advantage for the gamble without a loss.<sup>6</sup>

Although these findings are certainly a narrow starting point for general theory, the plot thickened when affect was invoked as an explanatory factor and an affect account was supported by experiments in which the gambles' component attributes were rated on valence (i.e. their goodness, badness or likeability). The \$9 outcome was found to evoke rather neutral feelings in the context of its alternative, 'win nothing.' The mediocre attractiveness of the no-loss gamble is driven by the somewhat negative feelings associated with its 7/36 probability of winning. But \$9 is seen in a favourable light and becomes an important factor contributing to the gamble's attractiveness, when it is paired with a 5¢ loss. This result is congruent with the concept of evaluability that has been shown to influence a wide range of judgements and decisions (Hsee, 1996a). The essence of evaluability is that affect conveys meaning upon information. Without affect, information lacks meaning and will not be given weight in decision making.

Taking a broader perspective, our studies of these few simple gambles demonstrate the importance of context in the 'construction' of utility and preference. One might expect that a lifetime of learning would imbue us with a clear sense of the value of such a familiar quantity as \$9 or £9. Instead, we find that this value depends greatly on context. In this light, we see a link between the 5¢ loss effect and the many diverse observations that led Kahneman and Tversky (1979) to propose a value function for Prospect Theory that was defined on gains and losses ('goods' and 'bads') rather than on total wealth (likely to be less evaluable). Indeed the present findings contribute to a broader conception in which important preferences may not exist within us, waiting to be elicited but, instead, are

constructed during the very process of elicitation or decision (Slovic, 1995; Lichtenstein and Slovic, 2006). In an interesting twist to this general story Peters et al (2006b) hypothesized and found that the effect of the small loss is driven by individuals higher in 'numeracy' (skill with numbers) presumably because they draw more meaning from the numerical comparison of the \$9 and 5¢ loss, compared to those low in numeracy.

## **Generalization to decisions with real consequences**

Although the experiments described in this chapter were all conducted with hypothetical payoffs, there is evidence that the affect-driven context dependency we observed would be as strong for gambles with real payoffs. Indeed, Bateman et al (2006) have conducted a study in which both the UKbase gamble and the UK-5 gamble were embedded in a set of 13 diverse items (e.g. you receive an envelope containing £5; you receive a box of 11 handmade Belgian chocolates; you receive a free, medium-sized box of Cornflakes; etc.). Each item was rated on the same 0–20 scale of attractiveness. At the outset, participants were told that, after they had rated each item, 2 of the 11 would be selected at random and they would receive the item they had rated more attractive. Thus, if the most attractive item in a pair was one of the gambles, they actually played the gamble and received either £9 or the other outcome (0 or –5p). The first-time ratings of the two real gambles were virtually identical to the ratings of the hypothetical gambles described in this chapter. The gamble with the 5p loss was rated far more attractive.

One referee of this chapter questioned whether the results would generalize to gambles involving losses. Perhaps losing \$9 would produce a more precise affective impression than winning \$9. We did not test this hypothesis. However, there is ample evidence that numerical representations of large losses of life, as occur in mass murder or genocide, often convey little or no affect (Slovic, 2007). But some large numbers do appear to carry special affective 'prominence' or meaning (Albers, 2001), as when the outcome reaches \$1000 or \$1 million or, in the case of the lottery, hundreds of millions of dollars (see e.g. Associated Press, 2001).

One might also ask whether the present results could generalize to gambles evaluated in terms of buying and selling prices. Because prices have been shown to be constructed by means of an anchoring and adjustment process and because the likely anchor (\$9) was the same for both loss and no-loss gambles, we would expect little or no price advantage for the loss bet.

Another referee questioned the seriousness of the mistakes made by participants in our studies who found the 5¢ loss gambles attractive. What is the boundary of this effect? How large will the loss have to be before the attractiveness of the gamble with the negative outcome becomes equal in attractiveness to the gamble with the zero outcome? We found that boosting the loss to 25¢ or 25p decreased the attractiveness only slightly, compared to US-5 or UK-5 (see Table 1.2), leaving the loss gamble still significantly more attractive than the base gamble. We did not examine gambles with losses any larger than 25¢ (25p).

On reflection, this is too narrow a perspective on the importance of the affect-

induced contextual effects documented here. A broader perspective would take account of the fact that affective processes similar to those underlying the 5¢ loss effect can be seen as contributing to the construction of preferences in many areas of economic, social and political life. Consider, for example, the well-known asymmetric dominance effect observed in choice experiments. First studied by Huber et al (1982), an asymmetrically dominated alternative is dominated by one item in the choice set but not by another. Huber et al observed that adding such an alternative to a choice set can increase the probability of choosing the item that dominates it. This violates a fundamental assumption of most choice theories – namely that the addition of a new alternative cannot increase the probability of choosing a member of the original set (see also Bateman et al, 2005). Asymmetric dominance bears a resemblance to the 5¢ loss effect described in this chapter. If alternative X is paired with alternative Y in the original choice set, adding a new alternative, Z, that is dominated by X but not by Y, makes X ‘look good,’ thus enhancing its attractiveness in competition with Y. Note the similarity with the effect that the 5¢ loss has in making \$9 look good. Doyle et al (1999) demonstrated the asymmetric dominance effect with real purchases in a grocery store. They concluded that the effect is robust, sizeable and of practical significance.

Other judgement and decision-making contexts in which affective processes have been shown to be important include destination preferences for vacations, jobs and retirement (Slovic et al, 1991c), risk perception (Loewenstein et al, 2001; Slovic et al, 2004), consumer product scares (Mitchell, 1989; Powell, 2001), marketing and advertising (Packard, 1957; Clark, 1988), insurance purchases (Hsee and Kunreuther, 2000), punitive damage awards by juries (Kahneman et al, 1998), environmental protection (Slovic and Slovic, 2004/2005) and response (or non-response) to life-saving opportunities (Fetherstonhaugh et al, 1997; Slovic et al, 2002; Slovic, 2007).

## **Affect and rationality**

Contemplating the workings of the affect heuristic may help us to appreciate neuroscientist Antonio Damasio’s (1994) contention that rationality is not only a product of the analytical mind, but of the experiential mind as well:

*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 become established . . . their effective deployment probably depends, to a considerable extent, on a continued ability to experience feelings. (pxii)*

Consistent with this view, Damasio documents the difficulties that individuals have in making good decisions when brain damage has impaired their ability to attach feelings to the anticipated outcomes of their actions. However, affective feelings are not always beneficial. Strong feelings can desensitize us to differences

among probabilities and outcomes (Loewenstein et al, 2001; Rottenstreich and Hsee, 2001; Sunstein, 2003; Hsee and Rottenstreich, 2004).

In addition, affect can sometimes deceive us through its strong dependency upon context and experience (Slovic, 2001; Slovic et al, 2002). As we have seen in this chapter, affect appears to have led the objectively inferior gamble to appear more attractive under certain circumstances. A challenge for future research is to better identify when affect facilitates good judgements and decisions and when it leads us astray.

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## Notes

- 1 There are also some circumstances in which payoffs are given more weight than probabilities. This occurs when people use a pricing response to evaluate a gamble (e.g. Lichtenstein and Slovic, 1971; Goldstein and Einhorn, 1987; Schkade and Johnson, 1989) and also when the gamble offers massive, highly exciting gains, as with a lottery (Loewenstein et al, 2001). Preferences within certain pairs of gambles can be predicted by a 'priority heuristic' which looks at a gamble's minimum gain as a first reason for choice (Brandstätter et al, 2006). The priority heuristic, however, would not predict the type of anomalous preferences that are the focus of the present study.
- 2 This interpretation is consistent with the link between evaluability, affect and monetary worth put forth by Hsee et al (1999). They observed that:  
*... an attribute can be difficult to evaluate even if its values are precisely given ... For example, everybody knows what money is ... but the monetary attribute of an option can be difficult to evaluate if the decision maker does not know the evaluability for that attribute in the given context ... To say that an attribute is difficult to evaluate ... means that the decision maker has difficulty determining the desirability of its value in the given decision context.* (p580, emphasis in the original)
- 3 The motivation for the earlier studies predates our interest in affect and evaluability. Rather, notions of compatibility (Slovic et al, 1990a) stimulated the original design. However, recent research has led us to interpret these studies and design new ones within the framework of the affect heuristic.

- 4 Specifically, instead of responding to the gamble on the 0–20 scale of attractiveness, respondents were instructed to: ‘Indicate your feeling about the attractiveness of playing this bet by drawing a circle on the back of this page. If the bet appears rather unattractive, draw a small circle. If it appears very attractive, draw a large circle. If it is somewhere in between, drawn an in-between size circle.’
- 5 The greater attractiveness of \$9 in the loss condition perhaps may answer a puzzling question raised by the choice study reported above: Why did gambles US–5 and UK–5 fare only slightly better against the \$4 (£4) sure gain than did their no-loss counterparts? Perhaps the relatively greater attractiveness of \$9 in the loss bet also enhanced the attractiveness of the \$4 alternative via an anchoring process. The \$2 (£2) sure gain, being smaller, may not have been as influenced by the \$9 anchor. This speculative answer could be tested using the methods described earlier for directly assessing affect.
- 6 A referee of this chapter asks why the zero outcome does not provide as good a level of comparison as either the 5¢ loss or the 5¢ gain: ‘Is it because people take the ratio of outcomes and don’t know how to divide by zero?’ Our sense is that the description of the gambles called attention to the small loss and small gain, which were placed right under the 7/36 win \$9. The win nothing outcome appeared only in text in two places not immediately below the gamble (see Figure 1.1). This may have reduced any tendency to compare \$9 with 0. Also, the effect of the zero outcome is probably quite sensitive to subtle aspects of its description. As we saw in the Plattsburgh replication, placing 29/36 win nothing in the description of the gamble did not enhance its attractiveness and, in fact, produced a much lower rating than did 29/36 lose nothing.





# References

- Ackerman, B. A. (1980) *Social Justice in the Liberal State*, Yale University Press, New Haven, CT, chapter 12
- Ackerman, B. A and Fishkin, J. S. (2004) *Deliberation Day*, Yale University Press, New Haven, CT, chapter 12
- Ackerman, B. A. and Stewart, R. B. (1988) 'Reforming environmental law: The democratic case for market incentives', *Columbus Journal of Environmental Law*, vol 13, pp171–199, chapter 12
- Ackerman, F and Heinzerling, L. (2004) *Priceless: On Knowing the Cost of Everything and the Value of Nothing*, The New Press, New York, chapter 12
- Ackoff, R. L. (1999) *Re-creating the Corporation: A Design of Organizations for the 21st Century*, Oxford University Press, New York, chapter 17
- Adler, R. and Pittle, D. (1984) 'Cajolery or command: Are education campaigns an adequate substitute for regulation?', *Yale Journal on Regulation*, vol 1, pp159–194, chapter 9
- Albers, W. (2001) 'Prominence theory as a tool to model boundedly rational decisions', in G. Gigerenzer and R. Selten (eds) *Bounded Rationality: The Adaptive Toolbox*, MIT Press, Cambridge, MA, chapter 1
- Alhakami, A. S. and Slovic, P. (1994) 'A psychological study of the inverse relationship between perceived risk and perceived benefit', *Risk Analysis*, vol 14, pp1085–1096, intro, chapter 2, chapter 7, chapter 15
- Allen, K. A., Moss, A., Giovino, G. A., Shopland, D. R. and Pierce, J. P. (1993) 'Teenage tobacco use: Data estimates from the Teenage Attitudes and Practices Survey, United States, 1989', *Advance Data*, vol 224, no 1, chapter 7
- Allen, M. W. and Ng, S. H. (2003) 'Human values, utilitarian benefits and identification: The case of meat', *European Journal of Social Psychology*, vol 33, pp37–56, chapter 12
- Almond, G. A. and Verba, S. (1980) *The Civic Culture Revisited*, Little, Brown, Boston, chapter 19
- Anand, P. (ed) (1997) 'Symposium: Economic and social consequences of BSE/CJD', *Risk Decision and Policy*, vol 2, no 1, pp3–52, chapter 19
- Andrade, E. B. (2005) 'Behavioral consequences of affect: Combining evaluative and regulatory mechanisms', *Journal of Consumer Research*, vol 32, pp355–362, chapter 8
- Andreoni, J. (1990) 'Impure altruism and donations to public goods: A theory of warm-glow giving', *The Economic Journal*, vol 100, pp464–477, intro
- Argo, J. J. and Main, K. J. (2004) 'Meta-analysis of the effectiveness of warning labels', *Journal of Public Policy and Marketing*, vol 23, pp193–208, chapter 22
- Ariely, D. (2001) 'Seeing sets: Representation by statistical properties', *Psychological Science*, vol 12, pp157–162, chapter 3

- Arvai, J. L., Gregory, R. and McDaniels, T. L. (2001) 'Testing a structured decision approach: Value focused thinking for deliberative risk communication', *Risk Analysis*, vol 21, no 6, pp1065–1076, chapter 19
- Associated Press (2001) 'Massive jackpot powers lottery mania', *The Register-Guard* [Eugene, OR], 25 August, p6A, chapter 1
- ATSDR (Agency for Toxic Substances and Disease Registry) (1990) 'Case studies in environmental medicine: Arsenic toxicity', US Department of Health and Human Services, Washington, DC, chapter 13
- ATSDR (1996), 'Exposure investigation CR #40W1', US Department of Health and Human Services, Public Health Service, Division of Health Assessment and Consultation, Atlanta, GA, chapter 13
- ATSDR (2007) 'Case studies in environmental medicine: Lead toxicity', [www.atsdr.cdc.gov/csem/lead/pbcover\\_page2.html](http://www.atsdr.cdc.gov/csem/lead/pbcover_page2.html), accessed 22 December 2009, chapter 10
- Baird, B. N. R. (1986) 'Tolerance for environmental health risks: The influence of knowledge, benefits, voluntariness, and environmental attitudes', *Risk Analysis*, vol 6, pp425–435, chapter 9
- Balkin, J. M. (1998) *Cultural Software*, Yale, New Haven, CT, chapter 11
- Barber, B. R. (1984) *Strong Democracy: Participatory Politics for a New Age*, University of California Press, Berkeley, chapter 19
- Barke, R. P., Jenkins-Smith, H. and Slovic, P. (1997) 'Risk perceptions of men and women scientists', *Social Science Quarterly*, vol 78, pp167–176, chapter 9, chapter 11, chapter 12
- Barnett, A., Menighetti, J. and Prete, M. (1992) 'The market response to the Sioux City DC-10 crash', *Risk Analysis*, vol 14, pp45–52, chapter 19
- Barrett, L. F. and Salovey, P. (eds) (2002) *The Wisdom in Feeling*, Guilford Press, New York, chapter 2
- Baron, J. (1997) 'Confusion of relative and absolute risk in valuation', *Journal of Risk and Uncertainty*, vol 14, no 3, pp301–309, chapter 2, chapter 4
- Baron, J. (2000) *Thinking and Deciding*, 3rd edn, Cambridge University Press, Cambridge, UK, chapter 21
- Baron, R. M. and Kenny, D. A. (1986) 'The moderator-mediator variable distinction in social-psychological research: Conceptual, strategic, and statistical considerations', *Journal of Personality and Social Psychology*, vol 51, pp1173–1182, chapter 8
- Bass, R. (1996) *The Book of Yaak*, Houghton Mifflin, New York, chapter 6
- Basso, K. H. (1996) *Wisdom Sits in Places: Landscape and Language among the Western Apache*, University of New Mexico, Albuquerque, NM, chapter 13
- Bateman, I. J., Munro, A. A. and Poe, G. L. (2005) *Asymmetric Dominance Effects in Choice Experiments and Contingent Valuation*, CSERGE Working Paper EDM 05-06, chapter 1
- Bateman, I. J., Dent, S., Slovic, P. and Starmer, L. (2006a) *Exploring the Determinants of Affect: Examining Rating Scale Assessments of Gambles*, CSERGE Working Paper, University of East Anglia, Centre for Social and Economic Research on the Global Environment, Norwich, chapter 1
- Bateman, I. J., Slovic, P. and Starmer, C. (2006b) *Incentivised Experimental Investigations of the Affect Heuristic*, CSERGE Working Paper, University of East Anglia, Centre for Social and Economic Research on the Global Environment, Norwich, chapter 1
- Bates, M. N., Smith, A. H. and Cantor, K. P. (1995) 'Case-control study of bladder cancer and arsenic in drinking water', *American Journal of Epidemiology*, vol 141, no 6, pp523–530, chapter 12

- Batson, C. D. (1990) 'How social an animal?' 'The human capacity for caring', *American Psychologist*, vol 45, pp336–346, chapter 3, chapter 5
- Batson, C. D., Eklund, J. H., Chermok, V. L., Hoyt, J. L. and Ortiz, B. G. (2007) 'An additional antecedent of empathic concern: Valuing the welfare of the person in need', *Journal of Personality and Social Psychology*, vol 93, pp65–74, chapter 3
- Baumeister, R. F. and Leary, M. R. (1995) 'The need to belong: Desire for interpersonal attachments as a fundamental human motivation', *Psychological Bulletin*, vol 117, no 3, pp497–529, chapter 11
- Beck, U. (1992) *Risk Society: Towards a New Modernity*, Sage, London, chapter 10
- Beck, U. (1999) *World Risk Society*, Polity Press, Malden, MA, chapter 10
- Behrens, E. G. (1983) 'The Triangle Shirtwaist Company fire of 1911: A lesson in legislative manipulation', *Texas Law Review*, vol 62, pp361–387, chapter 19
- Bellinger, D., Leviton, A., Waternaux, C., Needleman, H. and Rabinowitz, M. (1987) 'Longitudinal analyses of prenatal and postnatal lead exposure and early cognitive development', *New England Journal of Medicine*, vol 316, no 17, pp1037–1043, chapter 10
- Benjamin, D. J., Brown, S. A. and Shapiro, J. M. (2006) 'Who is "behavioral"? Cognitive ability and anomalous preferences', [papers.ssrn.com/sol3/papers.cfm?abstract\\_id=675264](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=675264) (accessed 31 December 2009), chapter 20
- Bentham, J. (1823) *An Introduction to the Principle of Morals and Legislation* (Original work published 1789), [www.constitution.org/jb/pml.htm](http://www.constitution.org/jb/pml.htm), accessed 18 December 2009, intro
- Benthin, A., Slovic, P. and Severson, H. (1993) 'A psychometric study of adolescent risk perception', *Journal of Adolescence*, vol 16, pp153–168, intro
- Benthin, A., Slovic, P., Moran, P., Severson, H., Mertz, C. K. and Gerrard, M. (1995) 'Adolescent health-threatening and health-enhancing behaviors: A study of word association and imagery', *Journal of Adolescent Health*, vol 17, pp143–152, chapter 7
- Berger, C. R., Lee, E.-J. and Johnson, J. T. (2003) 'Gender, rationality, and base-rate explanations for increasing trends', *Communication Research*, vol 30, no 6, pp737–765, chapter 12
- Bettman, J. R., Payne, J. W. and Staelin, R. (1987) 'Cognitive considerations in designing effective labels for presenting risk information', in K. Viscusi and W. Magat (eds) *Learning about Risk: Evidence on the Economic Responses to Risk Information*, Harvard University Press, Cambridge, MA, chapter 9
- Berkowitz, L. (2000) *Causes and Consequences of Feelings*, Cambridge University Press, New York, intro
- Birnbaum, M. H. (1999) 'How to show that  $9 > 221$ : Collect judgments in a between-subjects design', *Psychological Methods*, vol 4, no 3, pp243–249, chapter 1
- Bohölén, Å. (1998) 'Visual images and risk messages: Commemorating Chernobyl', *Risk Decision and Policy*, vol 3, no 2, pp125–143, chapter 19
- Bord, R. J. and O'Connor, R. E. (1997) 'The gender gap in environmental attitudes: The case of perceived vulnerability to risk', *Social Science Quarterly*, vol 78, pp830–840, chapter 9, chapter 10, chapter 11
- Bornstein, R. F. (1989) 'Exposure and affect: Overview and meta-analysis of research, 1968–1987', *Psychological Bulletin*, vol 106, pp265–289, chapter 7
- Boudon, R. (1998) 'Social mechanisms without black boxes', in P. Hedström and R. Swedberg (eds) *Social Mechanisms: An Analytical Approach to Social Theory*, Cambridge University Press, Cambridge, UK, chapter 11
- Brandon, T. H., Juliano, L. M. and Copeland, A. L. (1999) 'Expectancies for tobacco smoking', in I. Kirsch (ed) *How Expectancies Shape Behavior*, American Psychological Association, Washington, DC, chapter 22

- Brandstätter, E., Gigerenzer, G. and Hertwig, R. (2006) 'The priority heuristic: Making choices without trade-offs', *Psychological Review*, vol 113, pp409–432, chapter 1
- Breakwell, G. M. and Barnett, J. (2003) 'Social amplification of risk and the layering method', in N. Pidgeon, R. E. Kasperson and P. Slovic (eds) *The Social Amplification of Risk*, Cambridge University Press, Cambridge, UK, chapter 19
- Breyer, S. G. (1993) *Breaking the Vicious Circle: Toward Effective Risk Regulation*, Harvard University Press, Cambridge, MA, chapter 11, chapter 12
- Brickman, P., Coates, D. and Janoff-Bulman, R. J. (1978) 'Lottery winners and accident victims: Is happiness relative?', *Journal of Personality and Social Psychology*, vol 36, pp917–927, chapter 7
- Brody, C. J. (1984) 'Differences by sex in support for nuclear power', *Social Forces*, vol 63, pp209–228, chapter 9, chapter 11
- Buckner, H. T. (1994) 'Sex and guns: Is gun control male control?', [www.tbuckner.com/SEXGUN.HTM#Sex%20and%20Guns](http://www.tbuckner.com/SEXGUN.HTM#Sex%20and%20Guns), accessed 23 December 2009, chapter 11
- Bullard, R. D. (1990) *Dumping in Dixie: Race, Class and Environmental Quality*, Westview Press, Boulder, CO, chapter 10, chapter 13
- Burkhalter, A., Gastil, J. and Kelshaw, T. (2002) 'A conceptual definition and theoretic model of public deliberation in small face-to-face groups', *Communications Theory*, vol 12, pp398–422, chapter 12
- Burns, W. J. and Slovic, P. (2007) 'The diffusion of fear: Modeling community response to a terrorist strike', *Journal of Defense Modeling and Simulation*, vol 4, no 4, pp426–445, chapter 17
- Burns, W. J., Slovic, P., Kasperson, R., Kasperson, J. X., Renn, O. and Scrivas, E. (1993) 'Incorporating structural models into research on the social application of risk: Implications for theory construction and decision making', *Risk Analysis*, vol 13, pp611–623, chapter 17
- Bush, G., Luu, P. and Posner, M. I. (2000) 'Cognitive and emotional influences in the anterior cingulate cortex', *Trends in Cognitive Science*, vol 4, pp215–222, chapter 3
- Capek, S. M. (1993) 'The "environmental justice" frame: A conceptual discussion and an application', *Social Problems*, vol 40, pp5–24, chapter 10
- Carstensen, L. L. (2006) 'The influence of sense of time on development', *Science*, vol 312, pp1913–1915, chapter 8
- Centers for Disease Control and Prevention (1994) *Preventing Tobacco Use Among Young People: A Report of the Surgeon General* (No. S/N 017-001-00491-0), US Department of Health and Human Services, Washington, DC, chapter 7
- Centers for Disease Control and Prevention (2002) 'Annual smoking-attributable mortality, years of potential life lost, and economic costs: United States, 1995–1999', *Morbidity and Mortality Weekly Report*, vol 51, pp300–303, chapter 21
- Chaiken, S. (1980) 'Heuristic versus systematic information processing and the use of source versus message cues in persuasion', *Journal of Personality and Social Psychology*, vol 39, no 5, pp752–766, chapter 12
- Chaiken, S. and Maheswaran, D. (1994) 'Heuristic processing can bias systematic processing: Effects of source credibility, argument ambiguity, and task importance on attitude judgment', *Journal of Personality and Social Psychology*, vol 66, no 3, pp460–473, chapter 12
- Chaiken, S. and Trope, Y. (1999) *Dual-Process Theories in Social Psychology*, Guilford Press, New York, chapter 2, chapter 4
- Chang, L. and Krosnick, J. (2003) 'Comparing oral interviewing with self-administered

- computerized questionnaires: An experiment', [www.comm.stanford.edu/faculty/krosnick/Tel%20Int%20Mode%20Experiment.pdf](http://www.comm.stanford.edu/faculty/krosnick/Tel%20Int%20Mode%20Experiment.pdf), accessed 1 January 2010, chapter 18
- Chen, S., Duckworth, K. and Chaiken, S. (1999) 'Motivated heuristic and systematic processing', *Psychological Inquiry*, vol 10, no 1, pp44–49, chapter 11, chapter 12
- Chua, H. F., Yates, J. F. and Shah, P. (2006) 'Risk avoidance: Graphs versus numbers', *Memory and Cognition*, vol 34, no 2, pp399–410, chapter 20
- Citizen's Assembly on Electoral Reform (2006) [www.citizensassembly.bc.ca](http://www.citizensassembly.bc.ca), accessed 26 December 2009, chapter 12
- Clark, E. (1988) *The Want Makers: Inside the World of Advertising*, Penguin Books, New York, chapter 1
- Clark, M. S. and Fiske, S. T. (eds) (1982) *Affect and Cognition*, Erlbaum, Hillsdale, NJ, chapter 2
- Clark, R. D. and Maass, A. (1988) 'The role of social categorization and perceived source credibility in minority influence', *European Journal of Social Psychology*, vol 18, no 5, pp381–394, chapter 11, chapter 12
- Clore, G. L. and Huntsinger, J. R. (2007) 'How emotions inform judgment and regulate thought', *Trends in Cognitive Science*, vol 11, pp393–399, chapter 8
- Cobb, M. D. and Macoubrie, J. (2004) 'Public perceptions about nanotechnology: Risks, benefits and trust', *Journal of Nanoparticle Research*, vol 6, pp395–404, chapter 18
- Cohen, B. L. (1983) *Before It's Too Late: A Scientist's Case for Nuclear Energy*, Plenum Press, New York, chapter 9
- Cohen, G. L. (2003) 'Party over policy: The dominating impact of group influence on political beliefs', *Journal of Personality and Social Psychology*, vol 85, no 5, pp808–822, chapter 11, chapter 12
- Cohen, G. L., Aronson, J. and Steele, C. M. (2000) 'When beliefs yield to evidence: Reducing biased evaluation by affirming the self', *Personality & Social Psychology Bulletin*, vol 26, no 9, pp1151–1164, chapter 11, chapter 12
- Cohen, G. L., Sherman, D. K., Bastardi, A., Hsu, L., McGoey, M. and Ross, L. (2007) 'Bridging the partisan divide: Self-affirmation reduces ideological closed-mindedness and inflexibility in negotiation', *Journal of Personality and Social Psychology*, vol 93, no 3, pp415–430, chapter 11, chapter 12, chapter 18
- Cohen, J. and Solomon, N. (30 January 1994) 'Media ignore world's dying kids', *The Register-Guard*, p48, chapter 6
- Cohen, J. T., Duggar, K., Gray, G. M., Kreindel, S., Abdelrahman, H., HabteMariam, T., Oryang, D. and Tameru, B. (2001) 'Evaluation of the potential for bovine spongiform encephalopathy in the United States', [www.aphis.usda.gov/newsroom/hot\\_issues/bse/background/documents/mainreporttext.pdf](http://www.aphis.usda.gov/newsroom/hot_issues/bse/background/documents/mainreporttext.pdf), accessed 24 December 2009, chapter 12
- Coleman, J. S. (1990) *Foundations of Social Theory*, Bellknap Press, Cambridge, MA, chapter 19
- Combs, B. and Slovic, P. (1979) 'Newspaper coverage of causes of death', *Journalism Quarterly*, vol 56, no 4, pp837–843, 849, chapter 19
- Compas, Inc., Multi-Audience Research (1995) 'Perceived blood safety and transfusion acceptance: A report to the Canadian Red Cross Society on perceived safety of blood and willingness to accept a blood transfusion', Ottawa, Canada, chapter 14
- Conner, M. and Norman, P. (1996) *Predicting Health Behavior: Theory and Practice with Social Cognition Models*, Open University Press, Philadelphia, PA, chapter 21
- Cook, P. J. and Ludwig, J. (2000) *Gun Violence: The Real Costs*, Oxford University Press, Oxford, chapter 11

- Coombs, C. H. and Pruitt, D. G. (1960) 'Components of risk in decision making: Probability and variance preferences', *Journal of Experimental Psychology*, vol 60, pp265–277, intro
- Cooper, R. S. (1994) 'A case study in the use of race and ethnicity in public health surveillance', *Public Health Reports*, vol 109, pp46–52, chapter 9
- Crosby, N. and Nethercut, D. (2005) 'Citizens juries: Creating a trustworthy voice of the people', in J. Gastil and P. Levine (eds) *The Deliberative Democracy Handbook*, Jossey-Bass, New York, chapter 12
- Cross, F. B. (1998) 'Facts and values in risk assessment', *Reliability Engineering and System Safety*, vol 59, pp27–40, chapter 9
- The Cultural Cognition Project at Yale Law School (undated-a) 'Gun risk perceptions', [www.culturalcognition.net/projects/gun-risk-perceptions.html](http://www.culturalcognition.net/projects/gun-risk-perceptions.html), accessed 23 December 2009, chapter 12
- The Cultural Cognition Project at Yale Law School (undated-b) 'First national risk & culture study', [www.culturalcognition.net/projects/first-national-risk-culture-study.html](http://www.culturalcognition.net/projects/first-national-risk-culture-study.html), accessed 23 December 2009, chapter 12
- The Cultural Cognition Project at Yale Law School (2006a) 'Culture and political attitudes', [www.research.yale.edu/culturalcognition/content/view/91/100](http://www.research.yale.edu/culturalcognition/content/view/91/100), accessed 15 January 2006, chapter 12
- The Cultural Cognition Project at Yale Law School (2006b) 'Health risk perceptions', [www.research.yale.edu/culturalcognition/content/view/102/100](http://www.research.yale.edu/culturalcognition/content/view/102/100), accessed 15 January 2006, chapter 12
- The Cultural Cognition Project at Yale Law School (2006c) 'What matters more: Consequences or meanings?', [www.research.yale.edu/culturalcognition/index.php?option=content&task=view&id=104](http://www.research.yale.edu/culturalcognition/index.php?option=content&task=view&id=104), accessed 15 January 2006, chapter 12
- Currall, S. C., King, E. B., Lane, N., Madera, J. and Turner, S. (2006) 'What drives public acceptance of nanotechnology?', *Nature Nanotechnology*, vol 1, pp153–155, chapter 18
- Cvetkovich, G. and Earle, T. (1991) 'Risk and culture', *Special issue of Journal of Cross-Cultural Psychology*, vol 22, no 1, pp11–149, chapter 19
- Cvetkovich, G. and Löfstedt, R. E. (eds) (1999) *Social Trust and the Management of Risk*, Earthscan, London, chapter 19
- Cvetkovich, G., Siegrist, M., Murray, R. and Tragesser, S. (2002) 'New information and social trust: Asymmetry and perseverance of attributions about hazard managers', *Risk Analysis*, vol 22, pp359–369, chapter 19
- Dake, K. (1991) 'Orienting dispositions in the perception of risk: An analysis of contemporary worldviews and cultural biases,' *Journal of Cross-Cultural Psychology*, vol 22, no 1, pp61–82, chapter 11, chapter 18, chapter 19
- Dale, N. (1999) 'Cross-cultural community-based planning: Negotiating the future of Haida Gwaii', in L. Susskind, S. McKearnan and J. Thomas-Larmer (eds) *The Consensus Building Handbook*, Sage, Thousand Oaks, CA, chapter 12
- Damasio, A. R. (1994) *Descartes' Error: Emotion, Reason, and the Human Brain*, Avon, New York, intro, chapter 1, chapter 2, chapter 3, chapter 6, chapter 7, chapter 22
- Damasio, A. R., Tranel, D. and Damasio, H. (1990) 'Individuals with sociopathic behavior caused by frontal damage fail to respond autonomically to social stimuli', *Behavioural Brain Research*, vol 41, pp81–94, chapter 7
- Davidson, D. J. and Freudenburg, W. R. (1996) 'Gender and environmental risk concerns: A review and analysis of available research', *Environment and Behavior*, vol 28, pp302–339, chapter 10, chapter 11



- Davis, M. H. (1994) *Empathy: A Social Psychological Approach*, Brown and Benchmark, Madison, WI, chapter 3
- de Groot, A. D. (1978) *Thought and Choice in Chess*, Monton, New York, chapter 2
- de Vries, M., Holland, R. W. and Witteman, C. L. M. (2008) 'In the winning mood: Affect in the Iowa gambling task', *Judgment and Decision Making*, vol 3, no 1, pp42–50, chapter 8
- Denman, S., Pearson, J., Davis, P. and Moody, D. (1996) 'A survey of HIV- and AIDS-related knowledge, beliefs and attitudes among 14 year olds in Nottinghamshire', *Educational Research*, vol 38, pp93–99, chapter 14
- Denes-Raj, V. and Epstein, S. (1994) 'Conflict between intuitive and rational processing: When people behave against their better judgment', *Journal of Personality and Social Psychology*, vol 66, pp819–829, chapter 2
- DeVeillis, R. F. (1991) *Scale Development: Theory and Applications*, Sage, Newbury Park, CA, chapter 10
- Dickert, S. (2008) 'Two routes to the perception of need: The role of affective and deliberative information processing in pro-social behavior', Doctoral Dissertation, University of Oregon at Eugene, OR, chapter 3
- Diener, E. (1984) 'Subjective well-being', *Psychological Bulletin*, vol 95, pp542–575, chapter 8
- DiFranza, J. R., Rigotti, N. A., McNeill, A. D., Ockene, J. K., Savageau, J. A., St Cyr, D. and Coleman, M. (2000) 'Initial symptoms of nicotine dependence in adolescents', *Tobacco Control*, vol 9, pp313–319, chapter 7
- Dillard, A. (1999) *For the Time Being*, Knopf, New York, chapter 5, chapter 6
- DiMaggio, P. (1997) 'Culture and cognition', *Annual Review of Sociology*, vol 23, pp263–287, chapter 18
- Douglas, M. (1966) *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*, Routledge & Kegan Paul, London, chapter 12, chapter 18
- Douglas, M. (1970) *Natural Symbols: Explorations in Cosmology*, Barrie & Rockliff, London, chapter 11, chapter 12, chapter 18
- Douglas, M. (1982) 'Cultural bias', in *In the Active Voice*, Routledge & Paul, London, chapter 11
- Douglas, M. (1986) *How Institutions Think*, Syracuse University Press, New York, chapter 11, chapter 12
- Douglas, M. and Wildavsky, A. B. (1982) *Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers*, University of California Press, Berkeley, CA, chapter 11, chapter 18
- Downing, P., Chan, A., Peelen, M., Dodds, C. and Kanwisher, N. (2006) 'Domain specificity in visual cortex', *Cerebral Cortex*, vol 16, pp1453–1461, chapter 3
- Doyle, J. R., O'Connor, D. J., Reynolds, G. M. and Bottomley, P. A. (1999) 'The robustness of the asymmetrically dominated effect: Buying frames, phantom alternatives, and in-store purchases', *Psychology & Marketing*, vol 16, no 3, pp225–243, chapter 1
- Drolet, A. and Luce, M. F. (2004) 'The rationalizing effects of cognitive load on emotion-based trade-off avoidance', *Journal of Consumer Research*, vol 31, no 1, pp63–77, chapter 4
- Durant, J., Gaskell, G. and Buer, M. (1998) *Biotechnology in the Public Sphere: A European Sourcebook*, National Museum of Science and Industry, London, chapter 15
- Earle, T. C. and Cvetkovich, G. T. (1995) *Social Trust: Toward a Cosmopolitan Society*, Praeger, Westport, CT, chapter 19



- Eastwood, J. D., Smilek, D. and Merikle, P. M. (2001) 'Differential attentional guidance by unattended faces expressing positive and negative emotion', *Perception and Psychophysics*, vol 63, pp1004–1013, chapter 3
- Edelstein, M. R. (1987) 'Toward a theory of environmental stigma', in J. Harvey and D. Henning (eds) *Public Environments*, Environmental Design Research Association, Ottawa, Canada, chapter 13, chapter 19
- Edelstein, M. R. (1988) *Contaminated Communities: The Social and Psychological Impacts of Residential Toxic Exposure*, Westview, Boulder, CO, chapter 13
- Edwards, A., Elwyn, G., Covey, J., Matthews, E. and Pill, R. (2001) 'Presenting risk information: A review of the effects of "framing" and other manipulations on patient outcomes', *Journal of Health Communication*, vol 6, no 1, pp61–82, chapter 20
- Edwards, A., Unigwe, S., Elwyn, G. and Hood, K. (2003) 'Personalised risk communication for informed decision making about entering screening programs', *Cochrane Database of Systematic Reviews*, no 1: CD001865, chapter 20
- Edwards, W. (1954) 'The theory of decision making', *Psychological Bulletin*, vol 51, pp380–417, intro
- Edwards, W. and von Winterfeldt, D. (1987) 'Public values in risk debates', *Risk Analysis*, vol 7, no 2, pp141–158, chapter 19
- Ellis, R. and Thompson, M. (1997) 'Seeing green: Cultural biases and environmental preferences', in Wildavsky, A. B., Ellis, R. and Thompson, M. (eds) *Culture Matters: Essays in Honor of Aaron Wildavsky*, Westview Press, Boulder, CO, chapter 11
- Elstein, A. S., Chapman, G. B. and Knight, S. J. (2005) 'Patients' values and clinical substituted judgments: The case of localized prostate cancer', *Health Psychology*, vol 24, no 4, ppS85–S92, chapter 20
- English, M. R. (1992) *Siting Low-Level Radioactive Waste Disposal Facilities: The Public Policy Dilemma*, Quorum, New York, chapter 19
- Epstein, S. (1994) 'Integration of the cognitive and the psychodynamic unconscious', *American Psychologist*, vol 49, pp709–724, chapter 2, chapter 4, chapter 6, chapter 7, chapter 22
- Erikson, K. (1990) 'Toxic reckoning: Business faces a new kind of fear', *Harvard Business Review*, vol 68, no 1, pp118–126, chapter 13
- Erikson, K. (1994) *A New Species of Trouble: The Human Experience of Modern Disasters*, Norton, New York, chapter 13
- Eskridge, W. N. (2005) 'Pluralism and distrust: How courts can support democracy by lowering the stakes of politics', *Yale Law Journal*, vol 114, pp1279–1328, chapter 12
- Estrada, C. A., Martin-Hryniewicz, M., Peek, B. T., Collins, C. and Byrd, J. C. (2004) 'Literacy and numeracy skills and anticoagulation control', *American Journal of the Medical Sciences*, vol 328, no 2, pp88–93, chapter 20
- Fagerlin, A., Wang, C. and Ubel, P. A. (2005) 'Reducing the influence of anecdotal reasoning on people's health care decisions: Is a picture worth a thousand statistics?', *Medical Decision Making*, vol 25, no 4, pp398–405, chapter 20
- Fagerlin, A., Zikmund-Fisher, B. J., Ubel, P. A., Jankovic, A., Derry, H. A. and Smith, D. M. (2007) 'Measuring numeracy without a math test: Development of the Subjective Numeracy Scale (SNS)', *Medical Decision Making*, vol 27, no 5, pp672–680, chapter 20
- Farrell, M. H., Murphy, M. A. and Schneider, C. E. (2002) 'How underlying patient beliefs can affect physician–patient communication about prostate-specific antigen testing', *Effective Clinical Practice*, vol 5, pp120–129, chapter 16
- Fazio, R. H. and Hilden, L. E. (2001) 'Emotional reactions to a seemingly prejudiced

- response: The role of automatically activated racial attitudes and motivation to control prejudiced reactions', *Personality and Social Psychology Bulletin*, vol 27, no 5, pp538–549, chapter 22
- Fazio, R. H. and Olson, M. A. (2003) 'Implicit measures in social cognition research: Their meaning and uses', *Annual Review of Psychology*, vol 54, pp297–327, chapter 22
- Fenske, M. J. and Raymond, J. E. (2006) 'Affective influences of selective attention', *Current Directions in Psychological Science*, vol 15, pp312–316, chapter 3
- Fenske, M. J., Raymond, J. E. and Kunar, M. A. (2004) 'The affective consequences of visual attention in preview search', *Psychonomic Bulletin and Review*, vol 11, pp1055–1061, chapter 3
- Fenske, M. J., Raymond, J. E., Kessler, K., Westoby, N. and Tipper, S. P. (2005) 'Attentional inhibition has social-emotional consequences for unfamiliar faces', *Psychological Science*, vol 16, pp753–758, chapter 3
- Fetherstonhaugh, D., Slovic, P., Johnson, S. M. and Friedrich, J. (1997) 'Insensitivity to the value of human life: A study of psychophysical numbing', *Journal of Risk and Uncertainty*, vol 14, pp283–300, intro, chapter 1, chapter 2, chapter 4, chapter 5, chapter 6
- Fife-Schaw, C. and Rowe, G. (1996) 'Public perceptions of everyday food hazard: A psychometric study', *Risk Analysis*, vol 16, pp487–500, chapter 15
- Finucane, M. L. (2002) 'Mad cows, mad corn and mad communities: The role of socio-cultural factors in the perceived risk of genetically-modified food', *Proceedings of the Nutrition Society*, vol 61, pp31–37, chapter 18
- Finucane, M. L., Alhakami, A., Slovic, P. and Johnson, S. M. (2000a) 'The affect heuristic in judgments of risks and benefits', *Journal of Behavioral Decision Making*, vol 13, pp1–17, intro, chapter 2, chapter 7, chapter 8, chapter 12, chapter 14, chapter 15, chapter 19
- Finucane, M. L., Peters, E. and Slovic, P. (2003) 'Judgment and decision making: The dance of affect and reason', in S. L. Schneider and J. Shanteau (eds) *Emerging Perspectives on Judgment and Decision Research*, Cambridge University Press, Cambridge, UK, chapter 2
- Finucane, M. L., Slovic, P., Hibbard, J. H., Peters, E., Mertz, C. K. and MacGregor, D. G. (2002) 'Aging and decision-making competence: An analysis of comprehension and consistency skills in older versus younger adults considering health-plan options', *Journal of Behavioral Decision Making*, vol 15, no 2, pp141–164, chapter 20
- Finucane, M. L., Slovic, P., Mertz, C. K., Flynn, J. and Satterfield, T. A. (2000b) 'Gender, race, and perceived risk: The "white male" effect', *Health, Risk, & Society*, vol 2, no 2, pp159–172, chapter 10, chapter 11
- Fischer, P. M., Richards, J. W., Berman, E. F. and Krugman, D. M. (1989) 'Recall and eye tracking study of adolescents viewing tobacco advertisements', *Journal of the American Medical Association*, vol 261, pp84–89, chapter 22
- Fischer, P. M., Krugman, D. M., Fletcher, J. E., Fox, R. J. and Rojas, T. H. (1993) 'An evaluation of health warnings in cigarette advertisements using standard market research methods: What does it mean to warn?', *Tobacco Control*, vol 2, pp279–285, chapter 22
- Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S. and Combs, B. (1978) 'How safe is safe enough? A psychometric study of attitudes toward technological risks and benefits', *Policy Sciences*, vol 9, pp127–152, intro, chapter 2, chapter 7, chapter 15
- Fishkin, J. S. (1991) *Democracy and Deliberation*, Yale University Press, New Haven, CT, chapter 12

- Fishkin, J. and Farrar, C. (2005) 'Deliberative polling: From experiment to community resource', in J. Gastil and P. Levine (eds) *The Deliberative Democracy Handbook*, Jossey-Bass, New York, chapter 12
- Fitchen, J. M. (1989) 'When toxic chemicals pollute residential environments: The cultural meanings of home and home ownership', *Human Organization*, vol 48, no 4, pp313–324, chapter 13
- Flynn, J., Slovic, P. and Mertz, C. K. (1993a) 'Decidedly different: Expert and public views of risks from a radioactive waste repository', *Risk Analysis*, vol 13, pp643–648, chapter 15
- Flynn, J., Slovic, P. and Mertz, C. K. (1993b) 'The Nevada initiative: A risk communication fiasco', *Risk Analysis*, vol 13, no 5, pp497–502, chapter 19
- Flynn, J., Slovic, P. and Mertz, C. K. (1994) 'Gender, race, and perception of environmental health risks', *Risk Analysis*, vol 14, no 6, pp1101–1108, intro, chapter 9, chapter 10, chapter 11, chapter 14, chapter 16, chapter 18
- Flynn, J., Chalmers, J., Easterling, D., Kasperson, R., Kunreuther, H., Mertz, C. K., Mushkatel, A., Pijawka, K. D. and Slovic, P. with Dotto, L. (1995) *One Hundred Centuries of Solitude: Redirecting America's High-Level Nuclear Waste Policy*, Westview Press, Boulder, CO, chapter 19
- Flynn, J., Kasperson, R., Kunreuther, H. and Slovic, P. (1997) 'Overcoming tunnel vision: Redirecting the U.S. high-level nuclear waste program', *Environment*, vol 39, no 3, pp6–11, 25–30, chapter 13
- Flynn, J., Peters, E., Mertz, C. K. and Slovic, P. (1998) 'Risk, media, and stigma at Rocky Flats', *Risk Analysis*, vol 18, no 6, pp715–727, chapter 13, chapter 19
- Flynn, J., Slovic, P. and Kunreuther, H. (eds) (2001) *Risk, Media, and Stigma: Understanding Public Challenges to Modern Science and Technology*, Earthscan, London, chapter 17, chapter 19
- Forester, J. (1999) 'Dealing with deep value differences', in L. Susskind, S. McKernan and J. Thomas-Larmer (eds) *The Consensus Building Handbook*, Sage, Thousand Oaks, CA, chapter 12
- Forgas, J. P. (ed) (2000) *Feeling and Thinking: The Role of Affect in Social Cognition*, Cambridge University Press, Cambridge, UK, chapter 2
- Forrester, J. W. (1969) *Urban Dynamics*, MIT Press, Cambridge, MA, chapter 17
- Fox, E. (2002) 'Processing of emotional facial expressions: The role of anxiety and awareness', *Cognitive, Affective and Behavioral Neuroscience*, vol 2, pp52–63, chapter 3
- Framework Convention Alliance for Tobacco Control (2005) *Tobacco Warning Labels: Factsheet No. 7*, World Health Organization, Geneva, Switzerland, chapter 22
- Frederick, S. (2005) 'Cognitive reflection and decision making', *Journal of Economic Perspectives*, vol 19, no 4, pp24–42, chapter 20
- Freudenburg, W. R. (1992) 'Nothing recedes like success? Risk analysis and the organizational amplification of risks', *Risk: Issues in Health and Safety*, no 3, pp1–35, chapter 17, chapter 19
- Freudenburg, W. R. (2003) 'Institutional failure and the organizational amplification of risks: The need for a closer look', in N. Pidgeon, R. G. Kasperson and P. Slovic (eds) *The Social Amplification of Risk*, Cambridge University Press, Cambridge, UK, chapter 19
- Freudenburg, W. R., Coleman, C. L., Gonzales, J. and Hegelund, C. (1996) 'Media coverage of hazard events – Analyzing the assumption', *Risk Analysis*, vol 16, pp31–42, chapter 17, chapter 19
- Friedrich, J., Barnes, P., Chapin, K., Dawson, I., Garst, V. and Kerr, D. (1999) 'Psychophysical numbing: When lives are valued less as the lives at risk increase',

- Journal of Consumer Psychology*, vol 8, pp277–299, chapter 2, chapter 4
- Frewer, L. J., Howard, C., Hedderley, D. and Shepherd, R. (1996) 'What determines trust in information about food-related risk? Underlying psychological constructs', *Risk Analysis*, vol 16, pp473–486, chapter 15
- Frewer, L. J., Howard, C. and Shepherd, R. (1997) 'Public concerns in the United Kingdom about general and specific applications of genetic engineering: Risk benefit and ethics', *Science, Technology and Human Values*, vol 22, pp98–124, chapter 15
- Fung, H. H. and Carstensen, L. L. (2006) 'Goals change when life's fragility is primed: Lessons learned from older adults, the September 11th attacks and SARS', *Social Cognition*, vol 24, pp248–278, chapter 8
- Funtowicz, S. O. and Ravetz, J. R. (1992) 'Three types of risk assessment and the emergence of post-normal science', in S. Krimsky and D. Golding (eds) *Social Theories of Risk*, Praeger, Westport, CT, chapter 19
- Gallup Organization (1954, January 9–14) *The Gallup Poll*, Princeton, NJ, chapter 21
- Gallup Organization (1987) 'Survey of attitudes toward smoking', American Lung Association survey, Princeton, NJ, chapter 21
- Ganzach, Y. (2001) 'Judging risk and return of financial assets', *Organizational Behavior and Human Decision Processes*, vol 83, pp353–370, chapter 2
- Gardner, G. T. and Gould, L. C. (1989) 'Public perceptions of the risks and benefits of technology', *Risk Analysis*, vol 9, pp225–242, chapter 9
- Gaskell, G. and Allum, N. (2001) 'Sound science, problematic publics? Contrasting representations of risk and uncertainty', *Notizie di Politea*, vol 63, pp13–25, chapter 15
- Gaskell, G., Allum, N., Bauer, M. et al (2000) 'Biotechnology and the European public', *Nature Biotechnology*, vol 18, pp935–938, chapter 15
- Gaskell, G. and Bauer, M. (2001) *Biotechnology 1996–2000: The Years of Controversy*, National Museum of Science and Industry, London, chapter 15
- Gaskell, G., Bauer, M. W., Durant, J. and Allum, N. C. (1999) 'Worlds apart? The perception of genetically modified foods in Europe and the U.S.', *Science*, vol 258, pp385–387, chapter 15
- Gasper, K. and Clore, G. L. (1998) 'The persistent use of negative affect by anxious individuals to estimate risk', *Journal of Personality and Social Psychology*, vol 74, no 5, pp1350–1363, chapter 2, chapter 8
- Gastil, D. (1975) *Cultural Regions of the United States*, University of Washington Press, Seattle, chapter 12
- Gastil, J. (2000) *By Popular Demand*, University of California Press, Berkeley, chapter 12
- Gastil, J. and Dillard, J. P. (1999) 'Increasing political sophistication through public deliberation', *Political Commentary*, vol 16, no 1, pp3–23, chapter 12
- Gastil, J., Black, L. and Moscovitz, K. (2008) 'Ideology, attitude change, and deliberation in small face-to-face groups', *Political Communication*, vol 25, no 1, pp23–46, chapter 12
- Gelman, A. and Hill, J. (2007) *Data Analysis Using Regression and Multilevel/Hierarchical Models*, Cambridge University Press, New York, chapter 18
- Gerber, A. and Green, D. (1999) 'Misperceptions about perceptual bias', *Annual Review of Political Science*, vol 2, pp189–210, chapter 12
- Gerbert B., Maguire B. T. and Sumser, J. (1991) 'Public perception of risk of AIDS in health care settings', *AIDS Education and Prevention*, vol 3, pp322–327, chapter 14
- Gerlach, L. P. (1987) 'Protest movements and the construction of risk', in B. B. Johnson and V. T. Covello (eds) *The Social and Cultural Construction of Risk*, Reidel, Dordrecht, The Netherlands, chapter 19

- Gettys, C. F., Kelly, C. and Peterson, C. R. (1973) 'The best guess hypothesis in multi-stage inference', *Organizational Behavior and Human Performance*, vol 10, no 3, pp364–373, chapter 20
- Gigerenzer, G. and Edwards, A. (2003) 'Simple tools for understanding risks: From innuery to insight', *British Medical Journal*, vol 327, no 7417, pp741–744, chapter 20
- Gilbert, C. (2001) 'Cheney argues case for nuclear power', *Milwaukee Journal Sentinel*, 14 June, chapter 12
- Gilligan, C. (1982) *In a Different Voice: Psychological Theory and Women's Development*, Harvard University Press, Cambridge, MA, chapter 12
- Giner-Sorolla, R. and Chaiken, S. (1997) 'Selective use of heuristic and systematic processing under defense motivation,' *Personality & Social Psychology Bulletin*, vol 23, no 1, pp84–97, chapter 11, chapter 12
- Glendon, M. A. (1987) *Abortion and Divorce in Western Law*, Harvard University Press, Cambridge, MA, chapter 12
- Glöckner, A. and Betsch, T. (2008) 'Modeling option and strategy choices with connectionist networks: Towards an integrative model of automatic and deliberate decision making', *Judgment and Decision Making*, vol 3, pp215–228, chapter 3
- Goffman, E. (1963) *Stigma*, Prentice-Hall, Englewood Cliffs, NJ, chapter 13, chapter 19
- Goldstein, W. M. and Einhorn, H. J. (1987) 'Expression theory and the preference reversal phenomena', *Psychological Review*, vol 94, pp236–254, chapter 1, chapter 2
- Graham, J., Beaulieu, N. D., Sussman, D., Sadowitz, M. and Li, Y. (1999) 'Who lives near coke plants and oil refineries? An exploration of the environmental inequity hypothesis', *Risk Analysis*, vol 19, pp171–186, chapter 10
- Grandien, C., Nord, L. and Strömbäck, J. (2005) 'Efter flodvågskatastrofen (after the Tsunami disaster)', Krisberedningsmyndighetens temaserie, Stockholm, chapter 8
- Greenberg, M. (1993) 'Proving environmental equity in siting locally unwanted land uses', *Risk: Issues in Health and Safety*, vol 235, pp235–252, chapter 10
- Greenberg, M. and Schneider, D. (1995) 'Gender differences in risk perception: Effects differ in stressed versus non-stressed environments', *Risk Analysis*, no 15, pp503–511, chapter 10
- Gregory, R. (2002) 'Incorporating value trade-offs into community-based environmental risk decisions', *Environmental Values*, vol 11, pp461–488, chapter 12
- Gregory, R. and Failing, L. (2002) 'Using decision analysis to encourage sound deliberation: Water use planning in British Columbia, Canada', *Journal of Policy Analysis and Management*, vol 21, pp492–499, chapter 12
- Gregory, R. and McDaniels, T. (2005) 'Improving environmental decision processes', in National Research Council (NRC), Committee on the Human Dimensions of Global Change, G. D. Brewer and P. C. Stern (eds) *Decision Making for the Environment: Social and Behavioral Science Research Priorities*, National Academies Press, Washington, DC, chapter 12
- Gregory, R. and Wellman, K. (2001) 'Bringing stakeholder values into environmental policy choices: A community-based estuary case study', *Ecological Economics*, vol 39, no 1, pp37–52, chapter 12
- Gregory, R., Flynn, J. and Slovic, P. (1995) 'Technological stigma', *American Scientist*, vol 83, pp220–223, intro, chapter 9, chapter 13, chapter 14, chapter 19
- Gregory, R., Arvai, J. and McDaniels, T. (2001a) 'Value-focused thinking for environmental risk consultation', in G. Böhm, J. Nerb, T. McDaniels and H. Spada (eds) *Environmental Risks: Perception, Evaluation and Management*, Elsevier Science, Oxford, chapter 12

- Gregory, R., McDaniels, T. and Fields, D. (2001b) 'Decision aiding, not dispute resolution: Creating insights through structured environmental decisions', *Journal of Policy Analysis and Management*, vol 20, no 3, pp415–432, chapter 12
- Groeneweg, J., Wagenaar, W. A. and Reason, J. T. (1994) 'Promoting safety in the oil industry', *Ergonomics*, vol 37, pp1999–2013, chapter 19
- Gross, J. (2002) 'Emotion regulation: Affective, cognitive, and social consequences', *Psychophysiology*, vol 39, pp281–291, chapter 3
- Gross, J. L. and Rayner, S. (1985) *Measuring Culture: A Paradigm for the Analysis of Social Organization*, Columbia University Press, New York, chapter 11
- Gurmankin, A. D., Baron, J. and Armstrong, K. (2004) 'The effect of numerical statements of risk on trust and comfort with hypothetical physician risk communication', *Medical Decision Making*, vol 24, no 3, pp265–271, chapter 20
- Gustafson, P. E. (1998) 'Gender differences in risk perception: Theoretical and methodological perspectives', *Risk Analysis*, vol 18, no 6, pp805–811, chapter 10
- Gusfield, J. R. (1968) 'On legislating morals: The symbolic process of designating deviance', *California Law Review*, vol 56, no 1, pp54–73, chapter 12
- Gusfield, J. R. (1986) *Symbolic Crusade: Status Politics and the American Temperance Movement*, 2nd edn, University of Illinois Press, Champaign, chapter 12
- Gutierrez, R. and Giner-Sorolla, R. (2007) 'Anger, disgust and presumption of harm as reactions to taboo-breaking behaviors', *Emotion*, vol 7, pp853–868, chapter 18
- Gutteling, J. M. and Wiegman, O. (1993) 'Gender-specific reactions to environmental hazards in The Netherlands', *Sex Roles*, vol 28, pp433–447, chapter 9, chapter 10, chapter 11
- Gwartney-Gibbs, P. A. and Lach, D. H. (1991) 'Sex differences in attitudes toward nuclear war', *Journal of Peace Research*, vol 28, pp161–176, chapter 9
- Gyawali, D. (1999) 'Institutional forces behind water conflict in the Ganga plains', *GeoJournal*, vol 47, no 3, pp443–452, chapter 11
- Hagstrom, J. (2004) 'U.S. should follow Japanese on mad cow testing', *Congress Daily*, 17 March 2004, chapter 12
- Hahn, R. W., Lutter, R. W. and Viscusi, W. K. (2000) *Do Federal Regulations Reduce Mortality?*, AEI Press, La Vergne, TN, chapter 12
- Hahn, R. W. and Stavins, R. N. (1991) 'Incentive-based environmental regulation: A new era from an old idea?', *Ecology Law Quarterly*, vol 18, pp1–42, chapter 12
- Haidt, J. (2001) 'The emotional dog and its rational tail: A social intuitionist approach to moral judgment', *Psychological Review*, vol 108, no 4, pp814–834, chapter 5
- Haidt, J. (2007) 'The new synthesis in moral psychology', *Science*, vol 316, pp998–1002, chapter 5
- Haire, M. (1950) 'Projective techniques in marketing research', *The Journal of Marketing*, vol 14, pp649–656, chapter 22
- Hamilton, D. L. and Sherman, S. J. (1996) 'Perceiving persons and groups', *Psychological Review*, vol 103, pp336–355, chapter 3
- Hammond, D., Fong, G., McDonald, P., Cameron, R. and Brown, K. (2003) 'Impact of the graphic Canadian warning labels on adult smoking behavior', *Tobacco Control*, vol 12, pp391–395, chapter 22
- Hammond, D., Fong, G., McDonald, P., Brown, K. and Cameron, R. (2004a) 'Graphic cigarette package warning labels do not lead to adverse outcomes: Evidence from Canadian smokers', *American Journal of Public Health*, vol 94, pp1442–1445, chapter 22



- Hammond, D., McDonald, P., Fong, G., Brown, K. and Cameron, R. (2004b) 'The impact of cigarette warning labels and smoke-free bylaws on smoking cessation', *Canadian Journal of Public Health*, vol 95, pp201–204, chapter 22
- Handmer, J. and Penning-Rowsell, E. (1990) *Hazards and the Communication of Risk*, Gower, Aldershot, chapter 19
- Hart Research Associates (2006) 'Report findings: Based on a national survey of adults', [www.nanotechproject.org/file\\_download/files/HartReport.pdf](http://www.nanotechproject.org/file_download/files/HartReport.pdf), accessed 1 January 2010, chapter 18
- Hart Research Associates (2007) 'Awareness of and attitudes toward nanotechnology and federal regulatory agencies', [www.nanotechproject.org/process/files/5888/hart\\_nanopoll\\_2007.pdf](http://www.nanotechproject.org/process/files/5888/hart_nanopoll_2007.pdf), accessed 1 January 2010, chapter 18
- Harvey, D. R. (2001) 'What lessons from foot and mouth? A preliminary economic assessment of the 2001 epidemic', Working Paper No. 63, University of Newcastle upon Tyne, Centre for Rural Economy, chapter 19
- Hastie, R. and Park, B. (1986) 'The relationship between memory and judgment depends on whether the judgment task is memory-based or on-line', *Psychological Review*, vol 93, pp258–268, chapter 3
- Health Canada (2003) 'Canada's health warning messages for tobacco products: Labelling a legally available, inherently harmful product', [www.wto.org/english/tratop\\_e/tbt\\_e/event\\_oct03\\_e/case7\\_e.ppt](http://www.wto.org/english/tratop_e/tbt_e/event_oct03_e/case7_e.ppt), accessed 2 January 2010, chapter 22
- Health Canada (2007) 'Smoking prevalence in Canada', [www.hc-sc.gc.ca/hc-ps/pubs/tobac-tabac/prtc-relct-2006/part2-eng.php#a1](http://www.hc-sc.gc.ca/hc-ps/pubs/tobac-tabac/prtc-relct-2006/part2-eng.php#a1), accessed 6 January 2010, chapter 22
- Heeren, T., Edwards, E. M., Dennis, J. M., Rodkin, S., Hingson, R. W. and Rosenbloom, D. L. (2008) 'A comparison of results from an alcohol survey of a prerecruited Internet panel and the national epidemiologic survey on alcohol and related conditions', *Alcoholism: Clinical and Experimental Research*, vol 32, pp222–229, chapter 18
- Hendrickx, L., Vlek, C. and Oppewal, H. (1989) 'Relative importance of scenario information and frequency information in the judgment of risk', *Acta Psychologica*, vol 72, pp41–63, chapter 2
- Hendriks, C. M. (2005) 'Consensus conferences and planning cells: Lay citizen deliberations', in J. Gastil and P. Levine (eds) *The Deliberative Democracy Handbook*, Jossey-Bass, New York, chapter 12
- Henrich, J., Albers, W., Boyd, R., Gigerenzer, G., McCabe, K. A., Ockenfels, A. and Young, H. P. (2001) 'Group report: What is the role of culture in bounded rationality?', in G. Gigerenzer and R. Selten (eds) *Bounded Rationality: The Adaptive Toolbox*, MIT Press, Cambridge, MA, chapter 12
- Herman, J. (1997) *Trauma and Recovery: The Aftermath of Violence from Domestic Abuse to Political Terror*, rev edn, Basic Books, New York, chapter 13
- Hertwig, R., Barron, G., Weber, E. U. and Erev, I. (2004) 'Decisions from experience and the effect of rare events in risky choices', *Psychological Science*, vol 15, pp534–539, chapter 8
- Herzlinger, R. E. (2002) 'Let's put consumers in charge of health care', *Harvard Business Review*, vol 80, no 7, pp44–55, chapter 20
- Hibbard, J. H. and Peters, E. (2003) 'Supporting informed consumer health care decisions: Data presentation approaches that facilitate the use of information in choice', *Annual Review of Public Health*, vol 24, pp413–433, chapter 22

- Hibbard, J. H., Slovic, P., Peters, E. and Finucane M. L. (2002) 'Strategies for reporting health plan performance information to consumers: Evidence from controlled studies', *Health Services Research*, vol 37, no 2, pp291–313, chapter 20
- Hibbard, J. H., Peters, E., Dixon, A. and Tusler, M. (2007) 'Consumer competencies and the use of comparative quality information: It isn't just about literacy', *Medical Care Research and Review*, vol 64, no 4, pp379–394, chapter 20
- Hill, A. (2001) 'Media risks: The social amplification of risk and the media debate', *Journal of Risk Research*, vol 4, pp209–226, chapter 19
- Hillsman, Rev. M. and Krafter, M. (1996) Interview by author at the Shiloh Baptist Church, Marshall, Georgia, 29 July, chapter 13
- Hirsch, J. M. (1999) 'Emissions allowance trading under the Clean Air Act: A model for future environmental regulations?', *New York University Environmental Law Journal*, vol 7, pp352–397, chapter 12
- Hirschleifer, D. and Shumway, T. (2003) 'Good day sunshine: Stock returns and the weather', *The Journal of Finance*, vol 58, pp1009–1032, chapter 8
- Hofstadter, R. (1970) 'America as a gun culture', *American Heritage*, vol 21, October, pp4–10, 82–85, chapter 11
- Holmes, A., Vuilleumier, P. and Eimer, M. (2003) 'The processing of emotional facial expression is gated by spatial attention: Evidence from event-related brain potentials', *Cognitive Brain Research*, vol 16, pp174–184, chapter 3
- Holzheu, F. and Wiedemann, P. (1993) 'Introduction: Perspectives on risk perception', in B. Rück (ed) *Risk Is a Construct*, Knesbeck, Munich, chapter 19
- Hopkins, D. P., Briss, P. A., Ricard, C. J., Husten, C. G., Carande-Kulis, V. G., Fielding, J. E., Alao, M. O., McKenna, J. W., Sharp, D. J., Harris, J. R., Woollery, T. A. and Harris, K. W. (2001) 'Reviews of evidence regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke', *American Journal of Preventive Medicine*, vol 20, pp16–66, chapter 22
- Hsee, C. K. (1996a) 'Elastic justification: How unjustifiable factors influence judgments', *Organizational Behavior and Human Decision Processes*, vol 66, pp122–129, chapter 1
- Hsee, C. K. (1996b) 'The evaluability hypothesis: An explanation for preference reversals between joint and separate evaluations of alternatives', *Organizational Behavior and Human Decision Processes*, vol 67, pp247–257, intro, chapter 1
- Hsee, C. K. (1998) 'Less is better: When low-value options are valued more highly than high-value options', *Journal of Behavioral Decision Making*, vol 11, pp107–121, chapter 1
- Hsee, C. K. and Kunreuther, H. (2000) 'The affection effect in insurance decisions', *Journal of Risk and Uncertainty*, vol 20, pp141–159, chapter 1, chapter 2, chapter 8
- Hsee, C. K. and Menon, S. (1999) 'Affection effect in consumer choices', unpublished study, University of Chicago, chapter 2
- Hsee, C. K. and Rottenstreich, Y. (2004) 'Music, pandas, and muggers: On the affective psychology of value', *Journal of Experimental Psychology: General*, vol 133, pp23–30, chapter 1, chapter 4
- Hsee, C. K., Loewenstein, G., Blount, S. and Bazerman, M. H. (1999) 'Preference reversals between joint and separate evaluations of options: A review and theoretical analysis', *Psychological Bulletin*, vol 125, pp576–590, chapter 1
- Huber, J., Payne, J. W. and Puto, C. (1982) 'Adding asymmetrically dominated alternatives: Violations of regularity and the similarity hypothesis', *Journal of Consumer Research*, vol 9, no 1, pp90–98, chapter 1



- Hunt, S., Frewer, L. J. and Shepherd, R. (1999) 'Public trust in sources of information about radiation risks in the UK', *Journal of Risk Research*, vol 2, no 2, pp167–180, chapter 19
- Hyde, D. and Spelke, E. (2009) 'All numbers are not equal: An electrophysiological investigation of small and large number representations', *Journal of Cognitive Neuroscience*, vol 21, pp1039–1053, chapter 3
- Iglehart, J. K. (2002) 'Changing health insurance trends', *New England Journal of Medicine*, vol 347, no 12, pp956–962, chapter 20
- Industrial Relations and Social Affairs (IRSA) (1995) 'Eurobarometer 41.0: Europeans and blood', [ec.europa.eu/public\\_opinion/archives/ebs/ebs\\_083\\_en.pdf](http://ec.europa.eu/public_opinion/archives/ebs/ebs_083_en.pdf), accessed 28 December 2009, chapter 14
- Inglehart, R. (1988) 'The renaissance of political culture', *American Political Science Review*, vol 82, pp1203–1230, chapter 19
- Isen, A. M. (1993) 'Positive affect and decision making', in M. Lewis and J. M. Haviland (eds) *Handbook of Emotions*, Guilford Press, New York, chapter 2
- Isen, A. M. (1997) 'Positive affect and decision making', in W. M. Goldstein and R. M. Hogarth (eds) *Research on Judgment and Decision Making: Currents, Connections, and Controversies*, Cambridge University Press, New York, chapter 8
- Jamieson, P. and Romer, D. (2001) 'A profile of smokers and smoking', in P. Slovic (ed) *Smoking: Risk, Decision, and Policy*, Sage, Thousand Oaks, CA, chapter 21
- Janis, I. L. (1982) *Victims of Groupthink*, 2nd edn, Houghton-Mifflin, Boston, chapter 19
- Janis, I. L. and Mann, L. (1977) *Decision Making*, Free Press, New York, chapter 2, chapter 19
- Jenkins-Smith, H. (1991) 'Alternative theories of the policy process: Reflections on research strategy for the study of nuclear waste policy', *PS: Political Science & Politics*, vol 24, no 2, pp157–166, chapter 19
- Jenkins-Smith, H. (2001) 'Modeling stigma: An empirical analysis of nuclear waste images of Nevada', in P. Slovic, J. Flynn and H. Kunreuther (eds) *Risk, Media, and Stigma: Understanding Public Challenges to Modern Science and Technology*, Earthscan, London, chapter 11
- Jenkins-Smith, H. and Smith, W. (1994) 'Ideology, culture, and risk perception', in D. J. Coyle and R. Ellis (eds) *Politics, Policy, and Culture*, Westview Press, Boulder, CO, chapter 11
- Jenni, K. E. and Loewenstein, G. (1997) 'Explaining the "identifiable victim effect"', *Journal of Risk and Uncertainty*, vol 14, no 3, pp235–258, chapter 2, chapter 3, chapter 4
- Johnson, B. B. (2002) 'Gender and race in beliefs about outdoor air pollution', *Risk Analysis*, vol 22, no 4, pp725–738, chapter 10
- Johnson, B. B. and Covello, V. (1987) *Social and Cultural Construction of Risk*, Reidel, Dordrecht, The Netherlands, chapter 19
- Johnson, E. J. and Tversky, A. (1983) 'Affect, generalization, and the perception of risk', *Journal of Personality and Social Psychology*, vol 45, pp20–31, chapter 2, chapter 8
- Johnston, B. R. (ed) (1994) *Who Pays the Price? The Sociocultural Context of Environmental Crisis*, Island Press, Washington, DC, chapter 13
- Johnston, B. R. (ed) (1997) *Life and Death Matters: Human Rights and the Environment at the End of the Millennium*, AltaMira Press, Walnut Creek, CA, chapter 13
- Johnston, L. D., O'Malley, P. M. and Bachman, J. G. (1993) *National Survey Results on Drug Use from the Monitoring the Future Study* (No. 93-3598), National Institute on Drug Abuse, Rockville, MD, chapter 7

- Jones, E. E., Farina, A., Hastorf, A. H., Marcus, H., Miller, D. T., Scott, R. A. and French, R. D. (1984) *Social Stigma: The Psychology of Marked Relationships*, W. H. Freeman, New York, chapter 10, chapter 13
- Jones, R. E. (1998) 'Black concern for the environment: Myth versus reality', *Society and Natural Resources*, vol 11, pp209–228, chapter 10, chapter 11
- Jungermann, H., Pfister, H. R. and Fischer, K. (1996) 'Credibility, information preferences, and information interests', *Risk Analysis*, vol 16, pp251–261, chapter 15
- Just, R. (2008) 'The truth will not set you free: Everything we know about Darfur, and everything we're not doing about it', *The New Republic*, 27 August, pp36–47, chapter 4
- Kahan, D. M. (1999) 'The secret ambition of deterrence', *Harvard Law Review*, vol 113, no 2, pp413–500, chapter 12
- Kahan, D. M. (2007) 'The cognitively illiberal state', *Stanford Law Review*, vol 60, no 1, pp115–154, chapter 11
- Kahan, D. M. and Braman, D. (2003) 'More statistics, less persuasion: A cultural theory of gun-risk perceptions', *University of Pennsylvania Law Review*, vol 151, no 4, pp1291–1327, chapter 11
- Kahan, D. M. and Braman, D. (2006a) 'Cultural cognition and public policy', *Yale Journal of Law & Public Policy*, vol 24, p147, chapter 11
- Kahan, D. M. and Braman, D. (2006b) 'Overcoming the fear of guns, the fear of gun control, and the fear of cultural politics: Constructing a better gun debate', *Emory Law Journal*, vol 55, no 4, pp569–607, chapter 12
- Kahan, D. M. and Nussbaum, M. C. (1996) 'Two conceptions of emotion in criminal law', *Columbia Law Review*, vol 96, pp269–374, chapter 12
- Kahan, D. M., Braman, D., Gastil, J., Slovic, P. and Mertz, C. K. (2005) 'Gender, race, and risk perception: The influence of cultural status anxiety', <http://ssrn.com/abstract=723762>, accessed 23 December 2009, chapter 12
- Kahan, D. M., Slovic, P., Braman, D. and Gastil, J. (2006) 'Fear of democracy: A cultural critique of Sunstein on risk', *Harvard Law Review*, vol 119, pp1071–1109, chapter 11, chapter 18
- Kahan, D. M., Braman, D., Gastil, J., Slovic, P. and Mertz, C. K. (2007) 'Culture and identity-protective cognition: Explaining the white-male effect in risk perception', *Journal of Empirical Legal Studies*, vol 4, pp465–505, chapter 18
- Kahneman, D. (1994) 'New challenges to the rationality assumption', *Journal of Institutional and Theoretical Economics*, vol 150, pp18–36, chapter 2
- Kahneman, D. (1997) 'New challenges to the rationality assumption', *Legal Theory*, vol 3, pp105–124, chapter 7
- Kahneman, D. (2003) 'A perspective on judgment and choice: Mapping bounded rationality', *American Psychologist*, vol 58, pp697–720, chapter 1, chapter 3, chapter 4
- Kahneman, D. and Frederick, S. (2002) 'Representativeness revisited: Attribute substitution in intuitive judgment', in T. Gilovich, D. Griffin and D. Kahneman (eds) *Heuristics and Biases: The Psychology of Intuitive Judgment*, Cambridge University Press, New York, chapter 2, chapter 4
- Kahneman, D. and Snell, J. (1990) 'Predicting utility', in R. M. Hogarth (ed) *Insights in Decision Making*, pp295–310, University of Chicago, Chicago, IL, chapter 2, chapter 7
- Kahneman, D. and Snell, J. (1992) 'Predicting a changing taste', *Journal of Behavioral Decision Making*, vol 5, pp187–200, chapter 2
- Kahneman, D. and Tversky, A. (1979) 'Prospect theory: An analysis of decision under risk', *Econometrica*, vol 47, no 2, pp263–291, chapter 1, chapter 12, chapter 20

- Kahneman, D., Slovic, P. and Tversky, A. (eds) (1982) *Judgment Under Uncertainty: Heuristics and Biases*, Cambridge University Press, New York, intro, chapter 2
- Kahneman, D., Knetsch, J. L. and Thaler, R. H. (1991) 'Anomalies: The endowment effect, loss aversion, and status quo bias', *Journal of Economic Perspectives*, vol 5, no 1, pp193–206, chapter 12
- Kahneman, D., Schkade, D. and Sunstein, C. R. (1998) 'Shared outrage and erratic awards: The psychology of punitive damages', *Journal of Risk and Uncertainty*, vol 16, pp49–86, chapter 1, chapter 2
- Kaku, M. and Trainer, J. (eds) (1982) *Nuclear Power: Both Sides*, Norton, New York, chapter 12
- Kalof, L., Dietz, T., Guagnano, G. and Stern, P. C. (2002) 'Race, gender and environmentalism: The atypical values and beliefs of white men', *Race, Gender & Class*, vol 9, no 2, pp1–19, chapter 10, chapter 11
- Kasperson, J. X. and Kasperson, R. E. (1993) 'Corporate culture and technology transfer', in H. S. Brown, P. Derr, O. Renn and A. White (eds) *Corporate Environmentalism in a Global Economy*, Quorum Books, Westport, CT, chapter 19
- Kasperson, J. X. and Kasperson, R. E. (2001) 'Transboundary risks and social amplification', in J. Linnerooth-Bayer and R. E. Löfstedt (eds) *Cross-National Studies of Transboundary Risk Problems*, Earthscan, London, chapter 19
- Kasperson, J. X., Kasperson, R. E., Perkins, B. J., Renn, O. and White, A. L. (1992) *Information Content, Signals, and Sources Concerning the Proposed Repository at Yucca Mountain: An Analysis of Newspaper Coverage and Social-Group Activities in Lincoln County, Nevada*, Clark University, Center for Technology, Environment, and Development, Worcester, MA, chapter 19
- Kasperson, J. X., Kasperson, R. E. and Turner, B. L. (eds) (1995) *Regions at Risk: Comparisons of Threatened Environments*, United Nations University, Tokyo, Japan, chapter 19
- Kasperson, J. X., Kasperson, R. E., Pidgeon, N. and Slovic P. (2003). 'The social amplification of risk: Assessing fifteen years of research and theory', in N. Pidgeon, R. E. Kasperson and P. Slovic (eds) *The Social Amplification of Risk*, Cambridge University Press, Cambridge, UK, chapter 17
- Kasperson, R. E. (1992) 'The social amplification of risk: Progress in developing an integrative framework of risk', in S. Krimsky and D. Golding (eds) *Social Theories of Risk*, Praeger, New York, chapter 13, chapter 17, chapter 19
- Kasperson, R. E. (forthcoming) 'Process and institutional issues in siting hazardous facilities', chapter 19
- Kasperson, R. E. and Kasperson, J. X. (1991) 'Hidden hazards', in D. G. Mayo and R. D. Hollander (eds) *Acceptable Evidence: Science and Values in Risk Management*, Oxford University Press, New York, chapter 19
- Kasperson, R. E. and Kasperson, J. X. (1996) 'The social amplification and attenuation of risk', *The Annals of the American Academy of Political and Social Science*, vol 545, pp95–105, chapter 19
- Kasperson, R. E. and Stallen, P. J. M. (eds) (1991) *Communicating Risks to the Public: International Perspectives*, Kluwer Academic, Dordrecht, The Netherlands, chapter 19
- Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., Goble, R., Kasperson, J. X. and Ratick, S. (1988) 'The social amplification of risk: A conceptual framework', *Risk Analysis*, vol 8, pp177–187, chapter 12, chapter 13, chapter 17, chapter 19
- Kasperson, R. E., Golding, D. and Tuler, S. (1992) 'Social distrust as a factor in siting hazardous facilities and communicating risks: Individual and collective responses to

- risk', *Journal of Social Issues*, vol 48, no 4, pp161–188, chapter 19
- Kasperson, R. E., Kasperson, J. X. and Turner, B. L. (1999) 'Risk and criticality: Trajectories of regional environmental degradation', *Ambio*, vol 28, no 6, pp562–568, chapter 19
- Kasperson, R. E., Jhaveri, N. and Kasperson, J. X. (2001) 'Stigma, places, and the social amplification of risk: Toward a framework of analysis', in J. Flynn, P. Slovic and H. Kunreuther (eds) *Risk, Media and Stigma: Understanding Public Challenges to Modern Science and Technology*, Earthscan, London, chapter 19
- Keeney, R. L. (1990) 'Mortality risks induced by economic expenditures', *Risk Analysis*, vol 10, no 1, pp147–159, chapter 12
- Kennedy, P. (1998) *A Guide to Econometrics*, 4th edn, MIT Press, Cambridge, MA, chapter 4
- Kerr, N. L., MacCoun, R. J. and Kramer, G. P. (1996) 'Bias in judgment: Comparison individuals and groups', *Psychological Review*, vol 103, no 4, pp687–719, chapter 12
- Kirsch, I. S., Jungeblut, A., Jenkins, L. and Kolstad, A. (2002) 'Adult literacy in America: A first look at the findings of the National Adult Literacy Survey', 3rd edn, National Center for Education Statistics, <http://nces.ed.gov/pubs93/93275.pdf>, accessed 31 December 2009, chapter 20
- Kleck, G. (1996) 'Crime, culture conflict and the sources of support for gun control: A multilevel application of the general social surveys', *American Behavioral Scientist*, vol 39, no 4, pp387–404, chapter 12
- Kletz, T. A. (1996) 'Risk – Two views: The public's and the experts', *Disaster Prevention and Management*, vol 15, pp41–46, chapter 15
- Kogut, T. and Ritov, I. (2005a) 'The "Identified Victim" effect: An identified group, or just a single individual?', *Journal of Behavioral Decision Making*, vol 18, pp157–167, chapter 3, chapter 4
- Kogut, T. and Ritov, I. (2005b) 'The singularity of identified victims in separate and joint evaluations', *Organizational Behavior and Human Decision Processes*, vol 97, pp106–116, chapter 3, chapter 4
- Kraus, N., Malmfors, T. and Slovic, P. (1992) 'Intuitive toxicology: Expert and lay judgments of chemical risks', *Risk Analysis*, vol 12, pp 215–232, chapter 9, chapter 10, chapter 11, chapter 15
- Kristof, N. D. (2005) 'Nukes are green', *New York Times*, 9 April 2005, chapter 12
- Kroll-Smith, J. S. and Floyd, H. H. (1997) *Bodies in Protest: Environmental Illness and the Struggle over Medical Knowledge*, New York University Press, New York, chapter 13
- Kunreuther, H. and Slovic, P. (1996) 'Science, values, and risk', *The Annals of the American Academy of Political and Social Science*, vol 545, pp116–125, chapter 9
- Kunreuther, H., Fitzgerald, K. and Aarts, T. D. (1993) 'Siting noxious facilities: A test of the facility siting credo', *Risk Analysis*, vol 13, pp301–318, chapter 19
- Kuyper, H. and Vlek, C. (1984) 'Contrasting risk judgments among interest groups', *Acta Psychologica*, vol 56, pp205–218, chapter 9
- Kysar, D. A. (2003) 'The expectations of consumers', *Columbia Law Review*, vol 103, no 7, pp1700–1790, chapter 12
- Kysar, D. and Salzman, J. (2003) 'Environmental tribalism', *Minnesota Law Review*, vol 87, pp1099–1137, chapter 12
- La Porte, T. R. (1996) 'High reliability organizations: Unlikely, demanding and at risk', *Journal of Contingencies and Crisis Management*, vol 4, pp60–70, chapter 19
- Lackritz, E. M., Satten, G. A., Aberle-Grasse, J. et al (1995) 'Estimated risk of transmission of the human immunodeficiency virus by screened blood in the United States', *New England Journal of Medicine*, vol 333, pp1721–1725, chapter 14

- Lang, F. R. and Carstensen, L. L. (2002) 'Time counts: Future time perspective, goals and social relationships', *Psychology and Aging*, vol 17, pp125–139, chapter 8
- Langford, I. L. (2002) 'An existential approach to risk perception', *Risk Analysis*, vol 22, pp101–120, chapter 19
- Lasker, R. D. (2004) 'Redefining readiness: Terrorism planning through the eyes of the public', [www.redefiningreadiness.net/pdf/RedefiningReadinessStudy.pdf](http://www.redefiningreadiness.net/pdf/RedefiningReadinessStudy.pdf), accessed 31 December 2009, chapter 17
- Lau, J., Lau, M., Kim, J. H. and Tsui, H. I. (2006) 'Impacts of media coverage on the community stress level in Hong Kong after the tsunami on 26 December 2004', *Journal of Epidemiology and Community Health*, vol 60, pp675–682, chapter 8
- Lavie, N., Ro, T. and Russell, C. (2003) 'The role of perceptual load in processing distractor faces', *Psychological Science*, vol 14, pp510–515, chapter 3
- Lawless, E. W. (1977) *Technology and Social Shock*, Rutgers University Press, New Brunswick, NJ, chapter 19
- Le Doux, J. (1996) *The Emotional Brain*, Simon and Schuster, New York, chapter 2
- Lee, S. J., Liljas, B., Churchill, W. H. et al (1998) 'Perceptions and preferences of autologous blood donors', *Transfusion*, vol 38, pp757–763, chapter 14
- Leiserowitz, A. (2004) 'Before and after *The Day After Tomorrow*: A U.S. study of climate change risk perception', *Environment*, vol 46, no 9, pp22–37, chapter 17
- Leiserowitz, A. (2005) 'American risk perceptions: Is climate change dangerous?', *Risk Analysis*, vol 25, no 6, pp1433–1442, chapter 17, chapter 18
- Lerner, J. S. and Gonzalez, R. M. (2005) 'Forecasting one's future based on fleeting subjective experiences', *Personality and Social Psychology Bulletin*, vol 31, pp454–466, chapter 8
- Lerner, J. S., Gonzalez, R. M., Small, D. A. and Fischhoff, B. (2003) 'Effects of fear and anger on perceived risks of terrorism: A national field experiment', *Psychological Science*, vol 14, pp144–150, chapter 8
- Lester, J., Allen, H. and Hill, K. (2001) *Environmental Justice in the United States: Myths and Realities*, Westview Press, Boulder, CO, chapter 10
- Leventhal, H. (1970) 'Findings and theory in the study of fear communication', in L. Berkowitz (ed) *Advances in Experimental Social Psychology*, vol 5, Academic Press, New York, chapter 19
- Lewin, K. (1946) 'Behavior and development as a function of the total situation', in L. Carmichael (ed) *Manual of Child Psychology*, Wiley, New York, intro
- Lichtenberg, J. and Maclean, D. (1991) 'The role of the media in risk communication', in R. E. Kasperon and P. J. M. Stallen (eds) *Communicating Risks to the Public*, Kluwer Academic Press, London, chapter 19
- Lichtenberg, J. and MacLean, D. (1992) 'Is good news no news?', *Geneva Papers on Risk and Insurance*, vol 17, pp362–365, chapter 15
- Lichtenstein, S. and Slovic, P. (1971) 'Reversals of preference between bids and choices in gambling decisions', *Journal of Experimental Psychology*, vol 89, pp46–55, chapter 1
- Lichtenstein, S. and Slovic P. (eds) (2006) *The Construction of Preference*, Cambridge University Press, New York, chapter 1, chapter 8
- Lichtenstein, S., Slovic, P., Fischhoff, B., Layman, M. and Combs, B. (1978) 'Judged frequency of lethal events', *Journal of Experimental Psychology: Human Learning and Memory*, vol 4, pp551–578, chapter 2
- Lifton, R. J. (1967) *Death in Life: Survivors of Hiroshima*, Random House, New York, chapter 6, chapter 13

- Lifton, R. J. and Mitchell, G. (1995) 'The age of numbing', *Technology Review*, August/September, pp58–59, chapter 6
- Lipkus, I. M. and Hollands, J. G. (1999) 'The visual communication of risk', *Journal of the National Cancer Institute: Monographs*, no 25, pp149–163, chapter 20
- Lipkus, I. M., Samsa, G. and Rimer, B. K. (2001) 'General performance on a numeracy scale among highly educated samples', *Medical Decision Making*, vol 21, no 1, pp37–44, chapter 20
- Loewenstein, G. F. (1996) 'Out of control: Visceral influences on behavior', *Organizational Behavior and Human Decision Processes*, vol 65, pp272–292, chapter 2
- Loewenstein, G. F. (1999) 'A visceral account of addiction', in J. Elster and O.-J. Skog (eds) *Getting Hooked: Rationality and Addiction*, Cambridge University Press, Cambridge, UK, chapter 2, chapter 7
- Loewenstein, G. F. and Schkade, D. (1999) 'Wouldn't it be nice? Predicting future feelings', in E. Diener, N. Schwartz and D. Kahneman (eds) *Well-Being: The Foundations of Hedonic Psychology*, Russell Sage Foundation, New York, chapter 2, chapter 7
- Loewenstein, G. and Small, D. (2007) 'The scarecrow and the tin man: The vicissitudes of human sympathy and caring', *Review of General Psychology*, vol 11, pp112–126, chapter 3
- Loewenstein, G., Weber, E. U., Hsee, C. K. and Welch, E. S. (2001) 'Risk as feelings', *Psychological Bulletin*, vol 127, 267–286 intro, chapter 1, chapter 2, chapter 3, chapter 6, chapter 12, chapter 15
- Loewenstein, G., Small, D. A. and Strand, J. (2006) 'Statistical, identifiable, and iconic victims', in E. J. McCaffery and J. Slemrod (eds) *Behavioral Public Finance*, pp32–46, Russell Sage Foundation Press, New York, chapter 4
- Löfstedt, R. E. and Horlick-Jones, T. (1999) 'Environmental regulation in the UK: Politics, institutional change and public trust', in G. Cvetkovich and R. E. Löfstedt (eds) *Social Trust and the Management of Risk*, Earthscan, London, chapter 19
- Lord, C. G., Ross, L. and Lepper, M. R. (1979) 'Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence', *Journal of Personality and Social Psychology*, vol 37, no 11, pp2098–2109, chapter 12, chapter 18
- Lott, J. R. (2000) *More Guns, Less Crime: Understanding Crime and Gun-Control Laws*, 2nd edn, University of Chicago Press, Chicago, IL, chapter 11
- Luhmann, N. (1979) *Trust and Power: Two Works by Niklas Luhmann*, Wiley, Chichester, chapter 19
- Lukensmeyer, C. J., Goldman, J. and Brigham, S. (2005) 'A town meeting for the twenty-first century', in J. Gastil and P. Levine (eds) *The Deliberative Democracy Handbook*, Jossey-Bass, New York, chapter 12
- Luker, K. (1984) *Abortion and the Politics of Motherhood*, University of California Press, Berkeley, CA, chapter 11
- Lynch, B. S. and Bonnie, R. J. (1994) *Growing Up Tobacco Free: Preventing Nicotine Addiction in Children and Youths*, National Academies Press, Washington, DC, chapter 22
- Maani, K. E. and Cavana, R. Y. (2000) *Systems Thinking and Modelling: Understanding Change and Complexity*, Prentice Hall, Auckland, New Zealand, chapter 17
- MacGregor, D. G. (1991) 'Worry over technological activities and life concerns', *Risk Analysis*, vol 11, pp315–324, chapter 19
- MacGregor, D., Slovic, P. and Morgan, M. G. (1994) 'Perception of risks from electro-magnetic fields: A psychometric evaluation of a risk-communication approach', *Risk*



- Analysis*, vol 14, no 5, pp815–828, chapter 13
- MacGregor, D. G., Slovic, P., Dreman, D. and Berry, M. (2000) 'Imagery, affect, and financial judgment', *Journal of Psychology and Financial Markets*, vol 1, pp104–110, chapter 7
- Machlis, G. E. and Rosa, E. A. (1990) 'Desired risk: Broadening the social amplifications of risk framework', *Risk Analysis*, vol 10, no 1, pp161–168, chapter 19
- MacKie, D. M. and Quellar, S. (2000) 'The impact of group membership on persuasion: Revisiting "who says what to whom with what effect?"', in D. J. Terry and M. A. Hogg (eds) *Attitudes, Behavior, and Social Context: The Role of Norms and Group Membership*, Erlbaum, Mahwah, NJ, chapter 11
- MacKie, D. M., Gastardoconaco, M. C. and Skelly, J. J. (1992) 'Knowledge of the advocated position and the processing of in-group and out-group persuasive messages', *Personality and Social Psychology Bulletin*, vol 18, no 2, pp145–151, chapter 11
- Mackie, D. M., Worth, L. T. and Asuncion, A. G. (1990) 'Processing of persuasive in-group messages', *Journal of Personality and Social Psychology*, vol 58, no 5, pp812–822, chapter 12
- Macoubrie, J. (2006) 'Nanotechnology: Public concerns, reasoning and trust in government', *Public Understanding of Science*, vol 15, pp221–241, chapter 18
- Madison, J. (1787) 'The Federalist No. 10: The utility of the union as a safeguard against domestic faction and insurrection (continued)', [www.constitution.org/fed/federa10.htm](http://www.constitution.org/fed/federa10.htm), accessed 23 December 2009, chapter 12
- Mahood, G. (2004) *Canada's Tobacco Package Label or Warning System: 'Telling the Truth' About Tobacco Product Risks*, World Health Organization, Geneva, Switzerland, chapter 22
- Mandel, G. N. and Gathii, J. T. (2006) 'Cost-benefit analysis versus the precautionary principle: Beyond Cass Sunstein's "Laws of Fear"', *University of Illinois Law Review*, 2006, no 5, pp1037–1079, chapter 12
- Mann, H. (2007) 'Upplevd nyhetsrapportering och associerade känslor i samband med katastrofer: En explorativ studie [News coverage and experienced feelings in connection to disasters: An explorative study]', Reports from Stockholm University, <http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva6777>, accessed 19 January 2007, chapter 8
- Marcus, E. N. (2006) 'The silent epidemic: The health effects of illiteracy', *New England Journal of Medicine*, vol 355, no 4, pp339–341, chapter 20
- Margolis, H. (1996) *Dealing with Risk: When the Public and Experts Disagree on Environmental Issues*, University of Chicago Press, Chicago, IL, chapter 11, chapter 12, chapter 14
- Marlatt, G. A. and Gordon, J. R. (1985) *Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors*, Guilford Press, New York, chapter 22
- Marris, C., Langford, I. H. and O'Riordan, T. (1998) 'A quantitative test of the cultural theory of risk perceptions: Comparison with the psychometric paradigm', *Risk Analysis*, vol 18, no 5, pp635–647, chapter 11, chapter 19
- Marris, C., Wynne, B., Simmons, P. and Weldon, S. (2001) *Public Perceptions of Agricultural Biotechnologies in Europe*, Final Report FAIR CT98-3844, DG12-SSMI, Commission of the European Communities, Brussels, Belgium, chapter 19
- Matza, D. (1964) *Delinquency and Drift*, Transaction, Edison, NJ, chapter 12
- Mazur, A. (1984) 'The journalist and technology: Reporting about Love Canal and Three Mile Island', *Minerva*, vol 22, pp45–66, chapter 19

- Mazur, A. (1990) Nuclear power, chemical hazards, and the quantity of reporting', *Minerva*, vol 28, pp294–323, chapter 19
- McCabe, A. S. and Fitzgerald, M. R. (1991) 'Media images of environmental biotechnology: What does the public see?', in G. S. Saylor, R. Fox and J. W. Blackburn (eds) *Environmental Biotechnology for Waste Treatment*, Plenum, New York, chapter 19
- McGarity, T. O. (2002) 'Professor Sunstein's fuzzy math', *Georgetown Law Journal*, vol 90, p2341, chapter 12
- McIntosh, P. L. (1996) 'When the surgeon has HIV: What to tell patients about the risk of exposure and the risk of transmission', *University of Kansas Law Review*, vol 44, no 2, pp315–364, chapter 12
- McKelvie, S. J. (1997) 'The availability heuristic: Effects of fame and gender on the estimated frequency of male and female names', *Journal of Social Psychology*, vol 137, no 1, pp63–78, chapter 12
- McKibben, B. (1989) *The End of Nature*, Doubleday, New York, chapter 6
- McKibben, B. (1992) *The Age of Missing Information*, Random House, New York, chapter 6
- McKibben, B. (1998) *Maybe One: A Personal and Environmental Argument for Single-Child Families*, Simon & Schuster, New York, chapter 6
- McKibben, B. (2003) *Enough: Staying Human in an Engineered Age*, Times Books, New York, chapter 6
- McNeil, B. J., Pauker, S. G., Sox, H. C. and Tversky, A. (1982) 'On the elicitation of preferences for alternative therapies', *The New England Journal of Medicine*, vol 306, pp1259–1262, chapter 9
- Mellers, B. A. (2000) 'Choice and the relative pleasure of consequences', *Psychological Bulletin*, vol 126, no 6, pp910–924, chapter 2
- Mellers, B. A., Ordóñez, L. and Birnbaum, M. H. (1992) 'A change-of-process theory for contextual effects and preference reversals in risky decision making', *Organizational Behavior and Human Decision Processes*, vol 52, pp331–369, chapter 1
- Mellers, B. A., Schwartz, A., Ho, K. and Ritov, I. (1997) 'Decision affect theory: Emotional reactions to the outcomes of risky options', *Psychological Science*, vol 8, pp423–429, chapter 2
- Melville, K., Willingham, T. L. and Dedrick, J. R. (2005) 'National issues forums: A network of communities promoting public deliberation', in J. Gastil and P. Levine (eds) *The Deliberative Democracy Handbook*, Jossey-Bass, New York, chapter 12
- Merleau-Ponty, M. (1962) *The Phenomenology of Perception*, Routledge and Kegan Paul, London, chapter 13
- Metz, W. C. (1996) 'Historical application of a social amplification of risk model: Economic impact of risk events at a nuclear weapons facility', *Risk Analysis*, vol 16, no 2, pp185–193, chapter 19
- Miller, J. D., Scott, E. C. and Okamoto, S. (2006) 'Science communication: Public acceptance of evolution', *Science*, vol 313, pp765–766, chapter 18
- Mitchell, M. L. (1989) 'The impact of external parties on brand-name capital: The 1982 Tylenol poisonings and subsequent cases', *Economic Inquiry*, vol 27, pp601–618, chapter 1, chapter 13
- Mitchell, R. C., Payne, B. and Dunlap, R. E. (1988) 'Stigma and radioactive waste: Theory, assessment, and some empirical findings from Hanford, WA', in R. G. Post (ed) *Waste Management '88: Waste Processing, Transportation, Storage and Disposal, Technical Programs and Public Education*, vol 2, *High-Level Waste and General Interest*, University of Arizona, Tucson, AZ, chapter 19



- Mohai, P. and Bryant, B. (1998) 'Is there a "race" effect on concern for environmental quality?', *Public Opinion Quarterly*, vol 62, pp475–505, chapter 10, chapter 11
- Morgan, M. G., Fischhoff, B., Bostrom, A. and Atman, C. J. (2001) *Risk Communication: A Mental Models Approach*, Cambridge University Press, New York, chapter 19
- Morris, W. N. (1999) 'The mood system', in D. Kahneman, E. Diener and N. Schwarz (eds) *Well-being: The Foundations of Hedonic Psychology*, Russell-Sage, New York, chapter 8
- Mowrer, O. H. (1960a) *Learning Theory and Behavior*, Wiley, New York, intro, chapter 2, chapter 7
- Mowrer, O. H. (1960b) *Learning Theory and the Symbolic Processes*, Wiley, New York, intro, chapter 7
- Murphy, S. T. and Zajonc, R. B. (1993) 'Affect, cognition, and awareness: Affective priming with optimal and suboptimal stimulus exposures', *Journal of Personality and Social Psychology*, vol 64, pp723–739, chapter 3, chapter 22
- Mutz, D. C. and Martin, P. S. (2001) 'Facilitating communication across lines of political difference: The role of mass media', *American Political Science Review*, vol 95, pp97–114, chapter 18
- Needleman, H. L., Schell, A., Bellinger, D., Leviton, A. and Allred, E. N. (1990) 'The long-term effects of exposure to low doses of lead in childhood: 11-year follow-up report', *New England Journal of Medicine*, vol 322, no 2, pp83–88, chapter 10
- New York Times* (2001) 'Philip Morris issues apology for Czech study on smoking', 27 July, pC12
- Niaura, R. S., Rohsenour, D. J., Blinkoff, J. A., Monti, P. M., Pedraza, M. and Abrams, D. B. (1988) 'Relevance of cue reactivity to understanding alcohol and smoking relapse', *Journal of Abnormal Psychology*, vol 97, pp133–152, chapter 22
- Nisbett, R. E. and Cohen, D. (1996) *Culture of Honor: The Psychology of Violence in the South*, Westview Press, Boulder, CO, chapter 12
- Noll, R. G. and Krier, J. E. (1990) 'Some implications of cognitive psychology for risk', *Journal of Legal Studies*, vol 19, no 2, pp747–779, chapter 12
- Novemsky, N., Dhar, R., Schwarz, N. and Simonson, I. (2007) 'Preference fluency in choice', *Journal of Marketing Research*, vol 44, pp347–356, chapter 8
- NRC (National Research Council) Committee on Risk Characterization (1989) *Improving Risk Communication*, National Academy Press, Washington, DC, chapter 19
- NRC Committee on Risk Characterization (1996) *Understanding Risk: Informing Decisions in a Democratic Society*, National Academy Press, Washington, DC, intro, chapter 2, chapter 19
- NRC Committee on Toxicology (2001) *Arsenic in Drinking Water: 2001 Update*, National Academy Press, Washington, DC, chapter 12
- NRC Committee to Improve Research on Information and Data on Firearms (2004) *Firearms and Violence: A Critical Review*, National Academy Press, Washington, DC, chapter 12
- Nussbaum, M. C. (2001) *Upheavals of Thought: The Intelligence of Emotions*, Cambridge University Press, New York, chapter 12
- Ochsner, K. and Phelps, E. (2007) 'Emerging perspectives on emotion-cognition interactions', *Trends in Cognitive Sciences*, vol 11, pp317–318, chapter 3
- Okrent, D. and Pidgeon, N. E. (1998) 'Risk perception versus risk analysis', *Reliability Engineering and System Safety*, vol 59, no 1, pp1–159, chapter 19
- Oliver-Smith, A. (1996) 'Anthropological research on hazards and disasters', *Annual Review of Anthropology*, vol 25, p303, chapter 13

- Ordóñez, L. and Benson, L., III (1997) 'Decisions under time pressure: How time constraint affects risky decision making', *Organizational Behavior and Human Decision Processes*, vol 71, no 2, pp121–140, chapter 2
- Osgood, C. E., Suci, G. J. and Tannenbaum, P. H. (1957) *The Measurement of Meaning*, University of Illinois, Urbana, IL, intro, chapter 1
- Otway, H., Haastруп, P., Connell, W., Gianitsopoulos, G. and Paruccini, M. (1988) 'Risk communication in Europe after Chernobyl: A media analysis of seven countries', *Industrial Crisis Quarterly*, vol 2, pp31–35, chapter 19
- Packard, V. (1957) *The Hidden Persuaders*, David McKay, New York, chapter 1
- Palmer, C. G. S. (2003) 'Risk perception: Another look at the "white male" effect', *Health, Risk & Society*, vol 5, no 1, pp71–83, chapter 11
- Palmer, C. G. S., Carlstrom, L. K. and Woodward, J. A. (2001) 'Risk perception and ethnicity', *Risk Decision and Policy*, vol 6, pp187–206, chapter 19
- Parducci, A. (1995) *Happiness, Pleasure, and Judgment*, Erlbaum, Mahwah, NJ, chapter 1
- Pavot, W. and Diener, E. (1993) 'Review of the satisfaction with life scale', *Personality Assessment*, vol 5, pp164–172, chapter 8
- Pearce, W. B. and Littlejohn, S. W. (1997) *Moral Conflict: When Social Worlds Collide*, Sage, Thousand Oaks, CA, chapter 12
- Pennington, N. and Hastie, R. (1993) 'A theory of explanation-based decision making', in G. Klein, J. Orasano, R. Calderwood and C. E. Zsombok (eds) *Decision Making in Action: Models and Methods*, Ablex, Norwood, NJ, chapter 2
- Perrow, C. (1984) *Normal Accidents: Living with High-Risk Technologies*, Basic Books, New York, chapter 19
- Peters, E. (2006) 'The functions of affect in the construction of preferences', in S. Lichtenstein and P. Slovic (eds) *The Construction of Preference*, Cambridge University Press, New York, chapter 8
- Peters, E. and Slovic, P. (1996) 'The role of affect and worldviews as orienting dispositions in the perception and acceptance of nuclear power', *Journal of Applied Social Psychology*, vol 26, pp1427–1453, chapter 7, chapter 11, chapter 19
- Peters, E. and Slovic, P. (2000) 'The springs of action: Affective and analytical information processing in choice', *Personality and Social Psychology Bulletin*, vol 26, pp1465–1475, chapter 2, chapter 3, chapter 18
- Peters, E., Burraston, B. and Mertz, C. K. (2004) 'An emotion-based model of risk perception and stigma susceptibility: Cognitive appraisals of emotion, affective reactivity, worldviews, and risk perceptions in the generation of technological stigma', *Risk Analysis*, vol 24, pp1349–1367, chapter 12, chapter 18
- Peters, E., Västfjäll, D., Gärling, T. and Slovic, P. (2006a) 'Affect and decision making: A "hot" topic. The role of affect in decision making', *Journal of Behavioral Decision Making*, vol 19, no 2, pp79–85, chapter 1
- Peters, E., Västfjäll, D., Slovic, P., Mertz, C. K., Mazzocco, K. and Dickert, S. (2006b) 'Numeracy and decision making', *Psychological Science*, vol 17, pp407–413, chapter 1, chapter 20
- Peters, E., Dieckmann, N., Dixon, A., Hibbard, J. H. and Mertz, C. K. (2007a) 'Less is more in presenting quality information to consumers', *Medical Care Research and Review*, vol 64, no 2, pp169–190, chapter 20
- Peters, E., Romer, D., Slovic, P., Jamieson, K. H., Wharfield, L., Mertz, C. K. and Carpenter, S. M. (2007b) 'The impact and acceptability of Canadian-style cigarette warning labels among U.S. smokers and nonsmokers', *Nicotine & Tobacco Research*, vol 9, no 4, pp473–481, chapter 20

- Petterson, J. S. (1988) 'Perception vs. reality of radiological impact: The Goiania model', *Nuclear News*, vol 31, no 14, pp84–90, chapter 19
- Pfister, H.-R. and Böhm, G. (2008) 'The multiplicity of emotions: A framework of emotional functions in decision making', *Judgment and Decision Making*, vol 3, no 1, pp5–17, chapter 8
- Pham, M. T. (1998) 'Representativeness, relevance, and the use of feelings in decision making', *Journal of Consumer Research*, vol 25, pp144–159, chapter 8
- Pham, M. T. (2007) 'Emotion and rationality: A critical review and interpretation of empirical evidence', *Review of General Psychology*, vol 11, pp155–178, chapter 3
- Philipson, T. J. and Posner, R. A. (1993) *Private Choices and Public Health: The AIDS Epidemic an in Economic Perspective*, Harvard University Press, Cambridge, MA, chapter 12
- Phillips, L. D. (1984) 'A theory of requisite decision models', *Acta Psychologica*, vol 56, pp29–48, chapter 2
- Phillips, L., Bridgeman, J. and Ferguson-Smith, M. (2000) *The Report of the Inquiry into BSE and Variant CJD in the UK*, The Stationery Office, London, chapter 19
- Picard, A. (1995) *The Gift of Death: Confronting Canada's Tainted-Blood Tragedy*, HarperCollins, Toronto, Canada, chapter 14
- Pidgeon, N. F. (1988) 'Risk perception and accident analysis', *Acta Psychologica*, vol 68, pp355–368, chapter 19
- Pidgeon, N. F. (1997) *Risk Communication and the Social Amplification of Risk – Phase 1 Scoping Study*, Report to the UK Health and Safety Executive (Risk Assessment and Policy Unit), RSU Ref 3625/R62.076, HSE Books, London, chapter 17, chapter 19
- Pidgeon, N. F. and O'Leary, M. (1994) 'Organizational safety culture: Implications for aviation practice', in N. Johnston, N. McDonald and R. Fuller (eds) *Aviation Psychology in Practice*, Avebury Technical, Aldershot, chapter 19
- Pidgeon, N. F. and O'Leary, M. (2000) 'Man-made disasters: Why technology and organizations (sometimes) fail', *Safety Science*, vol 34, pp15–30, chapter 19
- Pidgeon, N. F., Henwood, K. and Maguire, B. (1999) 'Public health communication and the social amplification of risks: Present knowledge and future prospects', in P. Bennett and K. Calman (eds) *Risk Communication and Public Health*, Oxford University Press, UK, chapter 19
- Pidgeon, N. F., Hood, C., Jones, D., Turner, B. and Gibson, R. (1992) 'Risk perception', in The Royal Society Study Group (ed) *Risk: Analysis, Perception and Management*, The Royal Society, London, chapter 19
- Pidgeon, N. F., Kasperson, R. E. and Slovic, P. (eds) (2003) *The Social Amplification of Risk*, Cambridge University Press, Cambridge, UK, chapter 17
- Pierce, J. P., Farkas, A. J., Evans, N. and Gilpin, E. (1995) 'An improved surveillance measure for adolescent smoking?', *Tobacco Control*, vol 4, no 1, pp47–56, chapter 22
- Pollay, R. W. (1995) 'Targeting tactics in selling smoke: Youthful aspects of 20th century cigarette advertising', *Journal of Marketing Theory and Practice*, vol 3, pp1–22, chapter 22
- Pollay, R. W. (2000) 'Targeting youth and concerned smokers: Evidence from Canadian tobacco industry documents', *Tobacco Control*, vol 9, pp136–147, chapter 22
- Poortinga, W., Steg, L. and Vlek, C. (2002) 'Environmental risk concern and preferences for energy-saving measures', *Environment & Behavior*, vol 34, no 4, pp455–478, chapter 11
- Poortinga, W., Bickerstaff, K., Langford, I., Niewöhner, J. and Pidgeon, N. (2004) 'The British 2001 foot and mouth crisis: A comparative study of public risk perceptions,

- trust and beliefs about government policy in two communities', *Journal of Risk Research*, vol 7, pp73–90, chapter 19
- Posner, M. I. and Raichle, M. E. (1994) *Images of Mind*, Scientific American Books, New York, chapter 3
- Posner, M. I. and Rothbart, M. K. (2007) 'Research on attention networks as a model for the integration of psychological sciences', *Annual Review of Psychology*, vol 58, pp1–23, chapter 3
- Powell, D. (2001) 'Mad cow disease and the stigmatization of British beef', in J. Flynn, P. Slovic and H. Kunreuther (eds) *Risk, Media, and Stigma: Understanding Public Challenges to Modern Science and Technology*, Earthscan, London, chapter 1
- Power, S. (2003) *A Problem from Hell: America and the Age of Genocide*, Harper Perennial, New York, chapter 5
- Prentice, D. A. and Miller, D. T. (1993) 'Pluralistic ignorance and alcohol use on campus: Some consequences of misperceiving the social norm', *Journal of Personality and Social Psychology*, vol 64, no 2, pp243–256, chapter 12
- Project 88 (1988) 'Harnessing market forces to protect our environment: Initiatives for the new president', [www.hks.harvard.edu/fs/rstavins/Monographs\\_&\\_Reports/Project\\_88-1.pdf](http://www.hks.harvard.edu/fs/rstavins/Monographs_&_Reports/Project_88-1.pdf), accessed 26 December 2009, chapter 13
- Putnam, R. D. (1993) *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press, Princeton, NJ, chapter 19
- Putnam, R. D. (1995) 'Tuning in, tuning out: The strange disappearance of social capital in America', *PS Political Science and Politics*, vol 28, pp664–683, chapter 19
- Quattrone, G. A. and Jones, E. E. (1980) 'The perception of variability within in-groups and out-groups: Implications for the laws of small numbers', *Journal of Personality and Social Psychology*, vol 38, no 1, pp141–152, chapter 12
- Rappaport, R. A. (1988) 'Toward postmodern risk analysis', *Risk Analysis*, vol 8, pp189–191, chapter 19
- Rawls, J. (1993) *Political Liberalism*, Columbia University Press, New York, chapter 12
- Raymond, J. E., Fenske, M. J. and Tavassoli, N. T. (2003) 'Selective attention determines emotional responses to novel visual stimuli', *Psychological Science*, vol 14, pp537–542, chapter 3
- Raymond, J. E., Fenske, M. J. and Westoby, N. (2005) 'Emotional devaluation of distracting patterns and faces: A consequence of attentional inhibition during visual search?', *Journal of Experimental Psychology: Human Perception and Performance*, vol 31, pp1404–1415, chapter 3
- Rayner, S. (1988) 'Muddling through metaphors to maturity: A commentary on Kasperson et al, "The Social Amplification of Risk"', *Risk Analysis*, vol 8, pp201–204, chapter 19
- Rayner, S. (1992) 'Cultural theory and risk analysis', in S. Krimsky and D. Golding (eds) *Social Theories of Risk*, Praeger, Westport, CT, chapter 11, chapter 19
- Reber, R. and Schwarz, N. (1999) 'Effects of perceptual fluency on judgments of truth', *Consciousness and Cognition*, vol 8, pp338–342, chapter 8
- Reber, R., Schwarz, N. and Winkielman, P. (2004) 'Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience?', *Personality and Social Psychology Review*, vol 8, pp364–382, chapter 8
- Renn, O. (1991) 'Risk communication and the social amplification of risk', in R. E. Kasperson and P. J. M. Stallen (eds) *Communicating Risks to the Public: International Perspectives*, Kluwer Academic, Dordrecht, The Netherlands, chapter 19

- Renn, O. (1998a) 'Three decades of risk research: Accomplishments and new challenges', *Journal of Risk Research*, vol 1, pp49–71, chapter 19
- Renn, O. (1998b) 'The role of risk communication and public dialog for improving risk management', *Risk Decision and Policy*, no 3, pp5–30, chapter 17
- Renn, O. (2003) 'Social amplification of risk in participation: Two case studies', in N. Pidgeon, R. G. Kasperson and P. Slovic (eds) *The Social Amplification of Risk*, Cambridge University Press, Cambridge, UK, chapter 19
- Renn, O. and Levine, D. (1991) 'Credibility and trust in risk communication', in R. E. Kasperson and P. J. M. Stallen (eds) *Communicating Risks to the Public: International Perspectives*, Kluwer Academic, Dordrecht, The Netherlands, chapter 19
- Renn, O. and Rohrmann, B. (2000) *Cross-Cultural Risk Perception: A Survey of Empirical Studies*, Kluwer Academic Press, Amsterdam, The Netherlands, chapter 19
- Renn, O., Burns, W., Kasperson, J. X., Kasperson, R. E. and Slovic, P. (1992) 'The social amplification of risk: Theoretical foundations and empirical applications', *Journal of Social Issues*, vol 48, no 4, pp137–160, chapter 19
- Renn, O., Webler, T. and Wiedemann, P. (1995) *Fairness and Competence in Citizen Participation: Evaluating Models for Environmental Discourse*, Kluwer Academic, Dordrecht, The Netherlands, chapter 19
- Revesz, R. L. (1999) 'Environmental regulation, cost-benefit analysis, and the discounting of human lives', *Columbia Law Review*, vol 99, no 4, pp941–1017, chapter 11, chapter 12
- Reyna, V. F. and Brainerd, C. J. (1995) 'Fuzzy-trace theory: An interim synthesis', *Learning and Individual Differences*, vol 7, pp1–75, chapter 3
- Ries, L. A. G., Eisner, M. P., Kosary, C. L., Hankey, B. F., Miller, B. A., Clegg, L. and Edwards, B. K. (eds) (2001) 'Table XV-10. Lung and bronchus cancer (invasive): Incidence, mortality, and survival rates', in *SEER Cancer Statistics Review 1973–1998*, National Cancer Institute, Bethesda, MD, chapter 21
- Rip, A. (1988) 'Should social amplification of risk be counteracted?', *Risk Analysis*, vol 8, pp193–197, chapter 19
- Ro, T., Russell, C. and Lavie, N. (2001) 'Changing faces: A detection advantage in the flicker paradigm', *Psychological Science*, vol 12, pp94–99, chapter 3
- Roberts, K. H. (1989) 'New challenges in organizational research: High reliability organizations', *Industrial Crisis Quarterly*, vol 3, pp111–125, chapter 19
- Robinson, R. J. and Killen, J. D. (1997) 'Do cigarette warning labels reduce smoking? Paradoxical effects among adolescents', *Archives of Pediatrics and Adolescent Medicine*, vol 151, pp267–272, chapter 22
- Romer, D. and Jamieson, P. (2001) 'The role of perceived risk in starting and stopping smoking', in P. Slovic (ed) *Smoking: Risk, Perception, and Policy*, Sage, Thousand Oaks, CA, chapter 22
- Roosevelt, F. D. (1933) 'First inaugural address: Saturday, March 4, 1933', [www.bartleby.com/124/pres49.html](http://www.bartleby.com/124/pres49.html), accessed 23 December 2009, chapter 12
- Rosa, E. A. (1998) 'Metatheoretical foundations for post-normal risk', *Journal of Risk Research*, vol 1, pp15–44, chapter 19
- Rosa, E. A. (2003) 'The logical structure of the social amplification of risk framework (SARF): Metatheoretical foundations and policy implications', in N. Pidgeon, R. G. Kasperson and P. Slovic (eds) *The Social Amplification of Risk*, Cambridge University Press, Cambridge, UK, chapter 19
- Rothman, A. J. and Schwarz, N. (1998) 'Constructing perceptions of vulnerability: Personal relevance and the use of experiential information in health judgments',

- Personality and Social Psychology Bulletin*, vol 24, pp1053–1064, chapter 8
- Rothstein, H. (2003) 'Neglected risk regulation: The institutional attenuation phenomenon', *Health, Risk and Society*, vol 5, pp85–103, chapter 19
- Rottenstreich, Y. and Hsee, C. K. (2001) 'Money, kisses, and electric shocks: On the affective psychology of risk', *Psychological Science*, vol 12, pp185–190, chapter 1, chapter 2, chapter 12
- Rowe, G. and Wright, G. (2001) 'Differences in expert and lay judgments of risk: Myth or reality?', *Risk Analysis*, vol 21, pp341–356, chapter 15
- The Royal Society (1992) *Risk: Analysis, Perception and Management*, The Royal Society, London, chapter 19
- Rozin, P., Haidt, J. and McCauley, C. R. (1993) 'Disgust', in M. Lewis and J. M. Haviland (eds) *Handbook of Emotions*, Guilford Press, New York, chapter 2
- Ruckelshaus, W. (1996, November) 'Trust in government: A prescription for restoration', [www.napawash.org/resources/lectures/lecture\\_transcripts\\_web\\_1996.html](http://www.napawash.org/resources/lectures/lecture_transcripts_web_1996.html), accessed 3 January 2010, chapter 19
- Rueda, M. R., Posner, M. I. and Rothbart, M. K. (2005) 'The development of executive attention: Contributions to the emergence of self-regulation', *Developmental Neuropsychology*, vol 28, pp573–594, chapter 3
- Ruiter, R. A. C. (2005) 'Saying is not (always) doing: Cigarette warning labels are useless', *European Journal of Public Health*, vol 15, pp329–330, chapter 22
- Ruiter, R. A. C., Abraham, C. and Kok, G. (2001) 'Scaring warnings and rational precautions: A review of the psychology of fear appeals', *Psychology and Health*, vol 16, pp613–630, chapter 22
- Russell, J. A. (2003) 'Core affect and the psychological construction of emotion', *Psychological Review*, vol 110, pp145–172, chapter 8
- Sandman, P. (1989) 'Hazard versus outrage in the public perception of risk', in V. T. Covello, D. B. McCallum and M. T. Pavlova (eds) *Effective Risk Communication: The Role and Responsibility of Government and Nongovernment Organizations*, Plenum Press, New York, chapter 2
- Sanfey, A. and Hastie, R. (1998) 'Does evidence presentation format affect judgment? An experimental evaluation of displays of data for judgments', *Psychological Science*, vol 9, no 2, pp99–103, chapter 2
- Satterfield, T. A., Slovic, P., Gregory, R., Flynn, J. and Mertz, C. K. (2001) 'Risk lived, stigma experienced', in J. Flynn, P. Slovic and H. Kunreuther (eds) *Risk, Media, and Stigma: Understanding Public Challenges to Modern Science and Technology*, Earthscan, London, chapter 10
- Satterfield, T. A., Mertz, C. K. and Slovic, P. (2004) 'Discrimination, vulnerability, and justice in the face of risk', *Risk Analysis*, vol 24, no 1, pp115–129, chapter 11, chapter 18
- Savadori, L., Rumati, R. and Bonini, N. (1998) 'Expertise and regional differences in risk perception: The case of Italy', *Swiss Journal of Psychology*, vol 57, pp101–113, chapter 15
- Scheufele, D. A. (2006) 'Five lessons in nano outreach', *Materials Today*, vol 9, p64, chapter 18
- Scheufele, D. A. and Lewenstein, B. V. (2005) 'The public and nanotechnology: How citizens make sense of emerging technologies', *Journal of Nanoparticle Research*, vol 7, pp659–667, chapter 18
- Schkade, D. A. and Johnson, E. J. (1989) 'Cognitive processes in preference reversals', *Organizational Behavior and Human Performance*, vol 44, pp203–231, chapter 1



- Schnellhuber, H.-J., Block, A., Cassel-Gintz, M., Kropp, J., Lammel, G., Lass, W., Lienenkamp, R., Loose, C., Lüdeke, M. K. B., Moldenhauer, O., Petschel-Held, G., Plöchl, M. and Reusswig, F. (1997) 'Syndromes of global change', *GALA*, vol 6, pp19–34, chapter 19
- Schum, D. A. and DuCharme, W. M. (1971) 'Comments on the relationship between the impact and the reliability of evidence', *Organizational Behavior and Human Performance*, vol 6, no 2, pp111–131, chapter 20
- Schwab, J. (1994) *Deeper Shades of Green: The Rise of Blue Collar and Minority Environmentalism in America*, Sierra Club Books, San Francisco, CA, chapter 13
- Schwartz, A. (1988) 'Proposals for products liability reform: A theoretical synthesis', *Yale Law Journal*, vol 97, no 3, pp353–419, chapter 12
- Schwartz, L. M., Woloshin, S., Black, W. C. and Welch, H. G. (1997) 'The role of numeracy in understanding the benefit of screening mammography', *Annals of Internal Medicine*, vol 127, no 11, pp966–972, chapter 20
- Schwarz, N. (2004) 'Meta-cognitive experiences in consumer judgment and decision making', *Journal of Consumer Psychology*, vol 14, pp332–348, chapter 8
- Schwarz, N. and Clore, G. L. (1983a) 'Feelings and phenomenal experiences', in E. T. Higgins and A. W. Kruglanski (eds) *Social Psychology: Handbook of Basic Principles*, pp433–465, Guilford Press, New York, chapter 4
- Schwarz, N. and Clore, G. L. (1983b) 'Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states', *Journal of Personality and Social Psychology*, vol 45, pp513–523, chapter 8
- Schwarz, N. and Clore, G. L. (1988) 'How do I feel about it? Informative functions of affective states', in K. Fiedler and J. Forgas (eds) *Affect, Cognition, and Social Behavior*, Hogrefe International, Toronto, Canada, chapter 2
- Schwarz, N. and Clore, G. L. (2007) 'Feelings and phenomenal experiences', in A. Kruglanski and E. T. Higgins (eds) *Social Psychology: Handbook of Basic Principles*, 2nd edn, Guilford Press, New York, chapter 8
- Schwarz, N. and Strack, F. (1999) 'Reports of subjective well-being: Judgmental processes and their methodological implications', in D. Kahneman, E. Diener and N. Schwarz (eds) *Well-being: The Foundations of Hedonic Psychology*, Russell-Sage, New York, chapter 8
- Schwarz, N., Sanna, L., Skurnik, I. and Yoon, C. (2007) 'Metacognitive experiences and the intricacies of setting people straight: Implications for debiasing and public information campaigns', *Advances in Experimental Social Psychology*, vol 39, pp127–161, chapter 8
- Scott, J. C. (1990) *Domination and the Arts of Resistance*, Yale University, New York, chapter 13
- Sen, A. K. (1977) 'Rational fools: A critique of the behavioral foundations of economic theory', *Philosophy and Public Affairs*, vol 6, pp317–344, chapter 7
- Senge, P. M. (1990) *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday, New York, chapter 17
- Sexton, K. and Anderson, Y. B. (1993) 'Equity in environmental health: Research issues and needs', *Toxicology and Industrial Health*, vol 9, no 5, pp679–977, chapter 10
- Sheridan, S. L. and Pignone, M. (2002) 'Numeracy and the medical student's ability to interpret data', *Effective Clinical Practice*, vol 5, no 1, pp35–40, chapter 20
- Sherman, D. A., Kim, H. and Zajonc, R. B. (1998) 'Affective perseverance: Cognitions change but preferences stay the same', Paper presented at the annual meeting of the American Psychological Society, San Francisco, August, chapter 7

- Sherman, D. K. and Cohen, G. L. (2002) 'Accepting threatening information: Self-Affirmation and the reduction of defensive biases?', *Current Directions in Psychological Science*, vol 11, no 4, pp119–123, chapter 11, chapter 12
- Sherman, S. J., Beike, D. R. and Ryalls, K. R. (1999) 'Dual-processing accounts of inconsistencies in responses to general versus specific cases', in S. Chaiken and Y. Trope (eds) *Dual-process Theories in Social Psychology*, Guilford Press, New York, chapter 4
- Shiv, B. and Fedorikhin, A. (1999) 'Heart and mind in conflict: The interplay of affect and cognition in consumer decision making', *Journal of Consumer Research*, vol 26, pp278–292, chapter 4
- Shiv, B., Loewenstein, G., Bechara, A., Damasio, H. and Damasio, A. (2005) 'Investment behavior and the dark side of emotion', *Psychological Science*, vol 16, pp435–439, chapter 8
- Short, J. F., Jr. (1992) 'Defining, explaining, and managing risks', in J. F. Short, Jr. and L. Clarke (eds) *Organizations, Uncertainties, and Risk*, Westview Press, Boulder, CO, chapter 19
- Short, J. F., Jr. and Clarke, L. (1992) *Organizations, Uncertainties and Risk*, Westview Press, Boulder, CO, chapter 19
- Sia, C.-L., Tan, B. C. Y. and Wei, K.-K. (2002) 'Group polarization and computer-mediated communication: Effects of communication cues, social presence, and anonymity', *Information Systems Research*, vol 13, no 1, pp70–90, chapter 12
- Siegel, R. (2007) 'The new politics of abortion', *Illinois Law Review*, vol 2007, no 3, pp991–1053, chapter 11
- Siemer, M. and Reisenzein, R. (1998) 'Effects of mood on evaluative judgments: Influence of reduced processing capacity and mood salience', *Cognition and Emotion*, vol 12, pp783–806, chapter 8
- Siegrist, M. (1999) 'A causal model explaining the perception and acceptance of gene technology', *Journal of Applied Social Psychology*, vol 29, pp2093–2106, chapter 15
- Siegrist, M. (2000) 'The influence of trust and perception of risk and benefits on the acceptance of gene technology', *Risk Analysis*, vol 20, pp195–203, chapter 15
- Siegrist, M. and Cvetkovich, G. (2000) 'Perception of hazards: The role of social trust and knowledge', *Risk Analysis*, vol 20, pp713–719, chapter 15, chapter 19
- Siegrist, M., Cvetkovich, G. and Roth, C. (2000) 'Salient value similarity, social trust and risk/benefit perception', *Risk Analysis*, vol 20, pp353–362, chapter 19
- Singer, E. and Endreny, P. M. (1993) *Reporting on Risk: How the Mass Media Portray Accidents, Diseases, Disasters, and Other Hazards*, Russell Sage Foundation, New York, chapter 19
- Sjöberg, L. (1999) 'Risk perception in western Europe', *Ambio*, vol 28, pp555–568, chapter 19
- Sjöberg, L. (2001) 'Limits of knowledge and the limited importance of trust', *Risk Analysis*, vol 21, pp189–198, chapter 15
- Sjöberg, L. (2002) 'The allegedly simple structure of experts' risk perceptions: An urban legend in risk research', *Science Technology and Human Values*, vol 27, pp443–459, chapter 15
- Skitka, L. J., Mullen, E., Griffen, T., Hutchinson, S. and Chamberlin, B. (2002) 'Dispositions, scripts, or motivated correction? Understanding ideological differences in explanations for social problems', *Journal of Personality and Social Psychology*, vol 83, no 2, pp470–487, chapter 4
- Skilansky, D. (1999) *The Theory of Poker*, 4th edn, Two Plus Two, Henderson, NV, chapter 12



- Slooman, S. A. (1996) 'The empirical case for two systems of reasoning', *Psychological Bulletin*, vol 119, no 1, pp3–22, chapter 2
- Slovic, P. (1987) 'Perception of risk', *Science*, vol 236, pp280–285, chapter 2, chapter 7, chapter 10, chapter 13, chapter 14, chapter 15, chapter 16, chapter 19, chapter 22
- Slovic, P. (1992) 'Perception of risk: Reflections on the psychometric paradigm', in S. Krimsky and D. Golding (eds) *Social Theories of Risk*, Praeger, New York, chapter 10, chapter 13, chapter 19
- Slovic, P. (1993) 'Perceived risk, trust, and democracy', *Risk Analysis*, vol 13, pp675–682, chapter 15, chapter 17, chapter 19
- Slovic, P. (1995) 'The construction of preference', *American Psychologist*, vol 50, pp364–371, chapter 1, chapter 8
- Slovic, P. (1997) 'Trust, emotion, sex, politics, and science: Surveying the risk assessment battlefield', in M. H. Bazerman, D. M. Messick, A. E. Tenbrunsel and K. A. Wade-Benzoni (eds) *Environment, Ethics, and Behavior*, New Lexington, San Francisco, CA, chapter 9, chapter 11, chapter 14
- Slovic, P. (1998a) 'Do adolescent smokers know the risks?', *Duke Law Journal*, vol 47, pp1133–1141, chapter 7
- Slovic, P. (1998b) 'The risk game', *Reliability Engineering and Systems Safety*, vol 59, no 1, pp73–77, chapter 19
- Slovic, P. (1999) 'Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield', *Risk Analysis*, vol 19, no 4, pp689–701, chapter 2, chapter 10
- Slovic, P. (ed) (2000a) *The Perception of Risk*, Earthscan, London, intro, chapter 12, chapter 17, chapter 19
- Slovic, P. (2000b) 'Rejoinder: The perils of Viscusi's analyses of smoking risk perceptions', *Journal of Behavioral Decision Making*, vol 13, pp273–276, chapter 7
- Slovic, P. (2000c) 'What does it mean to know a cumulative risk? Adolescents' perceptions of short-term and long-term consequences of smoking', *Journal of Behavioral Decision Making*, vol 13, pp259–266, chapter 7
- Slovic, P. (2001) 'Cigarette smokers: Rational actors or rational fools?', in P. Slovic (ed) *Smoking: Risk, Perception and Policy*, Sage, Thousand Oaks, CA, chapter 1, chapter 2, chapter 21, chapter 22
- Slovic, P. (2002) 'Terrorism as hazard: A new species of trouble', *Risk Analysis*, vol 22, no 3, pp425–426, chapter 19
- Slovic, P. (2007) '"If I look at the mass I will never act": Psychic numbing and genocide', *Judgment and Decision Making*, vol 2, pp79–95, chapter 1, chapter 3, chapter 5
- Slovic, P. (2009) 'Can international law stop genocide when our moral intuitions fail us?', Report No. 09-06, Decision Research, Eugene, OR, chapter 5
- Slovic, P. and Lichtenstein, S. (1968a) 'The importance of variance preferences in gambling decisions', *Journal of Experimental Psychology*, vol 78, pp646–654, chapter 1
- Slovic, P. and Lichtenstein, S. (1968b) 'Relative importance of probabilities and payoffs in risk taking', *Journal of Experimental Psychology Monograph*, vol 78, no 3, pt 2, pp1–18, chapter 2
- Slovic, P., Fischhoff, B. and Lichtenstein, S. (1979) 'Rating the risks', *Environment*, vol 21, no 3, pp14–20, 36–39, chapter 10, chapter 11, chapter 15
- Slovic, P., Fischhoff, B. and Lichtenstein, S. (1980) 'Facts and fears: Understanding perceived risk', in R. Schwing and W. A. Albers (eds) *Societal Risk Assessment: How Safe Is Safe Enough?*, Plenum, New York, chapter 15
- Slovic, P., Lichtenstein, S. and Fischhoff, B. (1984) 'Modeling the societal impact of fatal accidents', *Management Science*, vol 30, pp464–474, chapter 19

- Slovic, P., Fischhoff, B. and Lichtenstein, S. (1985) 'Characterizing perceived risk', in R. W. Kates, C. Hohenemser and J. X. Kasperson (eds) *Perilous Progress: Technology as Hazard*, Westview, Boulder, CO, chapter 16
- Slovic, P., Kraus, N. N., Lappe, H., Letzel, H. and Malmfors, T. (1989) 'Risk perception of prescription drugs: Report on a survey in Sweden', *Pharmaceutical Medicine*, vol 4, pp43–65, chapter 16
- Slovic, P., Griffin, D. and Tversky, A. (1990a) 'Compatibility effects in judgment and choice', in R. M. Hogarth (ed) *Insights in Decision Making: A Tribute to Hillel J. Einhorn*, University of Chicago Press, Chicago, IL, chapter 1
- Slovic, P., Layman, M. and Flynn, J. (1990b) 'What comes to mind when you hear the words "Nuclear waste repository"? A study of 10,000 images', Report No. NWPO-SE-028-90, Nevada Agency for Nuclear Projects, Carson City, NV, chapter 13
- Slovic, P., Flynn, J. H. and Layman, M. (1991a) 'Perceived risk, trust, and the politics of nuclear waste', *Science*, vol 254, pp1603–1607, chapter 14, chapter 15, chapter 19
- Slovic, P., Kraus, N., Lappe, H. and Major, M. (1991b) 'Risk perception of prescription drugs: Report on a survey in Canada', *Canadian Journal of Public Health*, vol 82, ppS15–S20, chapter 16
- Slovic, P., Layman, M., Kraus, N., Flynn, J., Chalmers, J. and Gesell, G. (1991c) 'Perceived risk, stigma, and potential economic impacts of a high-level nuclear waste repository in Nevada', *Risk Analysis*, vol 11, no 4, pp683–696, chapter 1, chapter 7, chapter 17, chapter 19
- Slovic, P., Flynn, J. and Gregory, R. (1994) 'Stigma happens: Social problems in the siting of nuclear waste facilities', *Risk Analysis*, vol 14, no 5, pp773–777, chapter 19
- Slovic, P., Malmfors, T., Krewski, D., Mertz, C. K., Neil, N. and Bartlett, S. (1995) 'Intuitive toxicology II: Expert and lay judgments of chemical risks in Canada', *Risk Analysis*, vol 15, pp661–675, chapter 9, chapter 15
- Slovic, P., Malmfors, T., Mertz, C. K., Neil, N. and Purchase, I. F. H. (1997a) 'Evaluating chemical risks: Results of a survey of the British Toxicology Society', *Human & Experimental Toxicology*, vol 16, pp289–304, chapter 9
- Slovic, P., MacGregor, D. G., Malmfors, T. and Purchase, I. F. H. (1997b) *Influence of Affective Processes on Toxicologists' Judgments of Risk*, unpublished study, Decision Research, Eugene, OR, chapter 2
- Slovic, P., Flynn, J., Mertz, C. K., Poumadère, M. and Mays, C. (2000a) 'Nuclear power and the public: A comparative study of risk perception in France and the United States', in O. Renn and B. Rohrmann (eds) *Cross-Cultural Risk Perception: A Survey of Empirical Studies*, vol 13, Springer, New York, chapter 12, chapter 19
- Slovic, P., Monahan, J. and MacGregor, D. G. (2000b) 'Violence risk assessment and risk communication: The effects of using actual cases, providing instructions, and employing probability vs. frequency formats', *Law and Human Behavior*, vol 24, pp271–296, intro, chapter 2, chapter 7
- Slovic, P., Finucane, M. L., Peters, E. and MacGregor, D. G. (2002) 'The affect heuristic', in T. Gilovich, D. Griffin and D. Kahneman (eds) *Heuristics and Biases: The Psychology of Intuitive Judgment*, Cambridge University Press, New York, intro, chapter 1, chapter 2, chapter 3, chapter 4, chapter 6, chapter 7, chapter 8, chapter 16, chapter 19
- Slovic, P., Finucane, M. L., Peters, E. and MacGregor, D. G. (2004) 'Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality', *Risk Analysis*, vol 24, pp1–12, chapter 1, chapter 4, chapter 12, chapter 22
- Slovic, P., Peters, E., Finucane, M. L. and MacGregor, D. G. (2005) 'Affect, risk, and decision making', *Health Psychology*, vol 24, no 4, ppS35–S40, chapter 20

- Slovic, S. and Slovic, P. (2004/2005) 'Numbers and nerves: Toward an affective apprehension of environmental risk', *Whole Terrain*, vol 13, pp14–18, chapter 1
- Small, D. A. and Loewenstein, G. (2003) 'Helping the victim or helping a victim: Altruism and identifiability', *Journal of Risk and Uncertainty*, vol 26, no 1, pp5–16, chapter 4
- Small, D. A. and Loewenstein, G. (2005) 'The devil you know: The effect of identifiability on punitiveness', *Journal of Behavioral Decision Making*, vol 18, no 5, pp311–318, chapter 4
- Small, D. A., Loewenstein, G. and Slovic, P. (2007) 'Sympathy and callousness: Affect and deliberations in donation decisions', *Organizational Behavior and Human Decision Processes*, vol 102, pp143–153, chapter 3, chapter 5
- Smith, T. W. (2000) *1999 National Gun Policy Survey of the National Opinion Research Center: Research Findings*, National Opinion Research Center, Chicago, IL, chapter 11
- Snyder, L. B. and Park, C. L. (2002) 'National studies of stress reactions and media exposure to the attacks', in B. S. Greenberg (ed) *Communication and Terrorism: Public and Media Responses to 911*, Hampton Press, Cresskill, NJ, chapter 17
- Sokoloff, H., Steinberg, H. M. and Pyser, S. N. (2005) 'Deliberative city planning on the Philadelphia waterfront', in J. Gastil and P. Levine (eds) *The Deliberative Democracy Handbook*, Jossey-Bass, New York, chapter 12
- Song, J. (2002) 'Every dog has its day – but at what price?', *The Register Guard*, 26 April, p15A, chapter 4
- Sparks, P. and Shepherd, R. (1994) 'Public perceptions of the potential hazards associated with food production and food consumption: An empirical study', *Risk Analysis*, vol 14, pp799–806, chapter 15
- Sparks, P., Shepherd, R. and Frewer, L. (1995) 'Assessing and structuring attitudes toward the use of gene technology in food production: The role of perceived ethical obligation', *Basic and Applied Social Psychology*, vol 16, pp267–285, chapter 15
- Spence, R. (1995) 'IOM Blood Forum explores alternative decision-making and risk communications', *CCBC Newsletter*, 27 January, pp4–5, chapter 14
- Srole, L. (1965) 'Social integration and certain corollaries', *American Sociological Review*, vol 21, no 6, p709ff, chapter 10, chapter 13
- Stallen, P. J. M. and Tomas, A. (1988) 'Public concern about industrial hazards', *Risk Analysis*, vol 8, pp237–245, chapter 19
- Stavins, R. N. (1998) 'What can we learn from the grand policy experiment? Lessons from SO<sub>2</sub> allowance trading', *Journal of Economic Perspectives*, vol 12, no 3, pp69–88, chapter 12
- Steg, L. and Sievers, I. (2000) 'Cultural theory and individual perceptions of environmental risks', *Environment & Behavior*, vol 32, no 2, pp250–285, chapter 11
- Steger, M. A. and Witt, S. L. (1989) 'Gender differences in environmental orientations: A comparison of publics and activists in Canada and the U.S.', *The Western Political Quarterly*, vol 42, pp627–649, chapter 9, chapter 11
- Stein, B. D., Tanielian, T. L., Eisenman, D. P., Keyser, D. J., Burnam, A. and Pincus, H. A. (2004) 'Emotional and behavioral consequences of bioterrorism: Planning a public health response', *The Milbank Quarterly: A Multidisciplinary Journal of Population Health Policy*, vol 82, no 3, pp1–32, chapter 17
- Steingraber, S. (1997) *Living Downstream*, Addison-Wesley, New York, chapter 13
- Stephenson, M. T., Hoyle, R. H., Palmgreen, P. and Slater, M. D. (2003) 'Brief measures of sensation seeking for screening and large-scale surveys', *Drug and Alcohol Dependence*, vol 72, no 3, pp279–286, chapter 11

- Sterman, J. D. (2000) *Business Dynamics: Systems Thinking and Modeling for a Complex World*, McGraw-Hill, Boston, chapter 17
- Stern, P. C., Dietz, T. and Kalof, L. (1993) 'Value orientations, gender, and environmental concerns', *Environment and Behavior*, vol 24, pp322–348, chapter 9, chapter 10, chapter 11
- Stolz, B. A. (1983) 'Congress and capital punishment: An exercise in symbolic politics', *Law and Policy Quarterly*, vol 5, pp157–180, chapter 12
- Stone, E. R., Sieck, W. R., Bulla, B. E., Yates, F., Parks, S. C. and Rusha, C. J. (2003) 'Foreground: Background salience: Explaining the effects of graphical displays on risk avoidance', *Organizational Behavior and Human Decision Processes*, vol 90, no 1, pp19–36, chapter 20
- Strack, F. and Deutsch, R. (2004) 'Reflective and impulsive determinants of social behavior', *Personality and Social Psychology Review*, vol 8, no 3, pp220–247, chapter 4
- Sunstein, C. R. (1996) *Legal Reasoning and Political Conflict*, Oxford University Press, New York, chapter 12
- Sunstein, C. R. (2002) 'The laws of fear', *Harvard Law Review*, vol 115, no 4, pp1119–1168, chapter 12
- Sunstein, C. R. (2003) 'Terrorism and probability neglect', *The Journal of Risk and Uncertainty*, vol 26, pp121–136, chapter 1, chapter 11
- Sunstein, C. R. (2005) *Laws of Fear: Beyond the Precautionary Principle*, Cambridge University Press, New York, intro, chapter 12
- Sunstein C. R. and Thaler, R. H. (2003) 'Libertarian paternalism is not an oxymoron', *University of Chicago Law Review*, vol 70, no 4, pp1159–1202, chapter 20
- Surveillance, Epidemiology, and End Results Program (2001) 'Surveillance, Epidemiology, and End Results (SEER) program public-use data (1973–1998)', (Survival Matrix I), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, Bethesda, MD, chapter 21
- Susarla, A. (2003) 'Plague and arsenic: Assignment of blame in the mass media and the social amplification of attenuation risk', in N. Pidgeon, R. E. Kasperson and P. Slovic (eds) *The Social Amplification of Risk*, Cambridge University Press, Cambridge, UK, chapter 19
- Svenson, O. (1988a) 'Managing product hazards at Volvo Car Corporation', in R. E. Kasperson, J. X. Kasperson, C. Hohenemser and R. W. Kates (eds) *Corporate Management of Health and Safety Hazards: A Comparison of Current Practice*, Westview, Boulder, CO, chapter 19
- Svenson, O. (1988b) 'Mental models of risk communication and action: Reflections on social amplification of risk', *Risk Analysis*, vol 8, pp199–200, chapter 19
- Svenson, O., Fischhoff, B. and MacGregor, D. (1985) 'Perceived driving safety and seatbelt usage', *Accident Analysis & Prevention*, vol 17, pp119–133, chapter 9
- Szalay, L. B. and Deese, J. (1978) *Subjective Meaning and Culture: An Assessment through Word Associations*, Erlbaum, Hillsdale, NJ, intro, chapter 13, chapter 14, chapter 16
- Szasz, A. (1994) *Ecopopulism: Toxic Waste and the Movement for Environmental Justice*, vol 1, University of Minnesota Press, Minneapolis, MN, chapter 10, chapter 13
- Taylor, D. (2000) 'The risk of the environmental justice paradigm', *American Behavioral Scientist*, vol 43, pp508–580, chapter 10
- Theeuwes, J. and Van der Stigchel, S. (2006) 'Faces capture attention: Evidence from inhibition of return', *Visual Cognition*, vol 13, pp657–665, chapter 3
- Thomashow, M. (2002) *Bringing the Biosphere Home: Learning to Perceive Global Environmental Change*, MIT Press, Cambridge, MA, chapter 6

- Thompson, M., Ellis, R. and Wildavsky, A. B. (1990) *Cultural Theory*, Westview Press, Boulder, CO, chapter 11
- Tomkins, S. S. (1962) *Affect, Imagery, and Consciousness: Vol 1. The Positive Affects*, Springer, New York, chapter 2
- Tomkins, S. S. (1963) *Affect, Imagery, and Consciousness: Vol. 2. The Negative Affects*, Springer, New York, chapter 2
- Trumbo, C. W. (1996) 'Examining psychometrics and polarization in a single-risk case study', *Risk Analysis*, vol 16, no 3, pp429–438, chapter 19
- Trumbo, C. W. (2002) 'Information processing and risk perception: An adaptation of the heuristic-systematic model', *Journal of Communication*, vol 52, no 2, p367–382, chapter 12
- Turner, B. A. (1978) *Man-Made Disasters: The Failure of Foresight*, Wykeham, London, chapter 19
- Turner, B. A. and Pidgeon, N. F. (1997) *Man-Made Disasters*, 2nd edn, Butterworth-Heinemann, Oxford, chapter 19
- Tversky, A. and Kahneman, D. (1973) 'Availability: A heuristic for judging frequency and probability', *Cognitive Psychology*, vol 5, pp207–232, chapter 2, chapter 7
- Tversky, A. and Kahneman, D. (1974) 'Judgment under uncertainty: Heuristics and biases', *Science*, vol 185, pp1124–1131, chapter 7
- Tversky, A. and Koehler, D. J. (1994) 'Support theory: A nonextensional representation of subjective probability', *Psychological Review*, vol 101, pp547–567, chapter 7
- United Church of Christ (1987) *Toxic Waste and Race in the United States*, Commission for Racial Justice, New York, chapter 13
- United Kingdom International Liaison Group on Risk Assessment (1998a) *Risk Assessment and Risk Management: Improving Policy and Practice Within Government Departments*, Health and Safety Executive, London, chapter 19
- United Kingdom International Liaison Group on Risk Assessment (1998b) *Risk Communication: A Guide to Regulatory Practice*, Health and Safety Executive, London, chapter 19
- US General Accounting Office (1988) 'Blood safety: Recalls and withdrawals of plasma products', Publication No. GAO/T-HEHS-98-166, [www.gao.gov/archive/1998/he98166t.pdf](http://www.gao.gov/archive/1998/he98166t.pdf), accessed 28 December 2009, chapter 14
- USDHHS (US Department of Health and Human Services) (1989) 'Reducing the health consequences of smoking: 25 years of progress: A report of the surgeon general', DHHS Publication No. CDC89-84 11, US Government Printing Office, Washington, DC, chapter 21
- USDHHS (2000) *Healthy People, 2010*, US Department of Health and Human Services, Washington, DC, chapter 22
- US Senate, Subcommittee on Labor, Health and Human Services, and Education, and Related Agencies, Committee on Appropriations (2002) 'Cloning, 2002: Hearings before a subcommittee of the Committee on Appropriations, United States Senate, 107th Congress, second session', <http://purl.access.gpo.gov/GPO/LPS24045>, accessed 23 December 2009, chapter 12
- Västfjäll, D., Friman, M., Gärling, T and Kleiner, M. (2002) 'The measurement of core affect: A Swedish self-report measure', *Scandinavian Journal of Psychology*, vol 43, pp19–31, chapter 8
- Västfjäll, D., Peters, E. and Slovic, P. (2007) 'Affect and risk-benefit judgments in the aftermath of tsunami disaster', manuscript submitted for publication, chapter 8

- Västfjäll, D., Peters, E. and Slovic, P. (2009) 'Compassion fatigue: Donations and affect are greatest for a single child in need', DR Report No. 09-05, Decision Research, Eugene, OR, chapter 3, chapter 5
- Vaughan, D. (1992) 'Regulating risk: Implications of the Challenger accident', in J. F. Short, Jr. and L. Clarke (eds) *Organizations, Uncertainties, and Risk*, Westview Press, Boulder, CO, chapter 19
- Vaughan, D. (1996) *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA*, University of Chicago Press, Chicago, IL, chapter 19
- Vaughan, E. (1995) 'The significance of socioeconomic and ethnic diversity for the risk communication process', *Risk Analysis*, vol 15, pp169–180, chapter 10, chapter 19
- Vaughan, E. and Seifert, M. (1992) 'Variability in the framing of risk issues', *Journal of Social Issues*, vol 48, no 4, pp119–135, chapter 19
- Vercillo, A. P. and Duprey, S. V. (1988) 'Jehovah's Witnesses and the transfusion of blood products', *New York State Journal of Medicine*, vol 88, pp493–494, chapter 14
- Viscusi, W. K. (1983) *Risk by Choice: Regulating Health and Safety in the Workplace*, Harvard University Press, Cambridge, MA, chapter 11, chapter 12
- Viscusi, W. K. (1990) 'Do smokers underestimate risks?', *Journal of Political Economy*, vol 98, pp1253–1269, chapter 7, chapter 21
- Viscusi, W. K. (1991) 'Age variations in risk perceptions and smoking decisions', *The Review of Economics and Statistics*, vol 73, pp577–588, chapter 7
- Viscusi, W. K. (1992) *Smoking: Making the Risky Decision*, Oxford University Press, New York, chapter 2, chapter 7, chapter 12
- Viscusi, W. K. (1998a) 'Perception of smoking risks', Paper presented at the International Conference on the Social Costs of Tobacco, Lausanne, Switzerland, 21–22 August 1998, chapter 7
- Viscusi, W. K. (1998b) *Rational Risk Policy*, Oxford University Press, New York, chapter 12
- Vlek, C. A. J. and Stallen, P. J. M. (1981) 'Judging risk and benefits in the small and in the large', *Organizational Behavior and Human Performance*, vol 28, pp235–271, chapter 19
- Voils, C. I., Oddone, E. Z., Weinfurt, K. P. et al (2006) 'Racial differences in health concerns', *Journal of the National Medical Association*, vol 98, pp36–42, chapter 16
- Vuilleumier, P. (2005) 'How brains beware: Neural mechanisms of emotional attention', *Trends in Cognitive Sciences*, vol 9, pp586–594, chapter 3
- Vuilleumier, P. and Driver, J. (2007) 'Modulation of visual processing by attention and emotion: Windows on causal interactions between human brain regions', *Philosophical Transactions of The Royal Society*, vol 362, pp837–855, chapter 3
- Vuilleumier, P., Armony, J. L., Driver, J. and Dolan, R. J. (2003) 'Distinct spatial frequency sensitivities for processing faces and emotional expressions', *Nature Neuroscience*, vol 6, pp624–631, chapter 3
- Wählberg, A. (2001) 'The theoretical features of some current approaches to risk perception', *Journal of Risk Research*, vol 4, pp237–250, chapter 19
- Wandersman, A. H. and Hallman, W. K. (1993) 'Are people acting irrationally? Understanding public concerns about environmental threats', *American Psychologist*, vol 48, pp681–686, chapter 9
- Waters, E. A., Weinstein, N. D., Colditz, G. A. and Emmons, K. (2006) 'Formats for improving risk communication in medical tradeoff decisions', *Journal of Health Communication*, vol 11, no 2, pp167–182, chapter 20
- Watts, M. and Bohle, H. (1993) The space of vulnerability: The causal structure of hunger and famine', *Progress in Human Geography*, vol 17, no 1, pp43–67, chapter 10



- Weick, K. E. (1987) 'Organizational culture as a source of high reliability', *California Management Review*, vol 29, pp112–127, chapter 19
- Weinstein, N. D. (1998) 'Accuracy of smokers' risk perceptions', *Annals of Behavioral Medicine*, vol 20, pp135–140, chapter 7
- Weinstein, N. D. (1999a) 'Accuracy of smokers' risk perceptions', *Nicotine & Tobacco Research*, vol 1, ppS123–S130, chapter 21
- Weinstein, N. D. (1999b) 'What does it mean to understand a risk? Evaluating risk comprehension', *Journal of the National Cancer Institute Monograph*, vol 25, pp15–20, chapter 21
- West Virginia State Board of Education v. Barnette (1943) [www.oyez.org/cases/1940-1949/1942/1942\\_591](http://www.oyez.org/cases/1940-1949/1942/1942_591), accessed 27 December 2009, chapter 12
- Wewers, M. E., Ahijevych, K. L., Chen, M. S., Dresbach, S., Kihm, K. E. and Kuun, P. A. (2000) 'Tobacco use characteristics among rural Ohio Appalachians', *Journal of Community Health*, vol 25, pp377–388, chapter 21
- Wiener, J. B. (2002) 'Precaution in a multirisk world', in D. J. Paustenbach (ed) *Human and Ecological Risk Assessment: Theory and Practice*, Wiley, New York, chapter 2
- Wildavsky, A. and Dake, K. (1990) 'Theories of risk perception: Who fears what and why?', *Daedalus*, vol 119, no 4, pp41–59, chapter 11, chapter 18
- Wilkins, L. (1987) *Shared Vulnerability: The Media and the American Perspective on the Bhopal Disaster*, Greenwood Press, Westport, CT, chapter 19
- Wilkins, L. and Patterson, P. (1991) *Risky Business: Communication Issues of Science, Risk and Public Policy*, Greenwood Press, Westport, CT, chapter 19
- Williams, M. V., Parker, R. M., Baker, D. W., Parikh, N. S., Pitkin, K., Coates, W. C. and Nurss, J. R. (1995) 'Inadequate functional health literacy among patients at two public hospitals', *Journal of the American Medical Association*, vol 274, no 21, pp1677–1682, chapter 20
- Willis, H. H., DeKay, M. L., Fischhoff, B. and Morgan, M. G. (2005) 'Aggregate, disaggregate, and hybrid analyses of ecological risk perceptions', *Risk Analysis*, vol 25, pp405–428, chapter 17
- Wilson, T. D. and Brekke, N. C. (1994) 'Mental contamination and mental correction: Unwanted influences on judgments and evaluations', *Psychological Bulletin*, vol 116, pp117–142, chapter 4
- Wilson, T. D., Lisle, D. J., Schooler, J. W., Hodges, S. D., Klaaren, K. J. and LaFleur, S. J. (1993) 'Introspecting about reasons can reduce post-choice satisfaction', *Personality and Social Psychology Bulletin*, vol 19, no 3, pp331–339, chapter 2
- Wilson, T. D., Gilbert, D. T. and Wheatley, T. P. (1998) 'Protecting our minds: The role of lay beliefs', in V. Y. Yzerbyt, G. Lories and B. Dardenne (eds) *Metacognition: Cognitive and Social Dimensions*, pp171–201, Sage Publications, New York, chapter 4
- Wilson, T. D., Lindsey, S. and Schooler, T. Y. (2000) 'A model of dual attitudes', *Psychological Review*, vol 107, no 1, pp101–126, chapter 4
- Wilt, T. J. and Partin, M. R. (2003) 'Prostate cancer intervention', *Postgraduate Medicine*, vol 114, pp 43–49, chapter 16
- Winkielman, P., Zajonc, R. B. and Schwarz, N. (1997) 'Subliminal affective priming resists attributional interventions', *Cognition and Emotion*, vol 11, pp433–465, chapter 7
- Winkielman, P., Schwarz, N., Fazendeiro, T. and Reber, R. (2003) 'Hedonic marking of processing fluency: Implications for evaluative judgment', in J. Musch and K. C. Klauer (eds) *Psychology of evaluation: Affective processes in cognition and emotion*, Erlbaum, Mahwah, NJ, chapter 3

- Winship, C. (2006) 'Policy analysis as puzzle solving', in M. Moran, M. Rein and R. E. Goodin (eds) *The Oxford Handbook of Public Policy*, Oxford University Press, New York, chapter 12
- Witte, K. and Allen, M. (2000) 'A meta-analysis of fear appeals: Implications for effective public health campaigns', *Health Education and Behavior*, vol 27, pp591–615, chapter 22
- Wogalter, M. S. and Laughery, K. R. (1996) 'Warning sign and label effectiveness', *Current Directions in Psychological Science*, vol 5, pp33–37, chapter 22
- Woloshin, S., Schwartz, L. M., Moncur, M., Gabriel, S. and Tosteson, A. N. (2001) 'Assessing values for health: Numeracy matters', *Medical Decision Making*, vol 21, no 5, pp382–390, chapter 20
- World Health Organization (2005) 'Global tobacco treaty enters into force with 57 countries already committed: Parties represent 2.3 billion people', [www.who.int/mediacentre/news/releases/2005/pr09/en/index.html](http://www.who.int/mediacentre/news/releases/2005/pr09/en/index.html), accessed 2 January 2010, chapter 22
- Wright, G., Pearman, A. and Yardley, K. (2000) 'Risk perception in the U.K. oil and gas production industry: Are expert loss-prevention managers' perceptions different from those of members of the public?', *Risk Analysis*, vol 20, pp681–690, chapter 15
- Wright, W. F. and Bower, G. H. (1992) 'Mood effect on subjective probability assessment', *Organizational Behavior and Human Decision Processes*, vol 22, pp276–291, chapter 8
- Yamagishi, K. (1997) 'When a 12.86% mortality is more dangerous than 24.14%: Implications for risk communication', *Applied Cognitive Psychology*, vol 11, pp495–506, chapter 2
- Zajonc, R. B. (1968) 'Attitudinal effects of mere exposure', *Journal of Personality and Social Psychology*, vol 9, pp1–27, chapter 3, chapter 7
- Zajonc, R. B. (1980) 'Feeling and thinking: Preferences need no inferences', *American Psychologist*, vol 35, pp151–175, chapter 2, chapter 4, chapter 7, chapter 22
- Zajonc, R. B. (2000) 'Feeling and thinking: Closing the debate over the independence of affect', in J. P. Forgas (ed) *Feeling and Thinking: The Role of Affect in Social Cognition*, Cambridge University Press, Cambridge, UK, chapter 22
- Zajonc, R. B. (2001) 'Mere exposure: A gateway to the subliminal', *Current Directions in Psychological Science*, vol 10, pp224–228, chapter 22
- Zechendorf, B. (1994) 'What the public thinks about biotechnology', *Biotechnology*, vol 12, pp870–875, chapter 15
- Zikmund-Fisher, B. J., Smith, D. M., Ubel, P. A. and Fagerlin, A. (2007) 'Validation of the Subjective Numeracy Scale (SNS): Effects of low numeracy on comprehension of risk communications and utility elicitations', *Medical Decision Making*, vol 27, no 5, pp663–671, chapter 20
- Zimmerman, R. (1993) 'Social equity and environmental risk', *Risk Analysis*, vol 13, pp649–666, chapter 10, chapter 13



