Introduction

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What are the chances that you will be the victim of a crime on your way home this evening? How likely is it that you will contract cancer from smoking, eating unhealthy foods, or ingesting environmental toxins? Statisticians and scientists have a set of tools to answer these questions – statistics and rationality. What about the rest of us? Most people, when faced with questions like how common, how often, how probable, or how likely, are unable to respond with firm, confident replies. Most people have only an intuitive "feel" when making judgments about probabilities. But they must still make judgments about and choices between alternative risk management strategies or whom to support in public policy debates about health, safety, and the environment.

On what basis do people make such probability judgments? How rational are these judgments? How do such judgments affect how people make choices? Why are people's choices, especially under conditions of risk and uncertainty, seemingly inconsistent? These are the key questions facing scholars who seek to understand judgment and decision making. Researchers working at the intersection of psychology, economics, and the policy sciences have found that people do have a systematic way of arriving at these judgments and choices. But this systematic pattern does not conform to the rational decision process advocated and used by economists and statisticians. Instead, people seem to follow certain *heuristics* or rules of thumb that often do a reasonably good job of helping people make judgments under conditions of uncertainty and low levels of information. At other times, these same heuristics can fail miserably and leave people worse off than they would have been if they had been more systematically rational.

Thus, it is important to understand these systematic deviations from rationality and to examine their implications for policy outcomes. These

heuristics may help explain some policy failures, paradoxes, and inefficiencies that policy scientists sometimes attribute to people's irrational behavior (Stone, 1997; Sunstein, 1990). Some examples of these paradoxes include (1) people's failure to purchase flood insurance, even at subsidized rates (Kunreuther, 1978); (2) policies that mandate inefficient, zero-risk solutions such as complete cleanup of Superfund sites allegedly to satisfy people's preferences (Breyer, 1993); (3) policies that allocate relatively more resources to airline safety than to highway safety because people fear airline accidents more, even though more deaths result from highway accidents (Zeckhauser & Viscusi, 1996); (4) people's tendency to use vastly different discount rates for short versus long periods (Knetsch, 1995); and (5) people's tendency to value losses more than commensurate gains, which leads to a disparity between their willingness to pay to avoid environmental harms and their willingness to accept them (Knetsch 1995).

A fundamental reason for these and other paradoxes may lie in the assumptions, approaches, and methods policy analysts bring to their work, particularly their assumptions about human behavior. Most policy analysis builds on the foundational assumption that people are rational actors, that is, expected utility maximizers. Expected utility maximization may be an appropriate normative standard for people's behavior. However, if people's behavior does not conform to expected utility maximization, then policies based on that assumption may lead to policy failures, paradoxes, and inefficiencies. Incorporating descriptively accurate models of decision making in policy analysis may help resolve some of these paradoxes and inefficiencies.

Behavioral decision theory is one alternative approach to understanding human behavior. Behavioral decision theory provides a more descriptively accurate model of human behavior by capturing the complexity of human judgments and choices. It builds on evidence from experimental research in cognitive psychology that shows that people make judgments and decisions in a fundamentally different way from the way they are assumed to act in the economic model (Kahneman, Slovic, & Tversky, 1982).

According to behavioral decision theory, people systematically violate the normative assumptions of economic rationality by (1) miscalculating probabilities and (2) making choices between competing options based on noneconomic criteria (Camerer, 1995; Kahneman et al., 1982). This more complex but more accurate description of how people behave may reveal areas where people's behavior leads to outcomes different

from what traditional analysis would predict due to the use of judgmental heuristics. In such cases, behavioral decision theory may pinpoint areas where education and debiasing could prove useful, and may also help in designing policies that anticipate and counter cognitive errors.

In general, behavioral decision theoretic insights should be particularly useful wherever people's judgments and choices matter for policy formulation, acceptance, and implementation. It is possible that public policy could be improved with the integration of more accurate assumptions about people's motivations, how well they understand specific information, how aggressively they will pursue information needed to serve their own interest, and how effectively they can make decisions. Incorporating behavioral decision theory's insights will enhance the realism of existing policies, help in devising ones more likely to achieve their intended goals, and enable us to understand the limits of effective regulation. Further, an increase in the accuracy and realism of analysis that may emerge from integrating this perspective could lead to better utilization of policy analysis in the political sphere.

Unfortunately, behavioral decision theoretic insights have yet to be well integrated into the analysis of public policy issues. "Although taking greater account of this evidence could substantially improve the analysis of a wide range of economic issues and policy options, conventional practice continues much as before. There is seldom any reckoning, or even acknowledgment, of these contrary findings and virtually no serious attempt to exploit this evidence to improve policy design and choice" (Knetsch, 1995, p. 68). This is partly because of the dominance of the economic-rational approach in policy analysis. Another reason may be that public policy scholars and practitioners have yet to encounter an accessible introduction to the essence of the behavioral decision theoretic approach that demonstrates its applicability to public policy issues. Although many scholars profess great interest in the insights of behavioral decision theory, they point out that they are unable to grasp these insights well enough to integrate them into their own work. This is because most behavioral decision theoretic writing is confined to psychology and economics. There are few works written for the wider public policy community.

We hope this book will help remedy this deficiency by showcasing various insights and applications of behavioral decision theory in public policy. The chapters are written by leading scholars working on behavioral decision theory in diverse policy settings. The book is designed to give policy analysts and practitioners who are nonpsychologists a

clearer understanding of the complexities of human judgment and choice and an idea of how to integrate behavioral decision theoretic insights into the policy sciences.

The book is divided into five parts. Part I introduces the basics of behavioral decision theory and contrasts it with theories of rational choice. Chris Swoyer's chapter starts the book with a comprehensive overview of the research findings that comprise behavioral decision theory, as well as its boundary conditions and criticisms. Douglas MacLean examines the implications of this *nonrational* judgment and choice process for the policy process and public opinion. Eldar Shafir considers the implications of behavioral insights about human cognition for setting policy guidelines. His chapter demonstrates that presenting people with information either separately or comparatively can significantly alter their evaluations and choices.

Part II considers the relationship between behavioral insights and traditional economic methodologies and assumptions. Jack Knetsch explores the policy implications of the endowment effect, the behavioral foundation of the disparity between willingness to pay and willingness to accept. He also explores valuation over time on the basis of relevant behavioral findings and shows how it differs from standard discounting techniques in economics. Robert MacCoun addresses the question of whether some systematic deviations from rationality (biases) among individuals can be eliminated in group settings. He explores the difference between individual and group judgments using theoretical thought experiments that identify some of the conditions that determine *relative bias*, that is, the difference between group and individual bias. He finds that group interactions do not always attenuate individual-level biases identified by behavioral decision theory. Finally, Lee Friedman explores whether the insights of behavioral decision theoretic research can be operationalized in econometric research. He investigates the topic of energy purchasing by pitting a standard utility-maximizing model against a *bounded rationality* model. He finds that the bounded rationality model best describes natural gas purchasing behavior in an actual market setting.

Public policy is neither made nor executed in a vacuum. Political institutions and processes also affect policy. Part III provides some perspective on how the insights of behavioral decision theory help us better understand and evaluate institutional decision-making procedures and their impact on people's behavior and the policy process. This part includes discussions about the media, the courts, and the impact of political advertising on informed policy choices. Sharon Dunwoody

and Robert Griffin argue that any news story is the product of a host of small, individual-level decisions that are determined by fairly standardized decision heuristics that greatly influence the news-making process in a nonrational way. Jeffrey Fox and Rick Farmer then explore how behavioral findings can help us understand and evaluate the effects of political advertising. Cass Sunstein demonstrates how behavioral findings are creating a new field of *behavioral law and economics*. He traces some of the principal findings that emerge from behavioral research, and shows how they bear on positive and prescriptive work in law.

Part IV is devoted to applications of behavioral decision theory to environmental policy, risk perception and management, negotiation, and stigmatization. In the first chapter of Part IV, Rajeev Gowda considers how behavioral decision theoretic research, coupled with risk analysis, can generate useful insights into the potential effectiveness and popularity of innovative policy tools such as information provision laws. Anthony Patt and Richard Zeckhauser present an overview of how behavioral decision theoretic insights fundamentally challenge many of the assumptions involved in environmental policy analysis. Howard Kunreuther and Paul Slovic demonstrate how behavioral features such as imagery, affect, and emotion contribute to stigmatization, demonstrate how stigma arises in a variety of policy contexts, and explore ways to manage it better. Jonathan Baron and Max Bazerman then show how behavioral features affect the resolution of policy disputes. Their focus is on how disputes could be remedied by people sacrificing small losses for large gains. The barrier to such solutions is that people resist such tradeoffs because they resist integrating the losses and gains and attending to the net benefit. This takes the form of the *mythical fixed-pie assumption* in negotiation and is also found in the *do-no-harm* heuristic that leads to a bias toward harmful omissions as distinct from harmful acts.

The book concludes in Part V with a commentary by Philip Tetlock. Drawing on his perspective as both a psychologist and a political scientist, Tetlock strikes a cautionary note and points to the enormous challenges that lie ahead as we strive to understand how people really behave when they make judgments and choices.

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Part I

The Fundamentals of Behavioral Decision Theory

1 Judgment and Decision Making: Extrapolations and Applications

Chris Swoyer

People who make or implement public policy must often estimate probabilities, predict outcomes, and make decisions that affect the welfare, values, and lives of many others. Until recently, many of the disciplines that study policy employed a model of individuals and organizations as rational agents whose predictions conform to the prescriptions of probability theory and whose actions maximize their expected gains in conformity with classical decision theory.

Such theories lead a double life. They are sometimes viewed as *normative models* that tell us what we should do in order to be rational (even if we rarely manage to pull it off). Construed this way, they offer advice: We should have logically consistent beliefs, coherent probability assignments, and consistent preferences, and we should maximize expected utilities. But these same theories have also been viewed as *descriptive models*; construed this way, they are meant to provide an approximate characterization of the behavior of real people. It is this interpretation that has played a central role in economics, management science, and parts of political science, sociology, and the law.

Since the early 1970s, this descriptive picture of judgment and decision making has come under increasing attack from scientists working in behavioral decision theory, the field concerned with the ways in which people actually judge, predict, and decide. Much of the criticism

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derives from the work of Tversky, Kahneman, and others working in the *heuristics and biases tradition*. Scientists in this tradition argue that people often fail, sometimes quite dramatically, to conform to the strictures of the relevant normative models. Instead, they argue, people frequently employ judgmental heuristics, quick and relatively effortless reasoning strategies that produce accurate results in many circumstances but that are biased in ways that lead to systematic errors under inauspicious conditions.

The heuristics and biases tradition is now just one current in the large stream of behavioral decision theory, and many scientists in the field reject various aspects of this approach. Most agree, however, that people's judgments and decisions often don't fit the guidelines of classical normative models, and there is now no going back to the view that such models are descriptively accurate.

In hindsight, it is difficult to see why our failures to conform to normative models should have seemed a surprise. After all, precise versions of normative theories were formulated only with great effort rather late in human history. Despite millennia of gambling, the basics of probability theory were not hammered out until the middle of the seventeenth century, three more centuries passed before decision theory was formalized, and even today many students find parts of these theories difficult and counterintuitive. Furthermore, there has never been any solid body of evidence showing that we live up to such normative standards, nor does any theory with serious empirical support entail that we do. Indeed, there is much reason to think that we couldn't.

As Herbert Simon (1956) has stressed since the mid-1950s, human rationality is bounded. We have very limited attention, working memory, and computational capacities, and these limitations alone would make it impossible for us to perform the calculations normative theories often require. Moreover, although evolution doubtless equipped us with cognitive mechanisms that were reasonably accurate in the hunter-gatherer environment in which our species evolved, there is no reason to think that it could, much less did, attune us to the subtleties of Bayesian updating or the intricacies of expected utilities. Finally, almost any newscast or history book chronicles miscalculations and follies that are utterly self-defeating, even by the agents' own lights. But although it shouldn't come as news that people's inferences and decisions are sometimes suboptimal, what is surprising is that many of our cognitive and volitional lapses are quite systematic

(or biased), and systematic in ways that would have been difficult to predict.

This isn't to say that our judgments and decisions are hopelessly flawed. Indeed, the spotty picture emerging from several decades of research suggests that people have the ability to reason well under some conditions. This ability is fragile and unstable, however, and it can be affected, diverted, and even subverted by a variety of influences. In particular, many subtle features of the contexts in which people judge and decide influence *how* they judge and decide. In fact, one of the most pressing questions in the field, particularly when we are considering applications to politics or policy, is whether reasonably robust generalizations about human judgment and decision making can be found amid all the contextual variability.

My goal here is to sort out some of the issues involved in interpreting, evaluating, and applying work in behavioral decision theory to real-life situations involving policy, politics, and related matters. I will discuss the sorts of considerations that are relevant to settling various disputes about such work and its applications and note several obstacles to applying it to problems in the real world. There is enormous variability in the ways that policies are made and implemented, and it is unlikely that any simple morals will apply to all of them, but the general tenor of the discussion here is cautionary. Behavioral decision theory has produced many important empirical findings and promising models, but at this stage of the game it is difficult to apply many (though not all) of its findings to areas of policy with great confidence. I will end with a brief consideration of the status of normative models and their potential for improving policymaking and implementation.

The Checklist: What? Where? When? Who? Why?

The checklist for the behavioral decision theorist is much like that for the reporter (though the order is a bit different). The first step is to discover *phenomena* or *effects* (like insensitivity to sample size or preference reversals). These rough regularities in human behavior tell us *what* people tend to do. Once a phenomenon has been discovered, questions arise about its boundary conditions: *Where* and *when* does it occur? Which conditions produce, accentuate, attenuate, or eliminate it? Although little work has been done on individual differences in judgment and choice, these differences are often substantial, and researchers are beginning to ask: *Who* reasons in which ways? Finally, a basic goal of most science is to