

A COURSE IN
BEHAVIORAL
ECONOMICS
SECOND EDITION

CREATED BY

ERIK ANGNER

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A Course in Behavioral Economics

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A Course in Behavioral Economics

Second edition

Erik Angner

George Mason University, USA



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The master-piece of philosophy would be to develop the means which Providence employs to attain the ends it proposes over man, and to mark out accordingly a few lines of conduct which might make known to this unhappy biped individual the way in which he must walk within the thorny career of life, that he might guard against the whimsical caprices of this fatality to which they give twenty different names, without having as yet come to understand or define it.

The Marquis de Sade, *Justine*

which Providence
accordingly a few
individual the way
guard against the
names, without

de Sade, Justine

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As a Ph.D. student in economics, behavioral economics struck me as the most exciting field of study by far. Even with the benefit of some spectacular teachers, though, I felt that the existing literature failed to convey an adequate understanding of the nature and significance of the project, and how the many different concepts and theories described as “behavioral” were tied together. When as an assistant professor I was offered the opportunity to teach my own course, I discovered that there were very few texts occupying the niche between popular-science-style treatments, which do not contain enough substance for a university-level course, and original scientific papers, which are not easily readable and typically fail to provide sufficient background to be comprehensible to a novice reader.

This introduction to behavioral economics was written to be the book I wish I had had as a student, and the book that I want to use as a teacher. It aspires to situate behavioral economics in historical context, seeing it as the result of a coherent intellectual tradition; it offers more substance than popular books but more context than original articles; and while behavioral economics is a research program as opposed to a unified theory, the book not only describes individual concepts and theories but also tries to show how they hang together. The book was designed to be used as a user-friendly, self-contained, freestanding textbook suitable for a one-semester course for advanced undergraduates, but can easily be used in conjunction with books or articles in a variety of higher-level courses.

In recognition of the fact that many students of behavioral economics come from outside traditional economics, the exposition was developed to appeal to advanced undergraduates across the social and behavioral sciences, humanities, business, public health, and so on. The book contains no advanced mathematics and presupposes no knowledge of standard economic theory. If you are sufficiently interested to pick up a copy of this book and read this far, you have what it takes to grasp the material. Thorough battletesting at two medium-sized state universities in the US over the course of several years has confirmed that the treatment is accessible to economics majors and non-majors alike.

Serious economics does not need to be intimidating, and this book aims to prove it. Abstract, formal material is introduced in a progressively more difficult manner, which serves to build confidence in students with limited previous exposure. A wealth of examples and exercises serve to make the underlying intuitions as clear as possible. In order to sustain the interest of readers with different backgrounds, and to illustrate the vast applicability of economic analysis, examples are drawn from economics, business, marketing, medicine, philosophy, public health, political science, public policy, and

elsewhere. More open-ended problems encourage students to apply the ideas and theories presented here to decision problems they might come across outside the classroom.

The book is arranged in five main parts: (1) choice under certainty, (2) judgment under risk and uncertainty, (3) choice under risk and uncertainty, (4) intertemporal choice, and (5) strategic interaction. Each of these parts contains two chapters: an even-numbered one outlining standard neoclassical theory and an odd-numbered one discussing behavioral alternatives. A final part (6) concludes. The unique structure makes it easy for instructors to teach the book at a more advanced level, as they can easily assign even-numbered chapters as background reading and supplement the odd-numbered chapters with more advanced material of their choosing. Additional resources for general readers, students, and instructors are available via the companion website <http://www.palgrave.com/angner2>.

The non-trivial amount of neoclassical theory in this book may warrant explanation. First, because behavioral economics was developed in response to neoclassical economics, large portions of behavioral economics can only be understood against this background. Second, while behavioral economists reject the standard theory as a *descriptive* theory, they typically accept it as a *normative* theory. Third, much of behavioral economics is a modification or extension of neoclassical theory. Finally, to assess the relative merits of neoclassical and behavioral economics, it is necessary to understand both. Just as the study of a foreign language teaches students a great deal about their native tongue, so the study of behavioral economics will teach them a lot about standard economics.

As a textbook rather than an encyclopedia, this book does not aspire to completeness but explores a selection of the most important ideas in behavioral economics and their interrelations. Many fascinating ideas, developments, and avenues of research have deliberately been omitted. No doubt every behavioral economist will disagree with some of my decisions about the things that were left out. But I think most will agree about the things that were left in. The material presented in this book is, on the whole, uncontroversially part of the canon, and as such should be familiar to anyone who wishes to have a basic grasp of behavioral economics.

Like standard introductory textbooks, this book does not aim to review the empirical case offered in favor of the theories it presents. As a result, the exposition is uncluttered by extensive discussion of data, standards of evidence, empirical (including experimental) methodology, and statistical techniques. Instead, theories are illustrated with stories intended to elicit the intuition underlying the theory and to demonstrate that it is not entirely implausible. In this respect, the present book is no different from any of the widely used introductions to microeconomics, to take one example.

For this second edition of the book, Palgrave sought extensive feedback from current and prospective readers, including students and instructors, from across the world. As a result, the book now contains several new sections, including an entire chapter on behavioral welfare economics and the nudge agenda. Since the exercises (and answer key) turned out to be one of

the most appreciated features of the original edition, I added even more – and of a wider range of difficulty levels. Meanwhile, I did my best to keep the book readable and to-the-point (and also affordable).

For readers who wish to continue their study of behavioral economics, or who want to know more about its methodology, history, and philosophy, every chapter ends with a further reading section, which offers a selection of citation classics, review articles, and advanced textbooks. While this may be the first book in behavioral economics for many readers, my hope is that it will not be the last.

Erik Angner



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This book draws on many different sources of inspiration. I am particularly grateful to the teachers who set me off on this path (among them Cristina Bicchieri, Robyn Dawes, Baruch Fischhoff, George Loewenstein, Philip Reny, and Alvin Roth), whether or not they approve of the place to which it led, and to the students (too numerous to name) who keep me on the straight and narrow by catching errors and challenging me to explain the material better.

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Most importantly, Elizabeth Blum's love and support every step along the way were essential to the completion of the project.

Further suggestions for improvement are most welcome via the companion website <http://www.palgrave.com/angner2>. As always, errors remain my own.

About the Author



Erik Angner is Associate Professor of Philosophy, Economics, and Public Policy at George Mason University, where he directs the undergraduate Philosophy, Politics, and Economics (PPE) Program. As a result of serious mission creep, he holds two PhDs – one in Economics and one in History and Philosophy of Science – both from the University of Pittsburgh. He is the author of *Hayek and Natural Law* as well as numerous journal articles and book chapters on behavioral and experimental economics, the economics of happiness, and the history, philosophy, and methodology of contemporary economics. He has taught behavioral economics at the undergraduate level since 2006.

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Introduction

1 Introduction

- 1.1 Economics: Neoclassical and behavioral
- 1.2 The origins of behavioral economics
- 1.3 Methods
- 1.4 Looking ahead

Introduction

1.1 Economics: Neoclassical and behavioral

This is a book about **theories of decision**. To use the language of the epigraph, such theories are about the negotiation of “the thorny career of life”: they tell us how we make, or how we should make, decisions. Not that the Marquis de Sade would have spoken in these terms, living as he did in the eighteenth century, but the theory of decision seems to be exactly what he had in mind when he imagined “the master-piece of philosophy.”

Developing an acceptable theory of decision would be an achievement. Most human activity – finance, science, medicine, arts, and life in general – can be understood as a matter of people making certain kinds of decisions. Consequently, an accurate theory of decision would cover a lot of ground. Maybe none of the theories we will discuss is the masterpiece of which de Sade thought so highly. Each theory can be, has been, and perhaps should be challenged on various grounds. However, decision theory has been an active area of research in recent decades, and it may have generated real progress.

Modern theories of decision (or **theories of choice** – I will use the terms interchangeably) say little about what goals people will or should pursue. Goals may be good or evil, mean-spirited or magnanimous, altruistic or egoistic, short-sighted or far-sighted; they may be Mother Teresa’s or the Marquis de Sade’s. Theories of decision simply take a set of goals as given. Provided a set of goals, however, the theories have much to say about how people will or should pursue those goals.

Theories of decision are variously presented as descriptive or normative. A **descriptive** theory describes how people *in fact* make decisions. A **normative** theory captures how people *should* make decisions. It is at least theoretically possible that people make the decisions that they should make. If so, one and the same theory can simultaneously be descriptively adequate and normatively correct. However, it is possible that people fail to act in the manner in which they should. If so, no one theory can be both descriptively adequate and normatively correct.

Exercise 1.1 Descriptive vs. normative Which of the following claims are descriptive and which are normative? (Answers to this and other exercises can be found in the Appendix.)

- (a) On average, people save less than 10 percent of their income for retirement.
- (b) People do not save as much for retirement as they should.
- (c) Very often, people regret not saving more for retirement.

It can be unclear whether a claim is descriptive or normative. "People save too little" is an example. Does this mean that people do not save as much as they should? If so, the claim is normative. Does this mean that people do not save as much as they wish they did? If so, the claim is descriptive.

Example 1.2 Poker Suppose that you are playing poker, and that you are playing to win. Would you benefit from having an adequate descriptive theory, a correct normative theory, or both?

A descriptive theory would give you information about the actions of the other players. A normative theory would tell you how you should behave in light of what you know about the nature of the game, the expected actions of the other players, and your ambition to win. All this information is obviously useful when playing poker. You would benefit from having both kinds of theory.

Some theories of decision are described as **theories of rational choice**. In everyday speech, the word "rationality" is used loosely; frequently it is used simply as a mark of approval. For our purposes, a theory of rational decision is best seen as a **definition** of rationality, that is, as specifying what it means to be rational. Every theory of rational decision serves to divide decisions into two classes: rational and irrational. Rational decisions are those that are in accordance with the theory; irrational decisions are those that are not. A theory of rational choice can be thought of as descriptive or normative (or both). To say that a theory of rational decision is descriptive is to say that people in fact act rationally. To say that a theory of rational decision is normative is to say that people should act rationally. To say that a theory of rational decision is simultaneously descriptive and normative is to say that people act and should act rationally. Typically, the term **rational-choice theory** is reserved for theories that are (or that are thought to be) normatively correct, whether or not they are simultaneously descriptively adequate.

For generations now, economics has been dominated by an intellectual tradition broadly referred to as **neoclassical economics**. If you have studied economics but do not know whether or not you were taught in the neoclassical tradition, it is almost certain that you were. Neoclassical economics is characterized by its commitment to a theory of rational choice that is simultaneously presented as descriptively adequate and normatively correct. This approach presupposes that people by and large act in the manner that they should. Neoclassical economists do not need to assume that all people act rationally all the time, but they insist that deviations from perfect rationality are so small or so unsystematic as to be negligible. Because of its historical dominance, I will refer to neoclassical economics as standard economics, and to neoclassical economic theory as standard theory.

This is an introduction to **behavioral economics**: the attempt to increase the explanatory and predictive power of economic theory by providing it with more psychologically plausible foundations, where "psychologically plausible" means consistent with the best available psychology. Behavioral economists share neoclassical economists' conception of **economics** as the study of people's decisions under conditions of scarcity and of the results of those

decisions for society. But behavioral economists reject the idea that people by and large behave in the manner that they should. While behavioral economists certainly do not deny that some people act rationally some of the time, they believe that the deviations from rationality are large enough, systematic enough, and consequently predictable enough, to warrant the development of new descriptive theories of decision. If this is right, a descriptively adequate theory cannot at the same time be normatively correct, and a normatively correct theory cannot at the same time be descriptively adequate.

1.2 The origins of behavioral economics

Behavioral economics can be said to have a short history but a long past. Only in the last few decades has it emerged as an independent subdiscipline of economics. By now, top departments of economics have behavioral economists on their staff. Behavioral economics gets published in mainstream journals. Traditional economists incorporate insights from behavioral economics into their work. In 2002, Daniel Kahneman (one of the most famous behavioral economists) won the Nobel Memorial Prize “for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty.” In spite of its short history, however, efforts to provide economics with plausible psychological foundations go back a long way.

The establishment of modern economics is marked by the publication in 1776 of Adam Smith’s *Wealth of Nations*. Classical economists such as Smith are often accused of having a particularly simple-minded (and false) picture of human nature, according to which people everywhere and always, in hyper-rational fashion, pursue their narrowly construed self-interest. This accusation, however, is unfounded. Smith did not think people were rational:

How many people ruin themselves by laying out money on trinkets of frivolous utility? What pleases these lovers of toys is not so much the utility, as the aptness of the machines which are fitted to promote it. All their pockets are stuffed with little conveniences ... of which the whole utility is certainly not worth the fatigue of bearing the burden.

Smith wrote these words 200 years before the era of pocket calculators, camera phones, iPads, and smartwatches. Nor did Smith think people were selfish: “[There] are evidently some principles in [man’s] nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it.” Smith and the other classical economists had a conception of human nature that was remarkably multi-faceted; indeed, they did not draw a sharp line between psychology and economics the way we do.

Early neoclassical economics was built on the foundation of **hedonic psychology**: an account of individual behavior according to which individuals seek to maximize pleasure and minimize pain. In W. Stanley Jevons’s words: “Pleasure and pain are undoubtedly the ultimate objects of the Calculus of

Economics. To satisfy our wants to the utmost with the least effort ... in other words, to *maximise pleasure*, is the problem of Economics." The early neoclassical economists were inspired by the philosopher Jeremy Bentham, who wrote: "Nature has placed mankind under the governance of two sovereign masters, *pain* and *pleasure* ... They govern us in all we do, in all we say, in all we think." Because it was assumed that individuals have direct access to their conscious experience, some economists defended the principles of hedonic psychology on the basis of their introspective self-evidence alone.

After World War II, however, many economists were disappointed with the meager results of early neoclassicism in terms of generating theories with predictive power and so came to doubt that introspection worked. Similar developments took place in other fields: behaviorism in psychology, verificationism in philosophy, and operationalism in physics can all be seen as expressions of the same intellectual trend. Postwar neoclassical economists aimed to improve the predictive power of their theories by focusing on what can be publicly observed rather than on what must be experienced. Instead of taking a theory about pleasure and pain as their foundation, they took a theory of preference. The main difference is that people's feelings of pleasure and pain are unobservable, whereas their choices can be directly observed. On the assumption that choices reflect personal preferences, we can have direct observable evidence about what people prefer. Thus, postwar neoclassical economists hoped to completely rid economics of its ties to psychology – hedonic and otherwise.

In spite of the relative hegemony of neoclassical economics during the second half of the twentieth century, many economists felt that their discipline would benefit from closer ties to psychology and other neighboring fields. What really made a difference, however, was the cognitive revolution. In the 1950s and 1960s, researchers in psychology, computer science, linguistics, anthropology, and elsewhere rejected the demands that science focus on the observable and that all methods be public. Instead, these figures advocated a "science of cognition" or **cognitive science**. The cognitive scientists were skeptical of naive reliance on introspection, but nevertheless felt that a scientific psychology must refer to things "in the head," including beliefs and desires, symbols, rules, and images. Behavioral economics is a product of the cognitive revolution. Like cognitive scientists, behavioral economists – though skeptical of the theories and methods of the early neoclassical period – are comfortable talking about beliefs, desires, rules of thumb, and other things "in the head." Below, we will see how these commitments get played out in practice.

To some, the fact that behavioral economists go about their work in such a different way means that they have become economists in name only. But notice that behavioral economics is still about the manner in which people make choices under conditions of scarcity and the results of those choices for society at large – which is the very definition of economics. **Behavioral science** refers to the scientific study of behavior, which makes behavioral economics a kind of behavioral science. **Psychology and economics** is also a broader category, referring to anything that integrates the two disciplines, and which therefore does not need to be about choice at all.

1.3 Methods

Before we explore in earnest the concepts and theories developed by behavioral economists in the last few decades, I want to discuss the data that behavioral economists use to test their theories and the methods they use to generate such data.

Some of the earliest and most influential papers in behavioral economics relied on participants' responses to hypothetical choices. In such studies, participants were asked to imagine that they found themselves in a given choice situation and to indicate what decision they would make under those conditions. Here is one such question: "Which of the following would you prefer? A: 50% chance to win 1,000, 50% chance to win nothing; B: 450 for sure." Other early papers relied on readers' intuitions about how people might behave under given conditions. Thus, they offered scenarios such as: "Mr S. admires a \$125 cashmere sweater at the department store. He declines to buy it, feeling that it is too extravagant. Later that month he receives the same sweater from his wife for a birthday present. He is very happy. Mr and Mrs S. have only joint bank accounts." These thought experiments were apparently inspired in part by the author's observations of the behavior of fellow economists, who argued that people were always rational but at times behaved irrationally in their own lives.

More recently, hypothetical choice studies were almost completely displaced by **laboratory experiments** in which laboratory participants make real choices involving real money. Such experiments have been run for decades. In the early 1970s, for example, psychologists Sarah Lichtenstein and Paul Slovic ran experiments at a Las Vegas casino, where a croupier served as experimenter, professional gamblers served as participants, and winnings and losses were paid in real money. More frequently, behavioral economists use college undergraduates or other easily accessible participants. When behavioral economists engage in experimental studies, they can be hard to distinguish from neoclassical experimental economists, that is, neoclassical economists who use experiments to explore how people make decisions. Experimentalists agree that decisions performed by laboratory subjects must be real, and that actual winnings must be paid out.

Behavioral economists, during the last decade or so, have increasingly relied on data gathered "in the field." In one famous **field study**, Colin F. Camerer and colleagues studied the behavior of New York City cab drivers by using data from "trip sheets" – forms that drivers use to record the time passengers are picked up and dropped off as well as the amount of the fares – and from the cabs' meters, which automatically record the fares. Researchers in this study simply observed how participants behaved under different conditions. In **field experiments**, researchers randomly assign participants to test and control groups, and then note how (if at all) the behavior of individuals in the two groups differs. In one prominent field experiment, Jen Shang and Rachel Croson tracked how voluntary donations to a public radio station varied when prospective donors were given different social information, that is, information about how much other people had given.

To some extent, behavioral economists use what psychologists call **process measures**, that is, methods that provide hints about cognitive and emotional processes underlying decision-making. Some rely on **process-tracing** software to assess what information people use when making decisions in games. Others employ brain scans, typically functional Magnetic Resonance Imaging (fMRI), which allows researchers to examine, albeit crudely, which parts of an individual's brain are activated in response to a task or decision. Imaging methods have already been applied to a diversity of economic tasks, including decision-making under risk and uncertainty, intertemporal choice, buying and selling behavior, and strategic behavior in games. Even more exotic neuroscience methods are sometimes employed. One recent study explored what happens when you use a tool called Transcranial Magnetic Stimulation to disable a part of participants' brains. The increasing use of methods borrowed from neuroscience is, not coincidentally, connected to the rise of **neuroeconomics**, which integrates economics with neuroscience.

The use of multiple methods to generate evidence raises interesting methodological problems. This is particularly true when evidence from different sources points in slightly different directions. Sometimes, however, evidence from multiple sources points in the same direction. When this is true, behavioral economists have more confidence in their conclusions. It can be argued that part of the reason why behavioral economics has turned into such a vibrant field is that it successfully integrates evidence of multiple kinds, generated by a variety of methods.

1.4 Looking ahead

As stated in the Preface, this book is arranged in five main parts: (1) choice under certainty, (2) judgment under risk and uncertainty, (3) choice under risk and uncertainty, (4) intertemporal choice, and (5) strategic interaction. Each of these parts contains two chapters: an even-numbered one outlining standard neoclassical theory and an odd-numbered one discussing behavioral alternatives. A final part (6) concludes. As suggested in Section 1.1, the ultimate goal of behavioral economics is to generate novel insights into people's decisions under conditions of scarcity and the results of those decisions for society. Behavioral and neoclassical economists alike try to attain this goal by building abstract, formal theories. In this book we will explore increasingly general theories, both neoclassical and behavioral.

Studying behavioral economics is a non-trivial enterprise. For one thing, the level of abstraction can pose an initial challenge. But as we will see below, it is the very fact that economics is so abstract that makes it so very useful: the more abstract the theory, the wider its potential application. Some readers may be prone to putting down a book like this as soon as they notice that it contains mathematics. Please do not. There is no advanced math in the book, and **numeracy** – the ability with or knowledge of numbers – is incredibly important, even to people who think of themselves as practically oriented.

Exercise 1.3 Numeracy In a recent study on financial decision-making, people's answers to three quick mathematics questions were strong predictors of their wealth: households where both spouses answered all three questions correctly were *more than eight times* as wealthy as households where neither spouse answered any question correctly. So if you have ever struggled with math, be glad that you did. You can try answering the three questions for yourself:

- (a) If the chance of getting a disease is 10 percent, how many people out of 1000 would be expected to get the disease?
- (b) If five people all have the winning numbers in the lottery, and the prize is 2 million dollars, how much will each of them get?
- (c) Let us say you have \$200 in a savings account. The account earns 10 percent interest per year. How much would you have in the account at the end of two years?

To underscore the usefulness of behavioral economics, the book discusses a variety of applications. Among other things, you will learn how to choose a wingman or wingwoman, how to design a marketing scheme that works, how not to fall for such marketing schemes, how to compute the probability that your love interest is seeing somebody else, how to sell tires, and how to beat anyone at rock-paper-scissors. Ultimately, behavioral economics sheds light on human beings – the way they really are, as opposed to the way great thinkers of the past have thought they should be – and on the nature of the human condition.

FURTHER READING

Daniel Kahneman's *Thinking, Fast and Slow* (2011) and Richard H. Thaler's *Misbehaving: The Making of Behavioral Economics* are must-reads for anyone interested in behavioral economics, both for their unparalleled understanding of the theory and for their illuminating personal reminiscences. Angner and Loewenstein (2012) and Heukelom (2014) discuss the nature, historical origins, and methods of behavioral economics; Angner (in press) explores further the relationship between behavioral and neoclassical economics. *The Wealth of Nations* is Smith (1976 [1776]); the quotations in the history section are from Smith (2002 [1759], p. 211) and Smith (2002 [1759], p. 11), Jevons (1965 [1871], p. 37), and Bentham (1996 [1789], p. 11). The sample questions in the methods section come from Kahneman and Tversky (1979, p. 264) and Thaler (1985, p. 199). The psychologists who went to Vegas are Lichtenstein and Slovic (1973). The study of NYC cabdrivers is Camerer et al. (1997), the one about social information Shang and Croson (2009), and that which disabled parts of participants' brains Knoch et al. (2006). Camerer et al. (2005) provides a widely cited overview of neuroeconomics. The study on financial decision-making is Smith et al. (2010); the three numeracy questions were adapted from the University of Michigan Health and Retirement Study.

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PART

1

Choice under Certainty

2 Rational Choice under Certainty

- 2.1 Introduction
- 2.2 Preferences
- 2.3 Rational preferences
- 2.4 Indifference and strict preference
- 2.5 Preference orderings
- 2.6 Choice under certainty
- 2.7 Utility
- 2.8 Discussion

3 Decision-Making under Certainty

- 3.1 Introduction
- 3.2 Opportunity costs
- 3.3 Sunk costs
- 3.4 Menu dependence and the decoy effect
- 3.5 Loss aversion and the endowment effect
- 3.6 Anchoring and adjustment
- 3.7 Discussion