Expanding and Reorienting the Scope of Economic Thinking
James Halteman and Edd Noell

This chapter traces efforts to expand the approach of economic thinking to political, legal, social, and religious institutions. Using rational choice analysis, these efforts move the discussion closer to value-laden areas of life. One important concern is the nature of the utility function, how it is formed, and what is utility or happiness? Social norms, cooperation models, game theory, behavioral economics, and neuroeconomics all have something to say about human behavior, and they also have important moral ramifications. While some claim that behavioral responses in these cases are merely self-interest disguised, outward behavior seems to work best in the long run if it is heartfelt. Character traits that signal trust are strongest when backed by moral commitments, and there is evidence that human brains are hardwired with some empathetic tendencies. The work of Dan Kahneman and Amartya Sen is highlighted in the closing vignettes.

Neuromania
Paolo Legrenzi and Carlo Umiltà

Neuroeconomics, neuromarketing, neuroaesthetics, and neurotheology are just a few of the novel disciplines that have been inspired by a combination of ancient knowledge together with recent discoveries about how the human brain works. The mass media are full of news items featuring colour photos of the brain, that show us the precise location in which a certain thought or emotion, or even love occurs, hence leading us to believe that we can directly observe, with no mediation, the brain
at work. But is this really so? Even throughout the developed world, the general public has been seduced into believing that any study, research article, or news report, accompanied by a brain image or two is more reliable and more scientific, than one featuring more mundane illustrations. This book questions our obsession with brain imaging. It discusses some of the familiar ideas usually associated with mind-body, brain-psyche, and nature-culture relationships, showing how the biased and unquestioning use of brain imaging technology could have significant cultural effects for all of us.

**Emotion and Decision-making Explained**

**Edmund T. Rolls**

Published in print: 2013 Published Online: January 2014
Item type: book

What produces emotions? Why do we have emotions? How do we have emotions? Why do emotional states feel like something? What is the relation between emotion, and reward value, and subjective feelings of pleasure? How is the value of a good represented in the brain? Will neuroeconomics replace classical microeconomics? How does the brain implement decision-making? Are gene-defined rewards and emotions in the interests of the genes, and does rational multistep planning enable us to go beyond selfish genes to long-term plans and social contracts in the interests of the individual? This book seeks explanations of emotion and decision-making by considering these questions.

**Mapping Minimax in the Brain**

**Ignacio Palacios-Huerta**

in **Beautiful Game Theory: How Soccer Can Help Economics**

Published in print: 2014 Published Online: October 2017
Item type: chapter

This chapter is concerned with mixed strategies. Using fMRI techniques, it peers inside the brain when experimental subjects play the penalty kick game. As we have noted already, minimax is considered a cornerstone of interactive decision-making analysis. More importantly, the minimax strategies have not been mapped in the brain previously by studying simultaneously the two testable implications of equilibrium. The results show increased activity in various bilateral prefrontal regions during the decision period. Two inferior prefrontal nodes appear to jointly
contribute to the ability to optimally play the study's asymmetric zero-sum penalty kick game by ensuring the appropriate equating of payoffs across strategies and the generating of random choices within the game, respectively. This evidence contributes to the neurophysiological literature studying competitive games.

**Damaged Self, Damaged Control: A Component Process Analysis of the Effects of Frontal Lobe Damage on Human Decision Making**

Lesley K. Fellows

in Self Control in Society, Mind, and Brain

Published in print: 2010 Published Online: May 2010


Item type: chapter

Frontal lobe damage can disrupt judgment, decision making, and self-control, often with devastating impact on the everyday life of the affected person. Studies of these phenomena can identify the specific brain regions important for self-control and can specify the component processes for which these regions are necessary. This chapter provides an overview of recent neuropsychological work on regional frontal lobe contributions to reinforcement learning and decision making in humans. These findings argue that self-control can be understood in terms of simpler component processes, including the ability to flexibly learn from reward and punishment, to track the value of potential choices, or to predict future events. Further, these processes have been shown to rely on particular brain regions, an important step in delineating the neural mechanisms underlying self-control.

**Neuro**

Nikolas Rose and Joelle M. Abi-Rached

Published in print: 2013 Published Online: October 2017


Item type: book

The brain sciences are influencing our understanding of human behavior as never before, from neuropsychiatry and neuroeconomics to neurotheology and neuroaesthetics. Many now believe that the brain is what makes us human, and it seems that neuroscientists are poised to become the new experts in the management of human conduct. This book describes the key development—theoretical, technological, economic, and biopolitical—that have enabled the neurosciences to
gain such traction outside the laboratory. It explores the ways by which neurobiological conceptions of personhood are influencing everything from child rearing to criminal justice, and are transforming the ways we “know ourselves” as human beings. In this emerging neuro-ontology, we are not “determined” by our neurobiology: on the contrary, it appears that we can and should seek to improve ourselves by understanding and acting on our brains. The book examines the implications of this emerging trend, weighing the promises against the perils, and evaluating some widely held concerns about a neurobiological “colonization” of the social and human sciences. Despite identifying many exaggerated claims and premature promises, the book argues that the openness provided by the new styles of thought taking shape in neuroscience, with its contemporary conceptions of the neuromolecular, plastic, and social brain, could make possible a new and productive engagement between the social and brain sciences.

Conclusions, and broader issues
Edmund T. Rolls

This chapter is about decision-making. Neuroeconomics, expected utility; the implications for understanding the underpinnings of ethics, rights, and responsibilities; social cooperation, kinship and reciprocal altruism, and emotion and literature are all described in detail.

Decision-making
Edmund T. Rolls

This chapter looks at selection of mainly autonomic responses and their classical conditioning. Selection of approach or withdrawal, and their classical conditioning are also mentioned. It then goes on to describe a selection of fixed stimulus-response habits; and a selection of arbitrary behaviours to obtain goals, action-outcome learning, and
emotional learning. The roles of the prefrontal cortex in decision-making and attention are described. The chapter then goes on to talk about neuroeconomics, reward magnitude, expected value, and expected utility; delay of reward, emotional choice, and rational choice; reward prediction error, temporal difference error, and choice; reciprocal altruism, strong reciprocity, generosity, and altruistic punishment; and dual routes to action, and decision-making.

Foundations of Neuroeconomic Analysis
Paul W. Glimcher

A new academic field, neuroeconomics, has emerged at the border of the social and natural sciences. This book argues that a meaningful interdisciplinary synthesis of the study of human and animal choice is not only desirable, but also well underway, and so it is time to develop formally a foundational approach for the field. This book does so by laying the philosophical and empirical groundwork and integrating the theory of choice and valuation with the relevant physical constraints and mechanisms. While there has been an intense debate about the value and prospects of neuroeconomics, this book argues that existing data from neuroeconomics' three parent fields—neuroscience, psychology, and economics—already specify the basic features of the primate choice mechanism at all three levels of analysis. Its central argument is that combining these three disciplines gives us enough insight to define many of the fundamental features of decision making that have previously eluded scholars working within each individual field.

Choice and Process: Theory Ahead of Measurement
JESS BENHABIB and ALBERTO BISIN

Because the traditional method of decision theory accounts only for explaining choice instead of also looking into the process that underlies choice, other approaches such as behavioral economics and neuroeconomics attempt to come up with theories that would account for both the choice and the process. Such models which embody joint
implications that consider both process and theory comprise a whole different area in analyzing decision theory. It is emphasized that the literature related to such measures would adopt structural empirical methods that are vital in testing and analyzing the models. The gap between traditional theory and that which considers neuroscience signifies the need to establish a structural approach that would explain the implicit identifying assumptions observed on both sides. Also, the chapter includes a discussion about how a structural analysis in the context of intertemporal decision theory is essential in examining decision theory.

Epistemological Constraints on Consilience
Paul W. Glimcher

in Foundations of Neuroeconomic Analysis
Published in print: 2010 Published Online: January 2011
Item type: chapter

This chapter explores the metaphysical constraints that the “Theory of Knowledge” places on efforts to link any two or more independent explanatory systems. It reviews the role of the logical positivist philosophers in describing how the reductive synthesis of two disciplines typically occurs, and explores the well-described and explicit philosophical constraints on those synthetic approaches. The discussion serves as an essential prelude to any effort to build a neuroeconomic approach to human decision making because it tells us what we can—and cannot—expect to accomplish.

Because, Not As If
Paul W. Glimcher

in Foundations of Neuroeconomic Analysis
Published in print: 2010 Published Online: January 2011
Item type: chapter

This chapter provides a high-level description of the explicit theoretical goals that should guide the neuroeconomic study of choice. The first part of the chapter defends the view that economic theories must become explicitly sensitive to mechanisms. The second part lays out the most basic structural details of a global theory of neuroeconomics. It is a theory that proceeds mechanistically from axioms such as those used
in the generalized axiom of revealed preference (GARP) and expected utility.

Stochasticity and the Separation of Utility from Choice
Paul W. Glimcher

in Foundations of Neuroeconomic Analysis

Published in print: 2010 Published Online: January 2011
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This chapter begins by reviewing what is known about the mechanism that links subjective value to action. The first and most important goal of this examination is to achieve a convincing mechanistic separation between expected subjective value and action. The second goal of the chapter is to identify mismatches between economic theory and neurobiological data within hard expected utility (Hard-EU) and to examine, as a test case, how neuroeconomics should deal with such mismatches.

The Case for Mindless Economics
FARUK GUL and WOLFGANG PESENDORFER

in The Foundations of Positive and Normative Economics: A Hand Book

Published in print: 2008 Published Online: October 2011
Publisher: Oxford University Press
DOI: 10.1093/acprof:oso/9780195328318.003.0001

Neuroeconomics does not directly refer to neuroscience, but it is usually perceived as a field that incorporates psychology with economics. Neuroeconomics is a research field that considers the following claims: 1) physiological and psychological evidence can be used to either discard or reinforce certain economic models and methodology; and 2) economic welfare analysis should be making use of “true utility” rather than “choice utility” because it is more important to account for what makes individuals happy in contrast with the utilities governing choice. Because neuroeconomics surpasses conventional economic practices by integrating psychological insights and neuroscientific evidence, this chapter illustrates how neuroeconomics attempts to impose changes in methodology, and discusses a neuroscience critique of traditional economics.
Economics, in this chapter, is defined as the study of institutions and variables that may affect certain “economic” choices that are relevant in ascertaining levels of wealth, health, material assets, and other possible sources of happiness. Mindful economics, or neuroeconomics—which veers away from “mindless economics” or an approach that utilizes rational choice and revealed preferences—attempts to make use of neural data in generating a neutral discipline and mathematical approach in dealing with economics. Such an approach would employ data from brain imaging, Transeranial Magnetic Stimulation (TMS), psychophysiological indicators, and other such measures. This chapter presents how behavioral economics, which integrates psychology and neuroeconomics which refers to neuroscience, can be considered in coming up with economic choice theories.

In the first chapter, Faruk Gul and Wolfgang Pesendorfer present how accounting for psychological and neurological theory is important in dealing with normative and positive economics. Both Gul and Pesendorfer have been able to give comments regarding certain methodological claims of experimental, behavioral, and neuroeconomists. It is important to note that Economics, according to Gul and Pesendorfer's observations, is not readily affected, let alone enhanced, by how neurology sets what goes on in the human brain and by how psychology accounts for what goes on in people's minds when they are undergoing decision-making processes. Not considering the successes and failures of Gul and Pesendorfer's studies, this chapter attempts to look into the argument that neuroeconomics and behavioral economics cannot produce sufficient evidence for the support and
rejection of models in positive economics. Also, such concepts are believed to be irrelevant in terms of normative economics.

The Implications of Neuronal Stochasticity and Cortical Representation for Behavioral Models of Choice

Paul W. Glimcher

in Foundations of Neuroeconomic Analysis

Published in print: 2010 Published Online: January 2011
Publisher: Oxford University Press
Item type: chapter

The central premise of the neuroeconomic endeavor is that the iterative process of reductively linking neuroscience, psychology, and economics through theoretical modifications to each discipline will maximize predictive power. This chapter examines further neurobiological, psychological, and economic constraints on the choice mechanism to test that premise. First, it examines in greater detail the relationship between expected subjective value and expected utility, focusing on the interrelationship between neuronal and behavioral stochasticity as revealed by existing psychological models. Second, it looks at the precise nature of cortical representation in the nervous system. Theories of cortical representation anchored to normative models of efficient coding identify constraints all neural representations must acknowledge. These constraints predict a specific class of choice behaviors that violate traditional Soft-REU, behaviors that have already been observed but not yet linked to the structure of the choice mechanism. This suggests that a version of Hard-REU that incorporates these constraints has significantly greater predictive power at both the neural and behavioral levels than a model more closely aligned with traditional Soft-REU. These are the final issues that need to be engaged.

Beyond Neoclassics: Behavioral Neuroeconomics

Paul W. Glimcher

in Foundations of Neuroeconomic Analysis

Published in print: 2010 Published Online: January 2011
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Item type: chapter

This chapter argues that the tools of behavioral economics—the intellectual school in the economic community that stands in opposition to the neoclassical program—will have to fill the gaps that neoclassical
theory cannot, and should not, attempt to fill. It addresses questions
such as: What are some examples of phenomena that lie outside
the reach of the neoclassical approach, and what do these kinds of
neuroeconomic theories look like? What do we know, neurobiologically,
about the algorithms that give rise to phenomena that require behavioral
economic explanations?

Conclusions
Paul W. Glimcher

in Foundations of Neuroeconomic Analysis
Published in print: 2010 Published Online: January 2011
DOI: 10.1093/acprof:oso/9780199744251.003.0017
Item type: chapter

This chapter summarizes the discussions in the preceding chapters. It highlights four observations that are critical for the first revision of economics by neuroeconomics: reference dependence; cortical areas do not represent the absolute values of anything; stochasticity in choice; and the impact of learning on choice. It also identifies six huge unsolved problems in neuroeconomics.

Decision Making, Affect, and Learning
Mauricio R. Delgado, Elizabeth A. Phelps, and Trevor W. Robbins (eds)
Published in print: 2011 Published Online: May 2011
DOI: 10.1093/acprof:oso/9780199600434.001.0001
Item type: book

This latest volume in the Attention and Performance series focuses on two of the fastest moving research areas in cognitive and affective neuroscience — decision making and emotional processing. This book investigates the psychological and neural systems underlying decision making, and the relationship with reward, affect, and learning. In addition, it considers neurodevelopmental and clinical aspects of these issues, for example the role of decision making and reward in drug addiction. It also looks at the applied aspects of this knowledge to other disciplines, including the growing field of Neuroeconomics. After an introductory chapter, the book is arranged according to the following themes: psychological processes underlying decision-making; neural systems of decision-making; neural systems of emotion, reward and learning, and neurodevelopmental and clinical aspects.