

Preface

Dear scientists, students, and readers,

The present book, *Neuroeconomics*, was originally intended as the cornerstone of the Springer book series *Studies in Neuroscience, Psychology and Behavioral Economics*. It was not our idea to write (or edit) a book before or close to retirement. So it took a while before Springer, who had contacted MR to write a book on Neuroeconomics, persuaded us to do it. One prerequisite for MR was that CM agreed to do this jointly with MR, and CM did agree!! We have worked together side by side for many years and become very close friends. Springer ultimately convinced us, not only to publish this book, but to edit a whole book series. Meanwhile a first book, *Internet Addiction—Neuroscientific Approaches and Therapeutical Interventions*, which we edited, was published early in 2015, forming the first publication of this series and more books will appear in the future.

Science has become more and more interdisciplinary and so new scientific disciplines emerge—like neuroeconomics, which is a joint venture between neuroscientists, psychologists, and behavioral economists. The focus of interest in neuroeconomics lies on human decision-making under an economic perspective. “Economics” refers not only to monetary transactions, but also to all kinds of costs and benefits associated with decisions. Before a decision is reached and an actual action is exerted, cognitive and affective processes are active and these processes originate in the brain. Therefore, if one is interested in the question why people behave impulsively or rather rationally and in a manner guided by self-interest, the role of the brain has to be taken into account. Differences in the hard-wiring of the brain or functional differences in brain activity help to explain variation in human decision-making. Research topics like this are at the core of the young discipline of neuroeconomics.

Neuroeconomics has adopted and expanded games and paradigms from behavioral economics and psychology, and uses concepts from diverse disciplines like addiction research (e.g., reward or temporal discounting) and applies nearly all kinds of neuroscience techniques to the study of human decision-making.

In 2009, the Center for Economics & Neuroscience (CENs) was founded at the University of Bonn. There are three arms to the CENs; comprising a behavior

economics lab (Armin Falk), an imaging center (Bernd Weber), and MR's genetic laboratories. The collaboration with the colleagues of the CENs has alerted us to the problems related to interdisciplinary work in the field of neuroeconomics. Even the statistical methods preferred to analyze a given data set differ between psychologists and economists. Finding a common language is sometimes cumbersome, but at the same time offers researchers the chance to learn from our colleagues. This is further outlined by an example: behavioral economists are particularly fascinated by the opportunities offered by the neurosciences. However, they typically have not come across these techniques during their undergraduate and postgraduate training. We have often been asked for a scholarly introduction to molecular genetics, the field in which we are specialized. A comparable demand exists for other neuroscientific techniques. Thus, we decided not only to publish a textbook on neuroeconomics, but to enrich the book by a broad methods section in which the most common neuroscientific techniques, ranging from molecular techniques including genetics and hormone analysis, to brain imaging are introduced in a scholarly manner by experts in the field. This methods section is so far unique for a neuroeconomics book. We are convinced that many scientists and students will find they have an interest in this methods section, even if they are not primarily interested in neuroeconomics. We hope that this potential readership becomes aware of this special feature of the book.

The book comprises eight sections, starting with an introduction into neuroeconomics (1) followed by an overview on frequently applied experimental paradigms (games) in neuroeconomic research (2). In the next section, the molecular basis of human decision-making is addressed (3). Here, the focus is on the role of hormones, neurotransmitters, and (their underlying) genes that have been reported to be of relevance for the field. Section four focusses on environmental and situational factors (4) and section five on social contexts influencing human decision-making (5). From the synopses of sections 3, 4, and 5, it becomes apparent that the successful prediction of human behavior must include nature and nurture, as well as situational factors related to the decision (e.g., framing effects). Section six presents translational and developmental approaches to neuroeconomics including, among other valuable contributions, chapters on decision-making in children and among patients suffering from mental illness (6). An article on neuromarketing demonstrates how knowledge from neuroeconomics research can be applied in real life. For this reason, this chapter has been labeled *Applied Neuroeconomics* (7). Hopefully this section can be extended in the future; we are very confident that the applicability of basic neuroeconomic research will increasingly be acknowledged. The culmination of the present book constitutes the above-mentioned methods section, in which eight different neuroscience techniques are introduced (8).

The completion of this book took longer than planned, but now that it is finished, we are very satisfied with the product. We are happy to have received contributions from so many highly regarded experts in this field. Thank you all for your strong contributions and for your patience. Big thanks also go to Éilish Duke, for her critical redaction of our chapters.

We thank all the readers interested in this work. We hope that we meet your expectations and are thankful for your criticisms and comments.

We also want say thank you to our beloved wives [Anette (MR) and Susanne (CM)] and to our families, friends, and colleagues for their never ending support and love over all the years. Their support came long before this book project began.

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