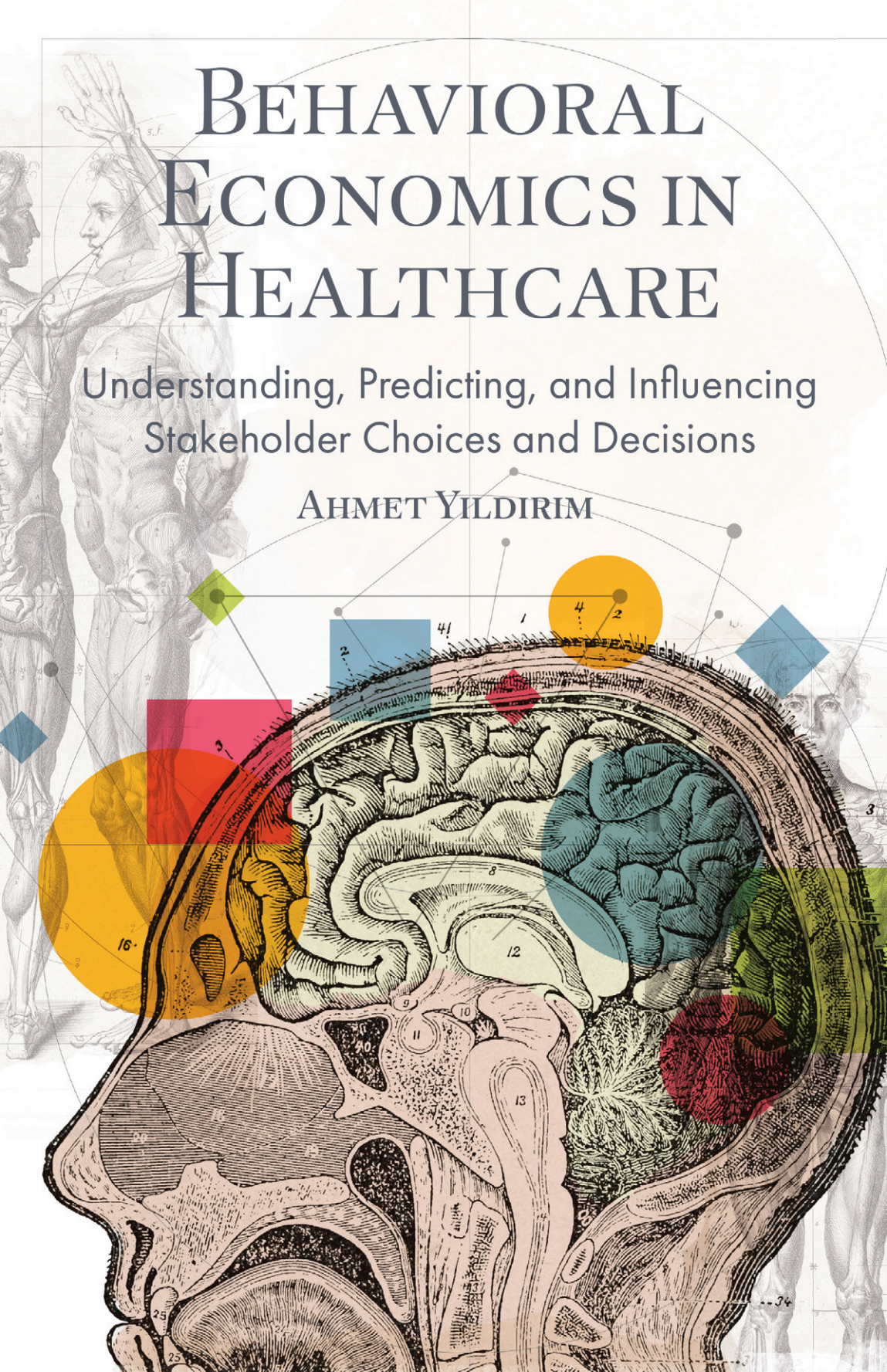
Behavioral Economics in Healthcare

Understanding, Predicting, and Influencing Stakeholder Choices and Decisions

Ahmet Yildirim



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BY

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Preface

When questioned, most people would consider the medical profession as critically vital to human existence. And again if we query about the most important notion in one's life, many individuals may choose health over money or love. Yet, the human aspect of healthcare continues to face various pressing challenges. Among the plethora of pertinent questions, only a few can be listed as follows: How should medical training be structured to enable doctors to make better choices? What are the strategies to enhance communication between doctors and patients? How can societies or politicians make smarter decisions regarding healthcare? What are the dynamics of the wrong choices and decisions that individuals make about their health? How can we address the famous phenomenon of doctor arrogance? What are the underlying sources of stakeholder incentives that result in scientific, economic, or moral failures in the industry? How can we mitigate the issue of violence against doctors?

This book endeavors to address these questions and many others by employing the lens of behavioral economics which is an emerging and promising field. Positioned at the crossroads of various social sciences, especially economics and psychology, behavioral economics systematically explores why people behave as they do by focusing on the cognitive and behavioral mechanisms that influence their decisions. Consequently, it offers numerous and inspirational insights into critical life issues involving human behavior. In the context of healthcare, the field provides valuable insights into the decision-making processes of all involved stakeholder groups.

Primarily designed as a review and a textbook for medical students and professionals, this book aims to enhance the understanding in predicting and improving the behaviors of the most prominent stakeholders in the medicine field. These include doctors, patients, hospital management, public authorities, medical firms, general public, and academicians. Specifically, a refined understanding of why people behave as they do is a crucial step toward incorporating empathy into relationships, thereby contributing to the communicative skills of healthcare students and professionals. Although current medical education primarily focuses on imparting extensive knowledge to students, it tends to neglect the interpersonal aspect of the profession. However, it is particularly important as people's sensitivity is heightened due to health-related concerns (Street & Haidet, 2001).

This book holds appeal not just for medical students and professionals but for intellectuals from any other background as well. They may find various insights on improving their decision quality about their patients' or own well-being,

designing a stronger healthcare system, understanding the effect of incentives on any desired behavior, and much more. In addition, healthcare constitutes an appropriate basis to evaluate people in a serious context for themselves and provides a realistic perspective on understanding how people actually think and behave. For this purpose, the book adopts a multidisciplinary approach by integrating insights from behavioral economics, psychology, and healthcare, offering a comprehensive understanding of how these fields converge to influence decisions and their outcomes. With the target audience's diverse backgrounds in mind, the book is crafted to be understandable for those with little to no background in economics or healthcare.

The outline of the book is structured as follows. After a brief introductory chapter on the basics of behavioral economics, the book turns to discuss the broad functioning principles of our mind in Chapter 2, such as shortcuts and heuristics, affect, comparisons, or framing, which aim to elucidate how the mind works to come to decisions. In relation to Chapter 2, Chapter 3 shifts the focus to more specific biases or thinking mistakes and discusses the main decision failures that people are prone to, including but not limited to confirmation and authority biases, errors in understanding causality, overdiagnosis, or statistical mistakes. The subsequent chapter presents the other side of the picture as a brief counter-argument, which is expected to significantly improve the perspective on approaching previously described mechanisms and failures by discussing why they are an integral part of human thinking, and how they are actually effective tools despite their problematic nature in causing decisional errors. Chapter 5 debates the possibility of eliminating these errors and explores effective strategies for improvement. Chapter 6 is a synthesis of the "nudges" in the context of healthcare, which is a famous and highly debated concept for motivating people to do the right thing for their interests. Benefiting from the mechanisms and biases discussed in Chapters 2 and 3, this chapter suggests some ways to design incentives for motivating healthier behavior such as complying with the medication schedule, maintaining long-term health, or getting vaccinated. Chapter 7 is situated at the intersection of traditional and behavioral economics and lays the foundations for discussing the role of incentives in motivating people for their health-related behaviors. In relation to Chapter 7, the final proceeding chapter is a brief discussion on how science and research in the field of medicine progress in relation to the problem of incentives and aims to provide a critical perspective for the scientific process regarding the field.

As for the teaching method, this book first briefly delineates each phenomenon and then employs a plethora of examples to demonstrate its implications in practical settings. This approach aims to foster the application of these concepts to various real-life scenarios that readers may encounter with the objective to enhance their imagination, understanding, and adaptability.

The content of this book is the culmination of material from the "Behavioral Economics in Medicine" course, which is prepared and instructed by the author in Istanbul Medeniyet University starting from 2022. The content is carefully compiled from a wide range of resources for the benefit of medicine students. About 75% of the examples are directly drawn from healthcare and related

professions to ensure relevance to the primary audience. Additionally, 25% of the content includes examples from other life contexts in order to provide a broader perspective and aid in the comprehension and application of concepts across various domains. The balanced mix of examples is designed to enhance understanding and to aid in the long-term retention of the material by the readers.

A very important consideration for readers is that this book is primarily focused on behavioral economics rather than being a comprehensive source of medical information. While it incorporates medical knowledge and examples which are duly cited, they serve to illustrate principles of behavioral economics rather than to provide medical guidance. Therefore, readers are encouraged to focus on the overarching messages about human behavior and decision-making processes. It is essential to understand that this book does not claim absolute correctness in medical matters and should not be used as a substitute for professional medical advice or treatment. The intent is to provide a behavioral economics perspective to complement medical understanding.

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Chapter 1

A Brief Introduction to Economics and Behavioral Economics

Abstract

This chapter introduces the fundamental concepts of economics and its emerging branch, behavioral economics, emphasizing their relevance in understanding human behavior in various fields, including healthcare. It explores the shift from traditional economic theories that assume rational decision-making to models that account for cognitive biases. Historical roots, from Adam Smith's *The Wealth of Nations* to the development of game theory and bounded rationality, are discussed. Key questions guiding the exploration of behavioral economics in healthcare include the nature of rationality, the impact of cognitive biases, and the role of incentives in shaping behavior. This chapter provides an introduction to such issues, highlights the interdisciplinary nature of behavioral economics, and discusses its role in understanding decision-making.

Keywords: Behavioral economics; rational man myth; decision-making; prospect theory; rationality in health; economic history

This chapter provides an introduction to the discipline of economics and behavioral economics as its emerging branch and their relevance in understanding human behavior in many fields including healthcare.

1.1 Why "Behavioral Economics in Health?"

When one hears the term "economics", thoughts often drift to money, labor, interest rates, and other facets of finance or production. However, at its essence, economics is fundamentally about understanding human behavior in various motivational contexts (Mankiw, 2004, p. 4). In this sense, bridging diverse disciplines as a rising branch, behavioral economics links various fields to understand human behavior by focusing on, benefiting from, and contributing to the issues such as human psychology,

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empathy, self-criticism, communication, system design, scientific progress, or understanding the role of incentives in behavior (Kahneman, 2011; Thaler, 2015). Thus, as a field that concentrates on describing, predicting, and influencing behavior, it offers valuable insights for medical education and decision-making, and it has the potential to impact the lives of billions globally.

Throughout this book, we will explore the pivotal questions: "How and why do people make decisions and act in health-related contexts?" To unravel this, we will examine several sub-questions, each shedding light on different aspects of decision-making in healthcare:

- Are we rational in our decisions, and if not, what are we?
- What processes does our mind undergo to arrive at decisions in the complex tapestry of real life?
- Which prevalent cognitive biases distort our judgment, and how do they affect our decision-making trajectory?
- How can our weaknesses strengthen us, and can their negative impacts be mitigated?
- Is it possible to design the conditions in favor of our interests based on the manipulation of our thinking errors? Can they simplify the process for doing the right thing?
- How do the incentives embedded in the healthcare system influence behavioral patterns?

These questions guide our exploration and connect deeply with fundamental concepts in behavioral economics. By probing these questions, we aim to offer a comprehensive understanding of how behavioral economics principles can be applied to improve healthcare practices and outcomes.

1.2 Understanding Economics

As indicated above, economics is a behavioral science that essentially investigates the decisions and behaviors of individuals and social groups under certain circumstances. On its more prevalent but narrower understanding, it primarily focuses on monetary issues such as inflation, supply and demand, interest rates, production, and so forth. However, in a more general perspective, economics explores decision-making, incentives, and behaviors across various aspects of life. This expansive view allows economists to delve into social issues beyond finance, including healthcare, crime, interpersonal relationships, education, politics, law, and much more (Becker & Posner, 2009; Levitt & Dubner, 2009a).

A striking example of economics' diverse applications comes from Roland Fryer's investigation into the higher rates of hypertension-related heart conditions among African Americans – even more than the Black people in Africa (Pollock, 2012). As also an African American who is a heart attack survivor at an early age, Fryer concluded that this condition may have its roots in history. He suggests that it was a routine for the slave traders to taste the level of salt on the faces of the

potential slaves – the saltier the taste, the greater the likelihood of selection for slavery. The traders observed that such people were more resistant during the long voyage under the conditions of inadequate water as their bodies could store more water. At the time when almost half of the slaves died during transportation, the genes that support water storage provided a survival advantage, thereby passing to next generations and being found in a high proportion of Black people in today's America. However, the adaptation for preserving salt and water also entails drawbacks, notably hypertension, which later appeared as a major cause for heart attacks. Thus, the descendants of people who come from Africa to the United States may have a genetic predisposition toward hypertension. This hypothesis still needs to be explored in more detail, but it nicely demonstrates a good example of how far economic analysis can go in investigating unusual issues in the field.

However, economics is not just about understanding existing patterns; it also involves predicting future behaviors and outcomes. By integrating traditional economic models with psychological insights, economists can provide more nuanced analyses of human behavior. This interdisciplinary approach has revolutionized our understanding of economics and extended its relevance to every facet of human life.

1.3 Historical Roots

Like many social sciences, economics emerged as a distinct discipline following the 17th Century's scientific revolution. Adam Smith's seminal work published in 1776, *The Wealth of Nations*, is regarded as a foundational text for modern economics as it offers the first systematic exploration of societal organization for production. Smith's work delved into the basic terminologies of economics and also briefly incorporated psychological aspects into economic theory.

Parallel to Smith's contributions, the concept of rational decision-making based on expected utility theory began to take shape for understanding and improving decision-making process. The model evaluates preferences by multiplying the outcomes of choices with their probabilities. The approach finds its philosophical roots in Blaise Pascal's famous gamble, known as Pascal's Wager, where he used mathematical logic to argue for the rational basis of faith through the outcomes of belief versus disbelief (Pascal, 1670). Initially conceived as a normative model that suggests how people should make decisions, it gradually evolved to describe how people actually make their decisions in the subsequent understandings of economics.

Notable historical figures like Benjamin Franklin and Charles Darwin appear to apply this "rational approach" in their personal decision-making. When asked about a potential job change, Benjamin Franklin recommended enumerating the pros and cons of each option. When equally important factors cancel each other, the weight of the remaining points would determine the outcome.[1] Around half a

[1] https://founders.archives.gov/documents/Franklin/01-19-02-0200 [Accessed 23 February 2024].

century later, the same reasoning is also employed by Charles Darwin when he was thinking about marrying to his cousin, Emma. Before his marriage, he considered the positives and negatives of marriage, namely spending an enjoyable leisure time and having children for the former and time loss and less time spared for books for the latter (Popova, 2012). During this period, decision-making is considered to be an individual issue, and its interactional nature is mostly neglected in the emerging field.

In the 1800s, economics saw pivotal advancements with deeper insights into production factors like land, labor, and population, with important contributions from David Ricardo's comparative advantage theory, Thomas Malthus's population dynamics, Jean Baptiste Say's market theories, and even Karl Marx's analysis of capitalist systems. As the 20th century unfolded, the focus shifted back to decision-making and behavior, this time with the addition of interaction, with John von Neumann's advancements starting in the 1920s (Heukelom, 2014, p. 28). Together with Oskar Morgenstern, he pioneered the groundbreaking game theory which revolutionized understanding of strategic interactions in decision-making. This period marked the dominance of the "homo economicus" model. It portrayed individuals as supremely rational beings capable of calculating the effect of everything and optimizing their decisions and consequent behaviors, even in complex environments involving other decision-makers. Together with the theories regarding the market which suggest all related information about a product is truly reflected on the price, the rational man theory claims that people behave in the way they must behave. Short-term deviations from these assumptions are balanced in the long term with the impact of learning and errors canceling each other out. Especially for more important decisions that involve serious consequences, we should expect people to behave within the "rational man" model.

In the 1950s, the first significant challenges to the traditional model of rational decision-making emerged. The famous economist and computer scientist Herbert Simon proposed a groundbreaking alternative. He introduced the concept of "bounded rationality" which argues that people and companies are not super rational, and they do not possess the capacity, time, or skills to access and evaluate all possible information. Instead, they seek satisfactory solutions rather than optimal ones and halt their search once a sufficiently good option is found (e.g., satisficing). This descriptive theory earned Simon the Nobel Prize in Economics in 1978.

Although Simon's model would later turn to one of the cornerstones of the field of economics and decision-making, it did not get accepted quickly and faced initial skepticism and criticism from mainstream economists. Their main argument was centered on the statistical error term. Put simply, in the long run, deviations from optimal decisions mutually neutralize since they can be both negative and positive, and the system thus reaches the optimal point (e.g., Lucas, 1972; Muth, 1961).

However, by the early 1970s, the prevailing assumptions in economics faced serious challenges that could not be dismissed as mere errors or with respect to long-term optimizations. The paper of George Akerlof (1970) on the market for "lemon" cars highlighted information asymmetry issues and demonstrated how

prices could misrepresent product quality as they might easily be used as a signaling tool to deceive people. The insight challenged the traditional belief that market prices always accurately reflect product information. Following this, the field of behavioral economics emerged more prominently with the introduction of the prospect theory by Daniel Kahneman and Amos Tversky (1974). This development significantly expanded the scope of economics to encompass a broader understanding of human behavior as we will discuss throughout following chapters.

The 2008 financial crisis further underscored the limitations of classical economic models. Economists began acknowledging that market pricing mechanisms are not infallible in reflecting the true value of commodities, and that people are not rational decision-makers as they are influenced by their desires, lack of computational abilities, and cognitive biases. Reflecting on these shifts, it has been suggested that while the 19th century was the century of hygiene and the 20th century was the century of medicine, 21st century may be the century of behavior change (Wansink, 2006, p. 206).

1.4 The Myth of a "Rational Man"

In neoclassical economics, the caricature of the rational economic man, referred to as the homo economicus, had been the dominant model for understanding human behavior for many decades. This typology portrays an individual who is exceptionally intelligent, aware of all possible choices, and capable of calculating the best outcomes for personal gain. Devoid of moral values, this figure resembles an evil computer with infinite computing power, prioritizing personal stakes above all else. For decades, many economic theories presupposed that real people exhibited these traits. However, this assumption is overly simplistic and fails to represent the complexities of human behavior where rationality is not the norm but rather an exception, even in life's most crucial matters.

For instance, the Centers for Disease Control and Prevention (CDC) estimates that 40% of deaths in the United States between 2008 and 2010 resulted from preventable causes like obesity, tobacco use, AIDS, or alcohol addiction (Yoon et al., 2014). Such carelessness challenges the notion of rational behavior because of the high stakes of health and mortality. Similarly, people's decision-making capacity is influenced by various "noise" factors. For example, portraying a product as "scientifically supported" can lead to unnecessary spending on food, supplements, or medication, illustrating the gap between rational choice and actual behavior when buzzwords come into play (Nisbett, 2015, p. 15). We make similar mistakes in other important issues of life as well, such as being cheated in shopping, not saving enough, choosing unfit partners, taking miscalculated actions due to anger, or not benefitting from the annual gym membership closer to the end of the contract.

Such "irrational" behaviors cannot simply be eliminated just through communication of necessary knowledge. In the United Kingdom and United States, despite the availability of performance scores and mortality rates for hospitals and doctors, only 30% of people have a glance at the data, and only half

of them consider these data when choosing medical care (The Kaiser Family Foundation, 2008). What is especially interesting is that when asked, 59% of the people say these data are important, while only 36% of the people agree that it is insufficient for a decision. The discrepancy between the value placed on information and its actual use in decision-making is one of the shortcomings of the rational actor model. Often, as a shortcut, personal recommendations from family and friends outweigh objective data in such decisions.

One pertinent question is whether individuals learn and get smarter over time by collecting feedback from their actions. Although experience is undoubtedly valuable, it does not always translate into better decisions especially in situations marked by uncertainty. In the medical field, experience can lead to quicker, but not more accurate, diagnoses and treatments. For instance, seasoned doctors might rely on their past experiences to rapidly prescribe familiar medications, which may not always be appropriate for the current patient's unique condition (Freedman, 2010, p. 33). Studies have shown that even highly experienced doctors make incorrect treatment decisions in about one out of every six cases and can cause serious potential consequences (Elstein, 1995). Experience can streamline the process but does not inherently eliminate the risk of error.

1.5 Is It Possible to Be a "Rational Man"?

According to decision scientist Ernst Pöppel (2008), people make around 20,000 decisions daily. Given such a volume, it is unrealistic to expect our central, conscious processor to manage this overload effectively. Our decision-making process is impeded by cognitive constraints: it operates slowly, is easily distractible, and has difficulty handling large volumes of information. In addition, our attention often misses small, subtle changes in the environment, which can sometimes be used for manipulation. For example, a peanut butter brand's subtle jar redesign to decrease its content by 10% illustrates how such changes can go unnoticed unless consumers deliberately check weight values or inspect the jar's bottom side (Poundstone, 2010, p. 15).

Even without such manipulations, our calculative decision-making capacity is inherently limited. Take the task of selecting a computer from a selection of 30 models, each featuring 20 unique attributes. This results in a database of 600 different values which are far beyond our brain's processing capacity. Consequently, we tend to focus on just a few characteristics by overlooking others. In such cases, our brains resort to simplifying complex information and lead us to make decisions based on incomplete data. This inherent limitation challenges the notion of being a "rational man" as traditionally defined in economic theory, which is a perfect calculator of alternatives.

As a common element in life, another significant challenge within the rational decision-making model is the omnipresence of uncertainty. In the face of uncertain decision outcomes, individuals tend to rely on simpler, proxy questions for evaluation. For example, a doctor's past performance might be used to predict future treatment success, even though it does not guarantee outcomes.

This uncertainty is compounded by the fact that people are inherently social and emotional beings with moral considerations. The influence of these factors on decision-making is consistently demonstrated in economic experiments like ultimatum or dictator games which show that the people are not indeed as selfish as theorized (e.g., Andrade & Ariely, 2009; Cameron, 1999). Contrary to the purely self-interested "rational man", most individuals do not and cannot exclude social, emotional, and moral considerations when making decisions (see Chapter 2.13, 4.2.4). This situation underlies the recommendation against surgeons operating on loved ones, where emotional connections could interfere with professional abilities. In other crucial life decisions, such as choosing a job, partner, or home, emotions often play a pivotal role alongside rational analysis. They can even override self-interest, as seen in situations where perceived unfairness leads individuals to seek revenge even at the expense of their own well-being. Thus, recognizing these complexities, economists have proposed alternative theories of rationality. Morris Altman (2012), for instance, suggests a model of "social rationality" where anthropological mechanisms foster individuals who prioritize the functioning of a healthy society over individualistic gains.

Even decision scientists who advocate for rational decision-making models like expected utility theory are generally aware of their limitations in practical scenarios. An illustrative anecdote from a professor at Columbia University underscores this point. Faced with the decision of whether to move to another university, he found himself in a quandary and sought advice from colleagues. One colleague suggested employing a rational approach by listing the pros and cons to maximize expected utility. However, the professor was not happy with this super rational suggestion and responded as "Come on, this is serious!" (Gigerenzer, 2007, p. 9). When confronted with significant, multifaceted decisions in the real life, the neat, calculated methods of decision science can sometimes feel inadequate or unrealistic.

1.6 Getting to Know Behavioral Economics

As a unique subdivision of the expansive field of economics, behavioral economics explores the real mechanisms behind our life-guiding decisions. It aims to demystify departures from the rational decision-making model established by conventional neoclassical economics. Diverging from conventional economic models that focus mainly on financial matters and market aggregates, behavioral economics extends its purview to include diverse aspects of human life such as law, healthcare, personal relationships, education, and politics. It places a particular emphasis on individual choices and behaviors rather than the aggregate behavior of groups constituting markets.

An important nuance to stress here is the existence of differing perspectives among behavioral economists. For instance, the American school, with prominent figures like Daniel Kahneman, often views expected utility theory and rationality as the ideal form of decision-making (e.g., Kahneman et al., 2021). In contrast, the German school which is mainly illustrated by the works of Gerd

Gigerenzer advocates for the "ecological intelligence theory". This perspective emphasizes that deviations from strict rationality are not just common but often advantageous. They result in clear, quicker, and more efficient decision-making processes (Gigerenzer, 2007).

1.7 Chapter Summary

This chapter provides an introduction to economics and behavioral economics. It highlights that economics is not only related to money and production but also deals with broader individual and social issues, such as understanding human behavior in different contexts. The rise of behavioral economics offers a solid foundation for discussing these broader aspects, as it draws on many other social sciences to uncover real-life decision-making processes and outcomes.

Economics, along with many other scientific branches, systematically emerged after the scientific revolution of the 17th century, particularly with Adam Smith's *The Wealth of Nations*. Historically, the focus in terms of decision-making had been on rational choice theory, which is based on optimizing decisions. This view aimed to maximize the expected utility from choices, assuming that people are generally maximizers, intending to maximize their outcomes in their decisions. This understanding gave rise to the concept of a rational man, who is selfish, aware of all alternative choices, and a perfect calculator. Initially designed to optimize individual decision-making, the model was strengthened by incorporating the dynamic external environment through game theory, which seeks to show the best decision in interactive environments where everyone is rational. Pascal, Franklin, Darwin, and von Neumann are among the famous proponents of this way of thinking.

Historically, deviations from the rational man assumptions were considered statistical errors. It was assumed that these errors would cancel each other out, and overall behavior in the long term would comply with rational decision-making principles. However, with the introduction of the bounded rationality model and prospect theory, this assumption was shown to be flawed. People's mistakes can appear in predictable directions, leading to systematic errors in many fields. Given the volume of decisions and uncertainty we face, our cognitive capacity constraints motivate us to use shortcuts and specific inherent decision-making mechanisms. These mechanisms, with regard to their influence in many fields, are increasingly explored by behavioral economists.

In this sense, our main focus throughout the book will be on how and why people decide and behave as they do in healthcare.