

Behavioral Economics

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Abstract

Standard economic models portray decision makers as perfectly rational agents who act selfishly to maximize their total earnings. In contrast, ample evidence in behavioral research suggests that people systematically deviate from the extreme rational assumption of such economic models. Behavioral economics is aimed at identifying the forces which shape the economic decisions that people make, in order to provide important insights of the human nature. This type of research often deals with questions such as how the presentation of information effect decision making, how different types and valances effect behavior, and what are the social, emotional, and situational factors that underlie economic decision making. This article describes foundational research in behavioral decision making and economics that lead to the emergence of behavioral economics; outline cutting-edge research on applied behavioral economics, debiasing techniques, and neuroeconomics; and discusses key issues for future research, such as the use of field experiments and tailor-made methodologies, and focusing on a more comprehensive approach. Our hope is that as behavioral economics advances it will examine not only the nature of the decisions people make but also their underlying cognitive processes.

INTRODUCTION

Traditional economic models portray individuals as having perfect memory, limitless computational abilities, and no emotions. As such, individuals are assumed to have the ability to maximize each and every one of their decisions. Behavioral economics, by contrast, does not hold such an assumption. Instead, behavioral economics empirically examines the psychological factors that influence human behavior, especially economic behavior, and uses this knowledge for building a better understanding of human nature. In this essay we summarize the lines of research which laid the groundwork for the emergence of behavioral economics, identify its central lines of research and going forward, point to key questions that remain unanswered, and conclude with a discussion of major application of the field.

An upsurge in well-documented suboptimal and irrational behaviors, as well as marked deviations from standard economic models served as the

spark that lit the flames of behavioral economics. Insights from psychology, sociology, economics, decision making, as well as other social and cognitive sciences, had led to the realization that people are not as rational and cognitively competent as suggested by the standard economic models. This realization has given birth to behavioral economics, which given its broad empirical grounds, is more a school of thought with roots in psychology, economics, and decision research, than a distinct subfield of economics.

At the core of behavioral economics research is the realization that individuals are not perfectly rational, and that a better understanding of the cognitive, emotional, and social underpinnings of behavior, especially of economic decision making, is crucial for the understanding of human nature. Most research in behavioral economics is concerned with fundamental questions such as the nature of the choices that people make, how preferences are being formed, what effect incentives have, and how people manage their assets, debts, and saving accounts. These investigations often generate theoretical and practical insights that are aimed to build a better understanding of the human nature, better predict behavior, and suggest tailor-made policies that facilitate more optimal decision making.

FOUNDATIONAL RESEARCH

CLASSIC AND NEOCLASSICAL ECONOMICS

The basic principles of behavioral economics are deeply rooted in classical economics. Indeed, many of the forefathers of economics acknowledged the important role that psychological principles play in choice behavior. Prime examples are the suggestions that utility formations are subjective, impacted by beliefs and emotions, and that social considerations are highly effect economic decisions. Notwithstanding, partly because at the time psychology was not yet a well-established science, and partly due to economists' desire to become closer to the natural sciences, a departure of standard economics from psychology developed at the turn of the twentieth century into the era of the neoclassical economics.

Throughout the first half of the twentieth century, psychology had started to gradually disappear from economic theories, and in its place came mathematical models that focused not on the way people make economic decision but rather on how optimal agents should operate in an economic environment. In this economic point-of-view, people are perfectly rational agents, who hold well-defined preferences over all outcomes, and act to maximize their utilities by choosing the best alternative in any given moment. In about the 1950s, important developments and advancements in psychology and decision-making research started to bring back the focus of psychological

factors to economic models and initiated the rise of behavioral economics. These developments are outlined in the next subsections.

BOUNDED RATIONALITY

The cognitive revolution during the 1950s and 1960s had freed psychology from the almost exclusive dominance of the behaviorist approach, and made room for an approach that examined not only behavior but also cognitive processes such as perception, information-processing, and thinking. Among other important developments, the cognitive revolution also led to the emergence of behavioral decision research, a branch in cognitive psychology that contributed most directly to the development of behavioral economics.

One important milestone in the emergence of behavioral economics that resulted directly from the cognitive revolution is Simon's (1957) notion on bounded rationality. According to Simon, individuals cannot be fully rational as they work with limited information under the constraints of their cognitive capacity and processing ability. In order to facilitate these constraints, individuals adopt simple cognitive shortcuts (rules of thumb) that use partial information and limited cognitive processing to evaluate the environment and make judgments and decisions effortfully and quickly. According to the bounded rationality account, individuals are not completely irrational, but because we are forced to make decisions anyway, we do the best with our bounded abilities to process and evaluate our surroundings and make satisfactory rather than optimal decisions.

A different form of bounded rationality came from the revolutionary heuristics and biases approach, put forward by the psychologists Tversky and Kahneman (1974). Much like Simon's approach, heuristics and biases does not assume that people aim to be irrational in their judgments and decisions. Instead, under this approach, individuals tend to rely on a small set of simplified cognitive strategies (heuristics), rather than on "cold" statistical and mathematical calculations, which in turn leading to systematic departures from rational thinking. The novelty of the heuristics and biases approach was not only in challenging the descriptive adequacy of the economic models but also in that that it offered a more detailed way to understand the ways in which decisions deviate from the normative (and rational) solution. Thus, this approach revolutionized not only the field of psychology but it also had a large effect on theory and practice across a wide range of disciplines such as law, economics, and medicine.

Originally, the heuristics and biases approach included three general heuristics that underlie many of the judgments people make: the availability heuristic, the representativeness heuristic, and the anchoring and adjustment heuristic. These heuristics represent simplified rules that use

intuitive judgments and limited information (rather than complex and exhaustive calculations) to make evaluations and provide estimations for questions such as what is the frequency of fatal car accidents (availability heuristic), what is the profession or political view of someone you have just met (representativeness heuristic), or what is the distance between the Statue of Liberty and the Rockefeller Center (anchoring and adjustment). The merits of these heuristics for making good approximations in many real-life situations notwithstanding, they often lead to systematic biases and erroneous judgments as they are based on accessible and easily retrieved information that is often not ideal to resolve the decision at hand. Soon after, however, many additional heuristics (e.g., the affect heuristics; Gilovich, Griffin, & Kahneman, 2002), as well as underlying biases, were found.

Still, despite the scientific (as well as intuitive) appeal of these bounded rationality approaches, neoclassical economists mostly ignored these ideas and findings. For most economists, these findings represented behavioral quirks, mere reflections of random human errors that only apply to small scale and unimportant decisions. However, during the early years of the 1970s, Richard Thaler, who was a young economist at the time, had become increasingly intrigued by these accumulated instances of behavioral anomalies that challenged the basis of neoclassical theory. After coming across the work of Tversky and Kahneman in 1976, he started to take these anomalies seriously and documented many of these anomalies in a way closer to the way economists were thinking about these behaviors (these anomalies were later published as a series of special columns in the *Journal of Economic Perspective* during the late 1980s and 1990s and collected in Thaler, 1994). The cooperation that started between the three had planted the seeds for the emergence of behavioral economics as an independent field.

SUBJECTIVE VALUES

Another important advancement in behavioral decision making that is considered one of the cornerstones of behavioral economics is the prospect theory (Kahneman & Tversky, 1979), a model to describe decision making under conditions of risk. Prospect theory describes how people evaluate potential positive and negative outcomes (as well as their probabilities), and how these evaluations are used to choose among alternatives. The theory was introduced as an alternative for expected utility theory.

For several decades, expected utility theory was one of the most important and influential economic models for decision making under risk. Expected utility was first introduced by Bernoulli (1738) as a modification to the expected value notion. In expected value, an outcome of each alternative is equal to its payoff multiplied by its probability. However, as Bernoulli

observed, the values that people attach to outcomes are influenced by several factors such as probabilities and magnitudes. Thus, he suggested a model that explains people's preferences in terms of subjective (utility) rather than objective evaluations of expected returns. Two centuries later, von Neumann and Morgenstern (1944) modified the expected utility model and formulized four axioms of rationality (completeness, transitivity, continuity, and independence) that were assumed to capture the way in which people judge the utility of outcomes and choose among available alternatives.

As with most economic models, expected utility assumes that people are rational maximizers who aim to maximize their utility. Yet, in reality people exhibit systematic violations of all axioms of the rational model (Allais, 1953; Ellsberg, 1961). In several well-controlled experiments, Kahneman and Tversky (1979) provided a compelling demonstration of these violations, and based on these findings developed prospect theory, an empirically supported alternative theory of choice. According to the prospect theory, instead of subjective utility, people calculate subjective values of alternatives. These subjective values represent the evaluations of outcomes as gains or losses relative to the current state of wealth (the reference point). The subjective value of each outcome is equal to its payoff (relative to the reference point) times its decision weight. Subjective evaluations of outcomes are based on a value function, while subjective probabilities (decision weights) are based on a probability weighting function. The value function is asymmetric and nonlinear. It is concave for gains and convex for losses and steeper for losses than for gain. In addition, the probability weighting function is lower than the objective probabilities for high probabilities and higher than the objective probabilities for low probabilities. According to the prospect theory, people are risk averse in the gain domain but risk seekers in the loss domain. They give stronger weight to losses than to equivalent gains (loss aversion), and the further away they go from their current state the less sensitive they become to increases in values (diminishing sensitivity). Combining all of these features, this model provides a more descriptively accurate description of economic decision making.

Prospect theory is one of the most influential theories to account for a wide range of puzzling behaviors that run counter to the predictions of the traditional economic models, and provide basic psychological mechanisms to explain these behaviors. These notions, alongside the fact that Kahneman and Tversky (1979) formulated and explained prospect theory in an economic language, are probably the main reasons why this seminal work had brought behavioral economics (and its importance) into the attention of many mainstream economists, and contributed tremendously to its emergence.

HYPERBOLIC TIME DISCOUNTING

The tradeoffs people make between costs and benefits that occur at different points in time is of major interest for economics. Because people usually prefer rewards sooner than later, options that delay rewards are perceived as less attractive and thus people discount them. The traditional economic model suggests that people discount future rewards by a fixed percentage for each time unit they need to wait. Thus, according to this model discounting utility is exponential, depending only on the length of the wait.

While the exponential model is widely common in economics, a large body of evidence from behavioral economics demonstrates that people systematically violate this time-consistent model. People prefer smaller rewards now over larger rewards later, and they discount future rewards at a greater rate when the delay occurs sooner. For example, most people will prefer \$200 now over \$210 tomorrow, but only few will choose \$200 in 2 weeks over \$210 in 2 weeks and 1 day. Thus, discounting rate decreases as the length of the delay increases. Research shows that a simple hyperbolic time-discounting function provides the best fit to the data, and capture the declining discount rates exhibited by people.

Hyperbolic time discounting is considered a robust and central phenomenon in behavioral economics, which accounts for several economic behaviors that cannot be explained by standard economic models (for a critical review, see Frederick, Loewenstein, & O'Donoghue, 2002). For example, hyperbolic discounting explains one of the reasons why credit card companies are able to charge such high interest rates for credit card expenditures. Often, when credit cards are used it is because the reward of buying something now outweighs the discounted displeasure of paying more for it later, and because this discount rate is so high, credit companies are able to get away with charging very high interest rates. Similarly, hyperbolic discounting can also explain why people are willing to accept low interest rates to saving and retirement plans. Because these saving plans are for the far future, people are much more patient and are willing to accept low interest rates. Hyperbolic discounting had also been used to explain why people exhibit a lack of self-control and low willpower. As an example, people who wish to live healthier and reduce extra weight realize the advantages of keeping a strict diet for the long run. However, the rewards from instant temptations in the form of a chocolate cake or a greasy bacon cheeseburger loom larger than the discounted reward of better health in the future. Thus, it is easier to think that tomorrow you will go on a diet and resist any temptation than to actually turn down an immediate one.

PROSOCIAL AND MORAL BEHAVIOR

Economics traditionally portray economic decision makers as selfish and self-interested agents who follow the principle of utility maximization. Under this conceptualization, any form of prosocial behavior such as fairness, cooperation, reciprocity, or charity giving is simply not existent (or it can be explained by a selfish underlying motive). Because prosocial behavior is neither rational nor economically beneficial, it is often ignored or assumed away by neoclassical economics. However, abundant empirical evidence from psychology and economics repeatedly demonstrate that prosocial motives and considerations play an important role in economic behavior (see e.g., Fehr & Schmidt, 1999).

Some of the most central and interesting findings about prosocial behavior show that people have a strong tendency for cooperation; however, this tendency decreases if they learn that their cooperators are taking advantage of them. In addition, research shows that people tend to punish noncooperators and free riders. Interestingly, punishing occurs even if the punishing is costly and does not provide material benefits for the punishers. Cooperation and reciprocity are not the only prosocial behaviors that effect economic behavior. Many experiments have demonstrated that individuals are highly sensitive to fairness far beyond material gain. In contrast to standard economic models, much evidence shows that people forgo a possible incentive if they feel that the offer is not fair. This tendency was also found among infants and primates, thus demonstrating how prevailing and robust prosocial considerations are.

Pure altruistic behavior such as donations and charity giving is another example of a common prosocial behavior that deviates from economic models. In economics, altruistic behavior is considered completely irrational, as it represent a total waste of resources. In reality, however, most people prefer to give away their hard-earned money (and other resources) in order to help others, and in fact over 90% of the household in the United States tend to donate a substantial amount of money to charity a year. Moreover, the forces that influence the level of giving are far from being purely rational. For example, the identifiable victim effect demonstrates that people are more willing to donate to one identifiable victim than to a group of people who share a similar unfortunate faith (or, as Mother Teresa eloquently expressed, "If I look at the mass, I will never act. If I look at one, I will"). While economic models cannot explain these ample instances of altruistic and prosocial behavior, behavioral economics provide several insights to the psychological and social factors which promote it (e.g., social desirability, sense of accomplishment).

On the other side of the social spectrum is anti-social or unethical behavior (e.g., cheating, dishonesty). While unethical behavior is not explicitly modeled in economics, the self-interested rational assumption of economics suggests that to the extent that they cannot get caught people should engage in unethical behavior as long as it increases their utility. Nevertheless, variety of laboratory and field studies show that peoples' unethicality deviates from the predictions of the economic models. While large-scale cheating instances such as Bernard Madoff's Ponzi scheme exist, research suggests that the majority of people restrict the amount of their self-serving unethical behaviors (see e.g., Ariely, 2012), even when complete privacy is guaranteed and the probability of being caught is very low. By restricting the extent of cheating, people are able to resolve the conflict between their desire to maximize their material profit and their desire to think of themselves as honest and prosocial. Thus, behavioral economics rejects the economic point of view and demonstrates that unethicality does not depend solely on cold calculations of monetary payoff, but rather on a variety of psychological, social, and contextual factors that shape ethical standards and moral behavior.

CUTTING-EDGE RESEARCH

Behavioral economics attempts to build a framework for understanding the rational and irrational elements of human nature. Usually, the starting point of these attempts includes basic research that tests theoretical ideas in controlled laboratory experiments. The findings from this basic research are then applied in several domains to provide a better understanding of how people actually make real-time mundane and significant decisions. Moving beyond the laboratory, applied behavioral economics is used to explain existing behavioral patterns in the world and to better understand the forces that shape behavior. Throughout the years, behavioral economic principles have been applied to many different domains and environments, such as law, health, finance, education, consumer behavior, and organizational science.

For example, financial decision making uses behavioral research findings as a prism to examine the psychological factors that shape the financial decisions that people make. Be they related to debt management, savings, housing, health care, or other monetary decisions, financial decision-making research examines how and why so many of the important and fundamental decisions that people make are irrational. The typical findings suggest that while making such financial decisions, people are usually focused only on a small part of the overall picture. Instead of wisely allocating and spending their resources, people are affected by situational factors, individual traits,

and social motivations. They fail to appreciate important concepts such as interest, compound interest, fungibility, and so forth, and this leads them to spend their hard-earned money unwisely and irrationally. Thaler (1980) uses the term *mental accounting* to describe the way in which people evaluate goods, organize their monetary assets, and make financial decisions. The idea is that people create separate, nonfungible, mental accounts for different goals (e.g., money for food, money for clothing, money for recreation). The different accounts are nontransferable, and thus spending money from one account does not affect decisions on spending from other accounts. In addition, the different account affect the utility that people assign to each of their assets, and thus affect their consumption behavior. For example, if someone exhausted her recreational money in a certain week but still has some money left in her money for clothing account, she will not use it to buy a concert ticket she wants even if she cannot find a dress she likes.

In a similar vein, behavioral economics tenets are applied in marketing and consumer behavior research to inform our understanding of how consumers evaluate brands and products, form and change preferences, think and feel about their consumption goods, and how marketing strategies can be tailored to increase efficiency.

A second cutting-edge area of research in behavioral economics is aimed at developing and identifying debiasing techniques to improve the decisions that people make. Early research on debiasing was mainly aimed at validating the existence of irrational behaviors, and to demonstrate the robustness of behavioral biases. However, as the existence of the gap between economic behavior and the economic assumption that people are rational is increasingly accepted by economists, the focus of debiasing research is changed. Building on behavioral economics findings, which help to identify the forces that shape our decisions and lead them astray, debiasing research pinpoints specific policies, interventions, and choice architectures geared to move people toward more optimal and rational decisions. These debiasing techniques could be as simple as practical suggestions that can help people better handle their savings account to more pervasive paternalistic policies and regulations that lead people to better manage their lives. Latest development in the field are aimed to help people better manage their savings and debt accounts, and to increase social and ethical behavior among individuals and societies.

A third cutting-edge area in behavioral economic is neuroeconomics. The role of behavioral economics is to understand how people make decisions, while the role of neuroscience is to study the neural underpinnings and brain mechanisms of human behavior. Neuroeconomics combine economics, psychology, and brain research into a single discipline that employs methods and insights from these three fields to develop better models of economic behavior that will account not only for how people behave but also provide some

insights of the underlying processes of this behavior. Owing to the expensive equipment required, the advanced training needed, and the strict methodological practices, it is still not widely used. However, neuroeconomics is becoming increasingly popular in behavioral economics in recent years.

Neuroeconomic practices in behavioral economics are usually used to understand how people evaluate monetary gains and losses, how they react to different types of incentives, and how subjective values or utilities are being formed. In addition, behavioral economics is starting to depart from the exclusive view of decision making as a cold cognitive process, and to show increasing interest in emotional and effective processes and their important role in economic decisions. To a large extent, neuroeconomics serves to identify such emotional processes, and to explain some of the behavioral deviations from the standard economic models that results directly from emotional processing (such as fairness and other forms of prosocial behavior). Relatedly, another recent development in behavioral research is the dual-system approach, which considers judgment and decision making as a process of two distinct systems: an intuitive system that is based on rapid and automatic processes, and a deliberative system, that is based on more controlled and reflective processes. In recent years, the dual-system approach has been proposed as a theoretical framework that explains some of the empirical regularities that differ from standard economic models (e.g., intertemporal choice, risk aversion). Usually, neuroeconomics is used under this framework to examine automatic and intuitive processes, which could not be easily quantified and tested with the more traditional methods in behavioral science.

KEY ISSUES FOR FUTURE RESEARCH

Perhaps the most important insight in behavioral economics is that people are not perfectly rational actors who simply maximize their expected value. Traditionally, behavioral economics relied on well-controlled laboratory experiments to better understand the forces that shape economic decision making, and to demonstrate marked deviations from rational economic models. However, laboratory settings often differ significantly from real-life situations, and in many cases researchers have to rely on hypothetical rather than real decisions, often creating somewhat superficial and unnatural situations, and using small rather than substantial monetary incentives. Thus, many of the findings in behavioral economics are challenged by economists on the ground that behavioral deviations from the economic models do not reflect actual economic behavior that people exhibit in real life.

To account for this important criticism, studies in behavioral economics have started to extend their scope of research methods to include larger

incentives, and simulate real and important monetary decisions in the laboratory and, most importantly, examine behavior in real-life settings (e.g., field experiments). Indeed, field experiments in behavioral economics have seen a steady growth in recent years, and to a large extent the findings from these experiments replicate those in the laboratory. Still, challenges remain for behavioral economics in planning and conducting field experiment that will allow the examination of the generalizability of these findings.

Another drawback often raised as a critique of behavioral economics is the fact that behavioral economics represents a collection of ideas rather than a unified and comprehensive theory. In a sense, it seems as behavioral economics are more focused on identifying behavioral irregularities and classifying them as new heuristics. However, in some situations these different heuristics lead to contradicting behavioral tendencies. For example, the gambler's fallacy (Kahneman & Tversky, 1972) is a term used to describe people's tendency to believe that if certain instances of some random process (e.g., the result of a coin toss) deviates to one direction, future deviations will more likely happen to the opposite direction. In contrast, the hot hand effect (Gilovich, Vallone, & Tversky, 1985) reflects the belief that deviation to one direction increases the likelihood that future instances will happen in the same direction.

Indeed, this criticism raises important questions about the true nature and goal of behavioral economics. Similar to many physical mechanisms (e.g., even the visual system includes many components), a realistic theory of economic decision making is likely to be very complex, and a trade-off between accuracy and parsimoniousness is probably inherent in the nature of behavioral economics. If parsimoniousness is the main goal, behavioral economists should focus on developing simple yet powerful models. If accuracy and application is the main goal, however, future research should focus on developing tools and interventions that will lead us to make better decisions. Thus, a key issue for the future is to consider under which conditions behavioral economics should be considered a pure science that aims to provide parsimonious models which account for the entire spectrum of human behavior and under which conditions should behavioral economics be considered a more applicable school of thought that aims to inform us of the various forces that shape our behavior, and suggests specific ways to aid people make better decisions.

Still, one way that behavioral economics should advance, and accuracy could be improved without jeopardizing parsimoniousness, is by focusing, at least to some extent, on the underlying cognitive and affective processes of these behavioral tendencies. Focusing on the underlying processes and not just on overt behavior would improve the descriptive and predictive power

of behavioral models, and provide a more comprehensive and unified theory of human nature. Moreover, such an understanding would facilitate the development of more successful interventions and debiasing techniques that will be more suited to the specific needs of the decision makers. Consider, for example, the case of unethical behavior. While behavioral economics findings show that most people choose to lie or cheat by a little, it is not clear yet whether people deliberately choose to cheat in order to increase their utility while maintaining a positive self-esteem, or if they are completely oblivious to their unethicity because of certain unconscious self-serving perception-distorting mechanisms.

Of course, much of these drawbacks are not entirely unique for behavioral economics. For example, neoclassical economics is also more a collection of ideas than a unified theory, and many disciplines can benefit from a more profound understanding of the processes that underlie human behavior. Currently, behavioral economics is more a school of thought deeply rooted in economics, psychology, and decision research, than an independent field in social sciences. Addressing some of these drawbacks of behavioral economics could make it a more distinct and independent discipline that parsimoniously explains a range of behavioral data and provides practical tools that would aid individuals to better manage their life and financial assets.

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