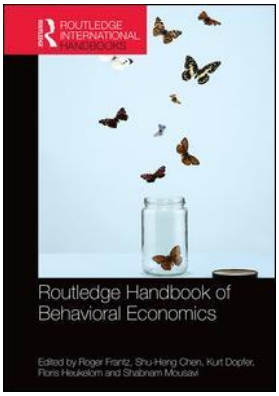


# Routledge Handbook of Behavioral Economics

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## A Bounded Rationality Assessment of the New Behavioral Economics

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# A BOUNDED RATIONALITY ASSESSMENT OF THE NEW BEHAVIORAL ECONOMICS

*Morris Altman*

## Introduction

I explore the evolution of behavioral economics, from a multidisciplinary rational agent or bounded rationality approach that was pioneered and championed by Herbert Simon (1959, 1978, 1987) from the 1950s, to the heuristics and biases approach that currently dominates the field. I argue that although the heuristics and biases approach pioneered by Kahneman and Tversky (1979; Kahneman, 2003, 2011; Tversky and Kahneman, 1981) has made significant contributions to the field, the bounded rationality approach holds most promise because of its focus on methodology and related causal analyses and modeling, smart decision-makers, capabilities, and institutional design.[1]

The heuristics and biases approach, where heuristics refers to decision-making shortcuts, is more focused on documenting deviations from the neoclassical or conventional behavioral norms, where the latter is considered to be the normative ideal. This normative ideal is typically rejected in the bounded rationality approach when inconsistent with the evidence. The heuristics and biases approach also pays considerable attention to how heuristic-based biased behavior better describes and explains a good deal of economic behavior and outcomes than the conventional wisdom.

This descriptive narrative raises questions about the analytical relevance of conventional economics, in many domains, and remains vitally important not only to the behavioral economics narrative, but also to economics in general. For all perspectives in economics the dynamic interaction, the passionate tango, between facts and theory, is supposed to be a linchpin of scientific analysis.

A common thread running through behavioral economics is that many economic outcomes are inconsistent with the predictions of conventional economic theory. Documenting this inconsistency represents key contributions of Herbert Simon, but especially that of Daniel Kahneman and Amos Tversky, all of whom are considered to be among the core founding fathers of contemporary behavioral economics. Significant efforts to document these inconsistencies with conventional theory have also been made by Vernon Smith (2003), one of the founding fathers of experimental economics, and by Gerd Gigerenzer (2007), a pioneer in developing the notion of rational decision-making heuristics (shortcuts). This documented inconsistency opens the door wide open to various alternative models of human decision-making and their

determinants. This is particularly true if one concludes that these inconsistencies are persistent and represent an important subset of choice outcomes, not just some interesting outlier anomalies.

Behavioral economics sometimes affords us with quite different and opposing perspectives on what the deviations from the conventional or neoclassical economic norms mean for our understanding of human behavior, the causes of such deviations, and for the development of robust economic theory and policy. These points of difference are a central theme of this chapter.

## Assumptions-matter and behavioral economics

In the contemporary literature on behavioral economics (the heuristics and biases approach), attention is drawn to behavioral economics as better describing economic reality than conventional theory in terms of both choice behavior and the outcomes of these choices, which tend to deviate from what is predicted by conventional economics. These outcomes are interpreted as being all too often a product of error prone and biased decision-making processes, where decisions are often driven by "irrational" emotional considerations as opposed to careful and considered calculating behavior. Apart from this interpretation of choice outcomes, an objective of documenting deviations from predicted conventional outcomes (a point of commonality with the bounded rationality approach) is to demonstrate that conventional theory too often fails to predict choice behaviors and choice outcomes.[2]

But this worldview is completely contrary to the methodological perspective of conventional economics, one that permeates other approaches to economic analysis as well. This outlook stems from the classic 1953 methodological paper by Friedman (1953), where he argued that the realism of simplifying modeling assumptions is not of any significance in building robust economic models or theories. Getting the description right as regards choice behavior is not of importance—all that counts is predicting the outcomes of choice behavior correctly. Of course, behavioral economists have additionally found that all too many of the predictions of the conventional model are incorrect. Related to this, Simon (1987) and the bounded rationality approach make a critical point—the realism of the simplifying assumptions of models is vitally important to achieve rigorous analytical predictions and causal analyses (Altman, 2005a, 2005b, 2012, 2015).

Friedman (1953) argues that trying to be more accurate in the realism of one's assumptions "only confuses the issue, promotes misunderstanding about the significance of empirical evidence for economic theory ... [and] ... wildly inaccurate descriptive representations of reality, and, in general the more significant the theory, the more unrealistic the assumption (in this sense)." A realistic modeling of assumptions is, therefore, of no consequence. The ultimate test of whether modeling assumptions are "good enough" or appropriate is the model's predictive power, even if the assumptions are markedly inaccurate. In other words, inaccurate assumptions and, even more extremely, assumptions that have no bearing on how decision-makers actually behave are quite acceptable when they generate reasonably robust predictions. From this methodological perspective, causality, cause and effect, as opposed to correlation, is difficult to determine. And, correlation can be misinterpreted as causation (Altman, 2006).

A critical facet of the bounded rationality approach is that causality can only be determined with reference to simplifying assumptions that are empirically derived. Only in this manner can one test whether a model's analytical predictions are robust and impute causation to the independent variables of the model and, more specifically, to the particular behaviors of decision-makers and their decision-making environment. This also reduces the probability of generating omitted variable problems. It also changes the analytical rules of the game away from necessarily assuming that individuals make decisions in optimally yielding optimal results (an analytical default option in the conventional wisdom) towards determining how

decision-makers actually behave and their decision-making constraints. Because Friedman assumes that individuals behave in a manner consistent with "optimal" economic behavior, it is also often assumed that outcomes are optimal even if, on the surface, they appear not to be so. This too runs contrary to the behavioral economics narrative where what appear to be suboptimal outcomes are interrogated and tested for suboptimality, and then related to the choice behavior of decision-makers.

In addition, this bounded rationality approach is not consistent with the modeling by some behavioral economists who introduce various psychological or sociological assumptions, as replacements for the conventional neoclassical ones, that yield robust predictions but which are not derived empirically. Although this approach to model building might appear reasonable, derived from the decision-making literature, the model's underlying assumptions are not derived from the actual decision-making process. For example, this approach would *not* assume that individuals behave as if they compute simultaneously hundreds of equations to optimize their results—which is the Milton Friedman approach modeling—but it would allow for assumptions that don't appear "absurd" but are equally unreasonable as are Friedman's deliberately wildly unrealistic assumptions. The common core here is that assumptions are not being empirically derived and what matters is that the predictions are robust (Altman, 2015; Berg and Gigerenzer, 2010). In the bounded rationality approach, behavioral and context-related assumptions need to be sensible and realistic given the context of decision-making, the hypothesis being tested, and the outcomes being explained. This assumptions-matter perspective also allows us to test the reasonableness and the implications of different sets of plausible behavioral assumptions for causality, prediction, and for improved decision-making outcomes.

## The conventional wisdom and the different faces of behavioral economics

According to Simon (1987), bounded rationality refers to rational choice behavior. But bounded rationality refers to the type of rational choice behavior that one finds in the real world. Such choice is bounded by a variety of factors, such as the cognitive limitations of decision-makers, including limitations to their knowledge of pertinent information (and their ability to acquire such knowledge), and to their computational capabilities and capacities (see Akerlof, 1970, on information asymmetries). The institutional factors that can hinder or improve the decision-making process and outcomes are also important. More recently, behavioral economists and others have increasingly introduced psychological (Kahneman and Tversky, 1979; Kahneman, 2003, 2011; Tversky and Kahneman, 1981; Lewis, Webley, and Furnham, 1995) and sociological factors in models of decision-making (Akerlof and Kranton, 2010).[3]

But what are the conventional economic or neoclassical norms for optimal behavior? Not everyone would completely agree. However, there are certain core assumptions that are often referenced by both neoclassical economic and behavioral economists:

1 Individuals can and do make consistent choices across all possible bundles of goods and services and through time.
2 It is assumed that all individuals have thorough knowledge of all of the relevant available options at any given point in time and they all have the means to process and understand this information in a timely manner—the brain is assumed not to be scarce resource and individuals' computational ability is unlimited.
3 Individuals can forecast the implications of their decisions through time and, hence, calculate at least in a measurable probabilistic sense the consequences of their choices.

4 Individuals are assumed to make choices across alternatives that maximize utility or well-being. It is typically assumed either explicitly or implicitly that, controlling for risk, utility maximization is consistent with wealth or income maximization.
5 It is assumed that individuals are effective and efficient calculating machines or at least they behave as if they are, irrespective of age, experience, or education.
6 It is assumed that all individuals independent of context should behave in the same calculating manner (following conventional behavioral norms) to maximize utility or efficiency.

The "new" behavioral economics, emanating from the initial research outcomes and initiatives of Kahneman and Tversky, sets out to develop theories that are better able to describe human behavior, where often such behavior is related to economic issues. In this vein, for example, they developed prospect theory as an alternative to subjective expected utility theory. Certainly, Kahneman and Tversky view their scientific project as bearing down on better describing choice behavior than conventional economic theory. In the Kahneman and Tversky approach, such descriptive theories are typically related to the behavior of the average individual. The focus on the average has also been a mainstay of conventional economics. This implicitly assumes that the average is the most appropriate point of reference for descriptive and analytical purposes.

This "new" behavioral economics also interprets the "average" individual's deviations from the conventional economic norms for optimal decision-making to be error prone and biased, and typically persistently so. On the one hand, this perspective on behavioral economics maintains and adheres to a fundamental premise of conventional economics, that there is particular way of behaving in the economic realm resulting in a particular set of choices and, therefore, outcomes that are optimal (most effective, efficient, unbiased). But it represents a big break with conventional economics in that individuals tend not to behave optimally in a large array of choice scenarios. It is argued that individuals tend to engage in biased and error prone behaviors. And they do so because they do not conform to conventional or neoclassical behavioral norms.

## The bounded rationality approach in context

The bounded rationality approach breaks with conventional economics by recognizing that individuals and organizations all too often behave in a manner that deviates from the conventional economic norms for optimal and even rational behavior. But unlike with the "new" behavioral economics, in the bounded rationality approach such deviations often signal decision-making processes and outcomes that are optimal and rational given the preferences of the decision-makers and the constraints that they face. These constraints can be of a physiological, neurological, psychological, or institutional nature. Hence, the bounded rationality approach rejects, on an empirical basis, that individuals and organizations generate decisions that are typically consistent with conventional economic theory predicted outcomes, while also rejecting the null hypothesis that one should typically use conventional economic theory benchmarks to determine which outcomes are optimal from either an individual or social perspective. This approach does not deny the possibilities of errors and even biases in decision-making. Moreover, there is a focus here on causal analysis. Modeling is important. Identifying which particular behaviors yield particular outcomes is critical. This shifts attention from correlation-based prediction to cause-and-effect modeling. The former remains the basis of much of conventional economics.

Herbert Simon developed the key analytical concepts of bounded rationality and satisficing as an alternative to the conventional economic concepts of rationality and maximizing or minimizing behavior. He argued that these alternative analytical tools were better able to describe and

explain (causally) the behavior of human decision-makers in the real world, as well as providing more reasonable normative benchmarks for rational behavior. He accepted a basic premise of conventional economics that most individuals (the typical individual) are goal-oriented and have reasons for what they do, for the decisions they make. Being goal-oriented and having reasons behind one's actions is what Simon considered to be fundamental to any reasonable definition of rationality. But determining rationality required placing human action in the context of an individual's and an organization's decision-making environment (Simon, 1987; Todd and Gigerenzer, 2003).

One of Simon's main differences with and concerns about conventional economics throughout his career was that conventional economics decontextualized the meaning of rationality. It thereby defines rationality in terms of norms that are often dissociated from the overall decision-making environment. Conventional economics also tends to assume that individuals and organizations behave in a manner consistent with these decontextualized norms, where such behavior is considered to be the only behavior that is rational. In this case, if individuals are rational, which is a bread-and-butter assumption of conventional economics, one must assume that behavior is consistent with conventional norms of rational behavior.

But if, as Simon argues, rationality needs to be more broadly defined and defined in a contextualized manner, conventional norms should not necessarily be used as a benchmark of rational behavior. What is rational from the perspective of conventional economics might be irrational from a bounded rationality perspective. And, what conventional economics considers to be an irrational behavior, might very well be rational behavior. Market forces should, according to the conventional wisdom, wipe out the former in a short enough period of time such that irrational behavior from a conventional economic perspective should not be of analytical significance (Reder, 1982). But the bounded rationality approach would consider deviations from the conventional norm to be not uncommon and to persist over time, especially if such deviations are the product of some rational decision-making process.

One example of the bounded rationality approach is provided by James March (1978), a close associate of Simon during the golden years of the foundational period of behavioral economics in Carnegie-Mellon University. March argued that one should approach the determination of the rationality of decision-making in the context of the decision-making environment. March, therefore, concludes that in the first instance one should assume that choice behavior is sensible and, therefore, rational, even if this behavior deviates from conventional economic norms, even by a significant extent:

> Engineers of artificial intelligence have modified their perceptions of efficient problem solving procedures by studying the actual behavior of human problem solvers. Engineers of organizational decision-making have modified their models of rationality on the basis of studies of actual organizational behavior . . . Modern students of human choice behavior frequently assume, at least implicitly, that actual human choice behavior in some way or other is likely to make sense. It can be understood as being the behavior of an intelligent being or group of intelligent beings . . .
>
> *(p. 589)*

This does not imply that all choices are rational or sensible. But one should not determine rationality, sensibility, or optimality, by the extent to which choice behaviors and outcomes deviate from conventional norms of rationality. Moreover, one should not attempt to achieve superior outcomes by inducing individuals or organizations to conform to or adhere to conventional economic behavioral norms.

More recently, Vernon Smith, a pioneer of contemporary experimental economics concluded in a similar vein, but based his conclusion on evidence derived from classroom experiments. One of his key findings is that behaviors that generate economic success are all too often not consistent with what contemporary economic theory considers to be rational or smart decision-making. But then this implies that there is something fundamentally wrong with the theory, in this case the assumption that profit maximizing behavior generates economic success and optimal economic outcomes. One should not challenge the rationality of decision-making that is consistent with economic success, when economic success is the normative end-game of the theory. Moreover, in this scenario the conventional economic model's prediction is also wrong. Profit maximization would not result in firm success whereas forms of non-maximization would.

Smith finds that:

> It is shown that the investor who chooses to maximize expected profit (discounted total withdrawals) fails in finite time. Moreover, there exist a variety of nonprofit-maximizing behaviors that have a positive probability of never failing. In fact it is shown that firms that maximize profits are the least likely to be the market survivors. My point is simple: when experimental results are contrary to standard concepts of rationality, assume not just that people are irrational, but that you may not have the right model of rational behavior. Listen to what your subjects may be trying to tell you. Think of it this way. If you could choose your ancestors, would you want them to be survivalists or to be expected wealth maximizers?
>
> *(2005: 149–50; see also Smith, 2003)*

Simon developed the concepts of bounded and procedural rationality, as well as satisficing, as alternatives to conventional economic rationality and maximizing/minimizing/optimizing behavior. These alternative concepts have embodied in them alternative sets of rational behavior which differ from those embodied in conventional economic modeling. Simon provided these alternative sets of concepts to capture rational or sensible behavior that was inconsistent with conventional economic norms. It was not enough to simply critique conventional economics as being descriptively incorrect. It was imperative to also provide conceptional vehicles to facilitate modeling human decision-making.

Bounded rationality (BR) refers to goal-oriented and even deliberative and, therefore, rational behavior. Unlike the conventional economics definition of rationality, BR is more broadly defined and is empirically derived, based on how smart people behave in the real world situations given the various parameters or constraints faced by the decision-maker and the decision-making environment.

BR is a contextualized and operational definition of rationality. Rational decision-making is bounded by a number of factors. And these bounds generate decision-making and outcomes and processes different from what one would predict or assume from the perspective of conventional economics. Of particular importance are the cognitive limitations of decision-makers, including limitations to their knowledge of pertinent information (and their ability to acquire such knowledge) and the limitations to their computational capabilities and capacities. The latter acknowledges the brain as a scarce resource—we are not endowed with unlimited cognitive capability or capacity. Our processing capacity can be potentially increased through the development of new products, such as calculators and computers—a crucial point made by Simon. An additional point that needs to be made is that this potential can only be realized if individuals can afford these computational aids and know how to use them. Hence, one integrates into one's modeling

framework the importance of income and education affecting the type of decisions made by rational but constrained individuals.

In this context, what appears to be a suboptimal choice or an error or bias in decision-making from a strictly conventional economics perspective or even from the heuristics and biases approach (Kahneman and Tversky, 1979; Kahneman, 2003, 2011) is rather a product of cognitive, educational or income constraints faced by the decision-maker. So, when a decision appears to be odd or irrational, this modeling framework demands that one should determine if there are BR constraints that can explain these "odd" decisions as rational. Here, improvements to decisions relate to improving individuals' decision-making capabilities. And, one of Simon's passions was to develop mechanical decision-making aids to improve individuals' decisions and, therefore, economic efficiency and also better meet the preferences of decision-makers. Overall, what might appear to be an irrational choice is quite rational within the bounds of reason—individuals are doing the best that they can given their constraints, capabilities, and opportunities.

Also important are institutional factors that can hinder or improve the decision-making process and outcomes. Institutional parameters, either formal or informal rules of the game, impact on the decision-making process and rules of the game. This is a point emphasized by Simon and of importance to the BR approach to behavioral economics. Choices that appear to be irrational or suboptimal might simply be a product of perverse institutional parameters that induce suboptimal choices. On the other hand, a different set of institutional parameters might be necessary for optimal decisions to be made from either an individual or social perspective (Simon, 1987; North, 1971). Simon places considerable weight on the importance of the old institutional economics, exemplified by Commons (1931) in explaining rational but non-neoclassical choice behavior.

Also, as mentioned above, sociological factors can impact on choice behavior, generating choices that might also appear to be irrational or suboptimal. This is a point made by Gary Becker, one of founding fathers of contemporary or mainstream economic theory. But he breaks with his peers by arguing for integrating social variables into his modeling of human decision-making. Price theory alone cannot explain choice behavior, at least in many critical instances. Relations with others in the past and present and one's place and standing in ones community are of vital importance to explain behavior that in the first instance might appear to be irrational. Sociological factors are typically not given due consideration in behavioral economics, but can be vitally important in better explaining and predicting choice behavior. A clear exception to this "rule" is Akerlof and Kranton (2010) who develop identity economics, where a person's utility maximizing behavior is driven by desire of individuals to fit into their group or community. One can go back in time to the contributions of Thorsten Veblen (1899) and there is also James Duesenberry (1949) who developed the concept of relative positioning in income as key to a person's utility as opposed to a person's absolute state of wealth. The latter concept is key to the work of Kahneman and Tversky's prospect theory, with an emphasis on how this yields suboptimal behavior by focusing on relative as opposed to absolute states of wealth or income.

Overall, institutional and sociological factors can also be important to explain and predict both suboptimal and optimal choices, where the latter are conditional upon an appropriate institutional and sociological environment. This is apart from the state of cognitive and related variables. Introducing such non-economic variables is most consistent with the BR approach given that they help explain rational choices that appear irrational from the perspective of the conventional wisdom. It is important to note that rational choices need not generate optimal outcomes, given the constraints faced the individual. This point is not emphasized enough in either perspective of behavioral economics (Altman, 2005b, 2015). Rational or smart decision-makers can yield inefficient outcomes (Altman, 2005b, 2015). One can end up with rational inefficiencies as opposed to errors and biases in decision-making, which is a focal point of the heuristics and biases

approach to behavioral economics. Where constraints and capabilities can be changed, rational individuals can be expected to adjust their decisions yielding improved choices.[4] Better education, improved access to computers (and computer literacy programs), improved institutional and sociological parameters, for example, can yield choices that can be more economically efficient and yield a higher level of utility or wellbeing to the individual.

Within the BR analytical framework one also has heuristics as possible efficient shortcuts in the decision-making process. In this case, individuals do not engage the careful and detailed calculating behavioral assumed by and considered to be normatively ideal in conventional economics. Heuristics are considered to be an effective means to make decisions in a cost effective manner given the various constraints and limitations faced by individuals in the decision-making process. Hence, Simon and those adhering to and developing the BR approach to decision-making, begin their analysis with the assumption that heuristics are used because they are the smart or rational means of engaging in the decision-making process.

This analytical approach has been further refined by Gerd Gigerenzer (2007) and colleagues who have advanced what is referred to as the fast and frugal heuristics toolbox. Evidence suggests that heuristics typically outperform conventional economic behavioral norms. It is important to note, however, that it is not assumed here that heuristics necessarily refer to gut reactions to challenges and opportunities. Gut reactions, however, are often based on prior learning and experience and generate efficient boundedly rational outcomes. But heuristics can be a product of careful deliberation where and when time permits. And, they need not always be correct. There can be errors in decision-making. Inappropriate heuristics can be chosen given the decision-maker's constraints and capabilities. However, in the bounded rationality approach, the norms for optimal behavior are empirically derived from the circumstances surrounding real world decision-making as opposed to being imposed exogenously without any connection to the empirics underlying decision-making. But the assumption that non-conventional behavioral norms (aka heuristics) typically outperform conventional behavioral norms in terms of outcomes, is another key distinction between the conventional wisdom and the BR approach to behavioral economics, and between the BR and the heuristics and biases analytical frameworks.

To reiterate what we have discussed above, in the conventional model a core assumption is that rational individuals must behave in a rigorously calculating manner and this will yield optimal outcomes. And, because we all behave in this manner, outcomes should be optimal. The BR perspective stands in stark contrast to this conventional scenario, and to the heuristics and biases approach to behavioral economics. The latter typically starts with the hypothesis that heuristics are biased and error prone because they deviate from the conventional economic norms for optimal decision-making behavior.

More recently, Kahneman (2011; Altman, 2015) has himself presented a more nuanced argument whereby heuristics can represent a relatively effective decision-making tool, under certain circumstances. Kahneman argues that individuals use or should use different types of mental processes to engage in decision-making, broadly categorized as System 1 and System 2. In System 1, decision-making tends to be fast, emotionally driven, and intuitive and, therefore, often based on deep-grained habits (or hardwired), and is consequently very difficult to modify and control. In System 2, decision-making tends to be thoughtful and deliberative involving much more effort and time than System 1 related decision-making. Kahneman argues that System 1 behavior can be more efficient in certain circumstances but is more subject to systematic errors and biases. System 2 behavior is more efficient in other circumstances and is less subject to systematic errors and biases. So, an important aspect of this type of more nuanced categorization of decision-making behavior is to determine which system works best and when, where, and for whom.

But still, even in this approach, heuristics remain error prone and predisposed to biases, and are especially inefficient when decisions can and should take place (providing that the time to think and analyze is available) over a longer period of time. Consistent with the BR approach there are a wide array of heuristics that are possible, not all of which will be error-free, unbiased, or best practice. However, in the real world, heuristics as opposed to conventional economic norms are almost always used to make decisions. In the BR approach, the default assumption is that heuristics are superior to conventional decision-making norms, having evolved over time and through experience. The critical question then becomes, again, under which circumstances are particular heuristics optimal and under which circumstances are they not?

## Satisficing and procedural rationality in context

With regard to satisficing, there is no denying here that individuals are assumed to be purposeful and even contemplative about their decisions at least in the longer term. Nor does satisficing deny, based on the evidence, that most individuals at least most of the time attempt to do the best they can. But it does deny that rational or smart individuals typically engage in the type of calculating marginal analysis that the conventional wisdom assumes. Moreover, most successful decision-makers do not behave in accordance with conventional behavioral norms, according to the evidence (Simon, 1959, 1978, 1987; Altman, 2012, 2015).

Satisficing is posited as an alternative to optimizing, foreshadowing the literature on heuristics. It is argued that individuals and organizations develop and adopt decision-making shortcuts or heuristics based on experience. When satisficing, an individual makes choices based on what meets predetermined criteria for what is good enough. There is often a form of stopping rule that is applied. The argument here is that given the constraints, capabilities, and opportunities faced by decision-makers in the real world, using heuristics and, therefore, satisficing, generates superior choices in a more efficient and effective manner than engaging in what conventional economics would define as optimizing behavior. This is especially the case when individuals update their heuristics as errors are uncovered and when better heuristics are discovered or developed. Satisficing heuristics need to evolve over time. When they do not, we can end up with errors in decision-making and suboptimal results.

Procedural rationality relates to BR, satisficing, and the use of heuristics in decision-making. Simon sets procedural rationality in stark contrast to the rationality of conventional or neoclassical economics, where the latter is referred to as substantive rationality. With substantive rationality the objective world is easily identified by the decision-maker who has unlimited computational capacity. And, one can deduce how an individual should behave to maximize efficiency or utility from the utility function of the individual. So, Simon argues that if the world is as the conventional wisdom assumes, there would be no problem with its modeling of choice behavior. One could take this particular argument to task. But, be this as it may, a critical point made by Simon (1986: S211) states that:

> . . . if we accept the proposition that knowledge and the computational power of the decision maker are severely limited, then we must distinguish between the real world and the actor's perception of it and reasoning about it . . . we must construct a theory (and test it empirically) of the processes of decision. Our theory must include not only the reasoning processes but also the processes that generate the actor's subjective representation of the decision problem, his or her frame . . . The rational person of neoclassical economics always reaches the decision that is objectively, or substantively, best in terms of the given utility function. The rational person of cognitive psychology

> goes about making his or her decisions in a way that is procedurally reasonable in the light of the available knowledge and means of computation [it is context dependent].

Procedural rationality is a form of BR. It relates to what are the best procedures to achieve the objectives (the utility or preference function) of an individual or an organization, given the decision-making environments faced by the individual or organization and the decision-making capacities and capabilities of the individual and organization. The benchmark for what are the best practice behavior cannot be given exogenously. There might also be alternative paths to achieve a given objective. Hence, what is procedural rationality can only be empirically derived, based on the capabilities and capacities of decision-makers and their preferences at any given point of real or historical time (Simon, 1986: S212):

> To move from substantive to procedural rationality requires a major extension of the empirical foundations of economics. It is not enough to add theoretical postulates about the shape of the utility function, or about the way in which actors form expectations about the future, or about their attention or inattention to particular environmental variables. These are assumptions about matters of fact, and the whole ethos of science requires such assumptions to be supported by publicly repeatable observations that are obtained and analyzed objectively . . . The application of this procedural theory of rationality to economics requires extensive empirical research, much of it at micro-micro levels, to determine specifically how process is molded to context in actual economic environments and the consequences of this interaction for the economic outcomes of these processes.

Satisficing, to reiterate, is a general term that relates heuristics in decision-making in contrast to maximizing or minimizing behavior. It is part and parcel of the concept of procedural rationality. It is a conceptual term that encapsulates how goal-oriented individuals tend to behave in the real world of decision-making. But what is procedurally rational—which satisficing heuristics are developed, adapted or adopted—is contingent upon goal and circumstance. Exogenously determined and imposed standards for optimality are rejected in this approach, in contrast to the worldview of both the conventional economic wisdom and the heuristics and biases approach.

## X-efficiency theory and external benchmarks for optimal behavior

There is another approach to procedural rationality and BR that uses rough conventional or neoclassical benchmarks for optimal performance but which rejects logically derived neoclassical procedures to achieve optimal performance. Note that the heuristics and biases approach also uses neoclassical benchmarks to determine optimality but in a less nuanced and in a much more generalized manner. Leibenstein (1966, 1979; Frantz, 1997) argues that for firms to be economically efficient the workers, managers, and employers, must be working as hard and as smart as they can, irrespective of their preference function. For efficiency to be achieved, certain behaviors must be realized. In the conventional model, the quantity and quality of effort input per unit of time, ceteris paribus, is assumed to be constant, but it is also typically and implicitly assumed to be fixed at some maximum.

But because, in reality, individuals and organizations deviate from conventional economic norms of effort maximization, firms tend to be economically inefficient; they are not as productive as they might otherwise be. Leibenstein refers to this scenario as x-inefficiency in

production. Individuals and organizations that are x-inefficient are considered to be irrational or quasi-rational at best, according to Leibenstein. Such quasi-rational behavior is assumed to be a function of individuals maximizing their utility, where utility maximization is consistent with x-inefficiency in production. In this case, a Darwinian-survival of the fittest process that forces individuals to maximize effort inputs is not in place. The latter process is assumed in the conventional model.

In the BR approach x-inefficient behavior would be considered rational because the decision-makers are achieving their goals and objectives. But outcomes are suboptimal in the sense that the firm's output is less than it might otherwise be. We have rational inefficiencies (Altman, 2005b, 2006, 2015). The fact that Leibenstein refers to x-inefficient decision-makers as quasi-rational or irrational is beside the point since, he argues, their choices are purposeful and deliberate as well as utility maximizing. Their choices derived from the decision-makers' utility maximizing preferences simply do not generate economically efficient outcomes.

For Leibenstein, the conventional economic norm of effort maximization is a reasonable one if productivity is to be maximized, but one that is typically not realized in the real world economy. A critical difference between Leibenstein and conventional economics is that he does not assume that organizations necessarily perform x-efficiently in production. Whether they do or do not cannot simply be assumed. It becomes an empirical question—a key methodological point among behavioral economists. In addition, a key point of focus for Leibenstein is the process by which an organization might achieve x-efficiency or the conditions under which suboptimal levels of production (x-inefficiency) are realized. This is well situated in the BR approach with its focus on procedural rationality—the actual behaviors required to meet a set of objectives are investigated and articulated (Cyert and March, 1963). According to Leibenstein, one can identify market structures, decision-makers' preferences, and industrial relations structures that are most conducive to x-efficiency in production. This cannot be done by framing one's analysis in terms of maximizing or minimizing behavior—this is too simplistic and not empirically based. X-efficiency is more related to cooperative forms of governance than to mechanistic maximizing-minimizing behavior (Altman, 2005b, 2006). Leibenstein also argues that there is no natural imperative for x-efficiency in production to take place, hence the importance of garnering an understanding of how firms behave inside of the black box of the firm. And, assuming that x-efficiency always exists generates serious missing variable problems, thereby misspecifying some of the key causes of a firm's suboptimal performance. Overall, from this perspective, although the conventional overarching behavioral norms might be correct (effort maximization is required to maximize productivity), this does not imply that these norms will be achieved or that the path to achieve these norms can be reduced into a simplistic optimization space.[5]

## Nudging versus constraints change and redesign

In popular lore, behavioral economics is very much about getting the individual to do what the expert perceives to be in the best interest of the individual. This is somewhat exaggerated, but is consistent with important aspects of the heuristics and biases approach to behavioral economics. This stems from the fact that an individual's choices tend to systematically deviate from conventional economic behavioral norms, assumed to be the benchmark for rational-optimal behavior, and that individuals are hardwired to behave in this deviant fashion. This has given rise to the nudge literature spearheaded by Thaler and Sunstein (2009). Although some of the nudge literature is oriented towards improving information stocks and flows and processing capabilities (arguably consistent with enhancing the freedom of choice afforded to

decision-makers), the substance of the nudge argument is that individuals need to be either softly (soft paternalism) and or to much more forcefully induce individuals to make choices which do not necessarily correspond with their preferences. This is achieved through what is referred to as choice architecture.

Thaler and Sunstein (2009: 6) maintain that:

> Individuals make pretty bad decisions in many cases because they do not pay full attention in their decision-making (they make intuitive choices based on heuristics), they don't have self-control, they are lacking in full information, and they suffer from limited cognitive abilities.

They also argue that those who oppose choice architecture make the false assumption that individuals typically make choices that are in their own best interest or that their choices are better than those that would be made on their behalf by the expert or choice architect (Thaler and Sunstein, 2009: 6). The essence of this approach is imposing external norms for what is deemed to be in the best interest of the individual on the individual's preferences and choices.

In the BR approach, the null hypothesis is that individuals do the best that they can (satisficing) given the constraints, capabilities, and opportunities that bound their choice sets. Hence, errors in decision-making or individuals' inability to realize their preferred preferences are often viewed as being a function of the constraints, capabilities, and opportunities faced by decision-makers—their decision-making environment. The core problem is typically viewed as not being a function of the hardwiring of the individual. Hence, the focus is on improving the decision-making environment, which would include improving the capabilities of the individual to process, understand, and access relevant information sets. Also, mechanisms could be put in place to resolve social dilemmas, or to provide a more equitable environment where such dilemmas can be resolved.[6] Hence, in the BR approach, the focus is on institutional design and improving decision-making technology as opposed to nudging individuals to make decisions that best fit into the experts' worldview of what is in the best interest of some average individual.

## Conclusion

A summary of the differences between conventional economics and the BR as well as heuristics and biases approaches to behavioral economics is presented in Figure 14.1. A critical difference between the BR approach and the heuristics and biases approach is that the former does not necessarily use conventional behavioral norms as the ideal for rational and optimal behavior. Deviations from conventional norms demonstrate a critical weakness of the conventional economic wisdom but, according to the BR approach, do not necessarily imply errors, biases, or irrationality in decision-making. On the other hand, one cannot assume that simply because individuals adopt heuristics as opposed to conventional decision-making rules that these heuristics and related decisions are in some sense necessarily optimal. Errors and biases can exist. Needless to say, in the BR approach the typical prior assumption is that individuals do the best that they can give their decision-making capabilities and their decision-making environment. But this does not mean that such rational decisions, from the perspective of the individual, are best for the organization or society at large. As a footnote, one should point out that the individual might not achieve her objective because of flaws in the overall decision-making environment.

From the BR perspective, which behavioral and related norms should be used as optimal decision-making benchmarks must be empirically derived and contextualized by the individual's

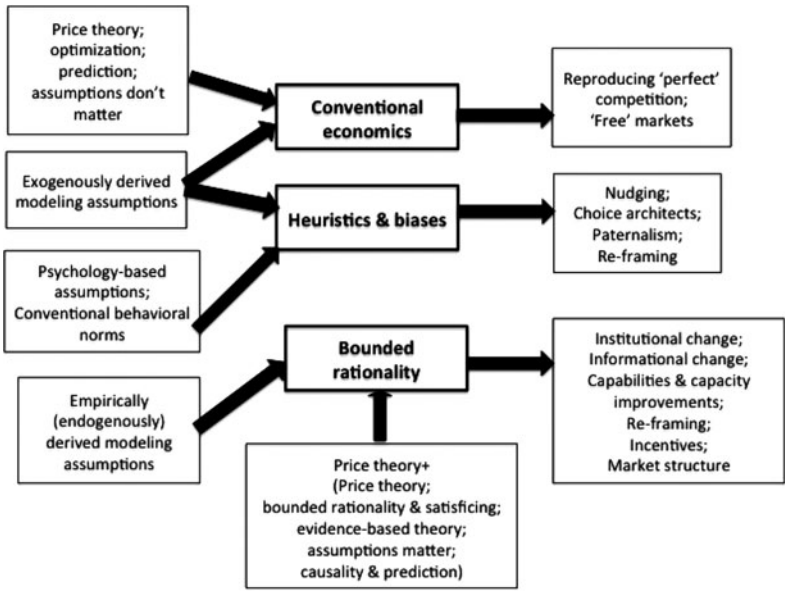


*Figure 14.1* The different faces of behavioral economics and the conventional wisdom

decision-making capabilities and their decision-making environment. These benchmarks should not be externally imposed, as it is the conventional economic wisdom and in the heuristics and biases approach.

For this reason, in the BR approach much attention is paid to changing the capabilities and constraints that bound an individual's decision-making environment. This would include education, improvements to information availability, asymmetries, and understandings, changes to incentives, and changes to the broader decision-making and related institutional environment. In contrast, from the heuristics and biases perspective, the tendency has been to correct or fix decision-making problems from the perspective that individuals need to be nudged towards choices that they might not otherwise make due to hardwired behavioral flaws. The ideal or optimal choices are prescribed exogenously. To reiterate, in the BR approach the ideal choices are derived from individual preferences and what these would be in an ideal decision-making environment (Altman, 2010, 2011).

When particular individual preferences generate negative externalities, then one has a social dilemma that needs to be resolved, going well beyond articulating a framework to facilitate the realization of the ideal choices of the individual decision-maker. Examples of these social dilemmas are:

- A firm's decision-makers might prefer a low wage, even conflictual, x-inefficient firm to one that is relatively high wage, cooperative, and x-efficient even if both are equally cost competitive, in contrast to the preferences of most employees.
- Smokers might not care about the secondhand smoke that they impose on others, which violates the preferences of non-smokers.
- For some individuals, utility is enhanced by freeriding on others, which can cause common pool problems.

These conflicting preference and free rider issues and problems cannot be resolved simply by addressing individualized choice problems, which have been a major point focus of behavioral economics. But behavioral economics can inform the resolution of such social dilemmas by informing the conversation about the actual preferences of individuals and their formation and how this might contribute towards resolving social dilemmas.

## Notes

1 See Tomer (2007) for detailed and nuanced discussion of behavioral economics. See Keynes (1936) for many early insights and applications of what has become known as behavioral economics.
2 It is important to note the research on emotions which suggests that emotions and intuition (based on experience) often play an important and positive role in decision-making (Damasio, 1996).
3 One can also refer to Becker (1996), who is very much immersed in price theory but who argues that sociological variables are vital to understand decision-making and choice behavior.
4 The importance of capabilities was later refined and articulated by Sen (1985) and Nussbaum (2011).
5 See Akerlof (2002) for an application of efficiency wage theory, a variant of x-efficiency theory, to macroeconomic theory and policy. See Akerlof and Shiller (2009) for a broader application of behavioral economics principles to an understanding of macroeconomic phenomenon.
6 There is still the possibility of individuals not having the capability of making optimal self-interested decisions because of psychological and physiological issues (such as addiction and mental illness). But this is another matter.

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