RATIONAL CHOICE THEORY – ALTERNATIVES AND CRITICISMS

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Abstract

The core premise of rational choice theory includes the following assumptions: (A1) behavior can be explained as a choice between alternatives; (A2) actors' preferences, beliefs and constraints are the main determinants of behavior; (A3) preferences must meet conditions such as: completeness and transitivity; and (A4) individuals choose the optimal alternatives, given their preferences, beliefs, and constraints. However, the application of rational choice theory to a growing number of research areas has clearly demonstrated the empirical inadequacy of this set of restrictive premises, leading proponents of rational choice theory to adopt a broader version that rejects assumption (A4) and allows for a wider range of preferences. Along with this metatheoretical reaction, another group of scientists proposes a more fundamental "overhaul" meaning that scientists go beyond explaining the rational behavior of actors based on profit maximization. There are two main goals of this paper. One is to contribute to the understanding of new concepts, models and theories of human behavior (the concept of rule-following behavior, rational-heuristic model, Elster's variant of rational choice theory and models of ecological rationality). The second goal is to, based on a comprehensive analysis of the content of alternative theoretical conceptions of rational human behavior, make recommendations for improving this theory.

Keywords: *rational choice theory, rule-following behavior, provisional rules, rational heuristics, ecological rationality models*

1. INTRODUCTION[1]

For many social theorists, the claim that actors behave rationally is more than an assumption. In economic literature, this claim is considered an axiom of rationality. The rationality axiom implies: (1) that individuals know very well what is in their best interest; and (2) that they must behave rationally if they want to maximize their well-being (Vanberg, 2004:24).

Both proponents and critics of rational choice theory point out that it is psychological and individualistic. It is psychological because it explains the actions of the actors starting from their mental states, and it is individualistic because it is applied to the behavior of individuals. Social groups and institutions are viewed exclusively as aggregates composed of individual actors (Krstić and Pavlović, 2020a:12).

Rational choice theory does not start from classes or social subjects, but from mutually independent individuals who establish optimal spending plans based on their utility functions and available income. This liberal mechanism is based on the egoistic behaviors of economic actors, while competition determines the results of their behavior. From the methodological point of view, most analyses of rational choice are, to a large extent, based on methodological individualism. Overall, social movements can be explained primarily by individual behaviors.

There are two main objectives of this paper. One is to contribute to the understanding of new concepts, models and theories of human behavior, and the second is to, based on a comprehensive analysis of the content of alternative theoretical conceptions of rational human behavior, make recommendations for advancing rational choice theory.

2. BASIC ASSUMPTIONS OF RATIONAL CHOICE THEORY

The consequences of choosing between alternatives have encouraged people to create theories about making rational decisions. Until the 20th century, there were very few theories with such a conceptual subject of research. However, this "picture" changed radically during the 20th century, when the first models of rational behavior appeared, first in the theory of operational research, and then in rational choice theory.

Rational choice theory is, at its foundation, a simple action theory that allows us to understand how "aspects" of a social situation can affect the choices and actions of individuals. As a normative theory, it tells us what we need to do to achieve our goals as much as possible. It is important to point out that this theory does not say what specific goals we should have. Unlike moral theories, rational choice theory offers conditional imperatives related to means (Elster, 1986:1).

Rational choice theory has been strongly criticized. Perhaps the most serious criticism is that models, built on the assumption of the existence of rational actors that maximize personal utility, are unable to explain some of the more important aspects of human behavior. The belief that everything related to human behavior can be explained on the basis of a simple assumption – which is at odds with much of what we know and notice

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2 In our region, the debate on the theory of rational / public choice began in 1990, when there was a well-known discussion between Prof. Dr. Aleksandra Pavličić and Prof. Dr. Aleksandar Kron (1990), on the one hand (whose pioneering paper "Some basic concepts of the theory of social decision-making" was published in the journal *Gledišta*), and Vladimir Gligorov (1990), on the other (whose paper "Interests and principles in the conditions of decentralized decision-making" was published in the journal *Naše teme*), in which the "key point" was the question: how to accurately interpret Kenneth Arrow's theory of social choice?

about individuals – has been the subject of much debate2 (Mueller, 2008; Hindmoor, 2006; Lohmann, 2008). It is true that individuals often behave rationally. But the claim that individuals always demonstrate completely rational, optimizing behavior has no empirical confirmation.

Proponents of rational choice theory are aware of the imperfections of this theory. Yet, despite well-founded criticism, rational choice is one of the inevitable and popular analytical tools available to social theorists. One of the reasons for such superiority is that a rational choice perspective creates the impression that we are closer to placing the social sciences on the same analytical level as the natural sciences. The predictive power of economic models, based on rational choice, allows social theorists to emulate (imitate) some of the most valued skills of researchers in the natural sciences. This makes rational choice theory a very powerful and useful tool (Krstić and Pavlović, 2020a).

The following is a concise analysis of the basic assumptions of rational choice theory where we focus attention on the assumptions of the theory that have a significant place in microeconomic analysis.

1. Maximization of expected utility

A rational individual will choose that alternative (action), that, based on the individual's assessment, has the greatest (or maximum) expected utility of all the actions they consider feasible (Lahno, 2007).

2. Consequentialism

Any assessment of the action (alternative), that is important for the decision-making of an individual, can be reduced to an assessment of the possible outcomes of the action. The assessment of the outcome of the action is fully determined by: (1) the possible consequences of the action that the individual expects; (2) the probability they attribute to these consequences; and (3) the way the individual assesses the consequences of the action (Kroneberg and Kalter, 2012).

3. Conditions of rationality

If we start from the fact that people are free in a very elementary sense, it is usually said that people are able to make a choice regardless of what the subject of the choice is. Thus, choice here is understood very abstractly and the question arises: is it possible to make some elementary logical framework within which such an understood choice can be described? Philosophers, mathematicians, and, of course, economists, dealing with microeconomic theory, achieved pioneering work in that field (Morgenstern and Von Neumann, 1953; Samuelson, 1948). Such an understood logical framework in which the choice takes place, philosophically speaking, can be interpreted as an instrumental rationality. Namely, it is not considered what someone should choose, but what we should do, if someone has chosen their goal, in order for that choice to be meaningful. In rational choice theory, this framework is most often defined by axioms of preferences.

Suppose we have a set of actions (alternatives) that have only one known outcome. We will determine preferences between actions based on preferences between their outcomes. In the general case, we will mark the alternatives with $x, y, z…$

Let us now define the relations of preference and indifference. If, when comparing the two alternatives, x and y, we consider that alternative x is better than alternative y, we say that we strictly prefer x over y, or:

$$x\mathrm{P}y$$

If we consider alternatives x and y to be equally good, we say that we are indifferent (indecisive) between x and y or:

$$x\mathrm{I}y$$

In order to make rational decisions, it is necessary for our preferences to meet conditions, such as: completeness and transitivity. These conditions are called the conditions of rationality or logical consistency and are formally expressed in the form of the following axioms (Pavličić, 2007):

- **Completeness** – For any two alternatives, x and y, we either prefer x over y or y over x or we are indifferent between them. We can formally write this condition in the following way, where the conjunction "v" means disjunction:

$$(x)\ (y)\ [(x\mathrm{P}y)\ \mathrm{v}\ (y\mathrm{P}x)\ (x\mathrm{I}y)]$$

- **Transitivity** – For any three actions x, y, z the following applies: if we prefer x over y and y over z, then we prefer x over z. When written formally, where the arrow indicates the conjunction "if, then", the condition of transitivity is:

$$(x)\ (y)\ (z)\ [(x\mathrm{P}y)\ (y\mathrm{P}z)] \rightarrow (x\mathrm{P}z)$$

4. Unlimited cognitive abilities

A rational actor has unlimited abilities in terms of rational thinking and information processing. "Unlimited" (infinity) in this sense means that if there is a correct way of reasoning about problems, a rational individual will use it without significant effort and expense (Akerlof, 2007).

3. SOCIOLOGICAL VERSION OF RATIONAL CHOICE THEORY

"When faced with several options, individuals usually choose the one that will give the best results" (Elster, 1989:22).

This seemingly simple sentence summarizes the essence of rational choice theory. Even if we agree that this trivial description of behavior reflects the essence of the theory, the sociological version of rational choice theory is quite different. To simplify, different variants of rational choice theory can be defined in relation to how much the basic assumptions (theory) are emphasized, and the sociological version of rational choice theory can be found anywhere on the continuum from "narrow" to "wide" versions (rational choice theory).

Studies of "narrow" or "wide" versions of rational choice theory use the deductive power of mathematical models to explain how individual actions combine and produce a social

outcome(s). On this side of the continuum are the most sophisticated studies (Voss and Abraham, 2000; Coleman, 1990). On the other side of the spectrum, we find researchers who, perhaps, do not explicitly use the terms of rational choice theory, or who reject the assumptions of this theory as being scientifically unfounded. Such research can still be included in what we mean by a sociological approach to rational choice theory, as long as it is based on a theory that individuals have intentions and face a set of rules that shape human interactions (Edling and Stern, 2003; Brinton, 1993; Granovetter, 1985). Better said, the sociological version of rational choice theory is based on a certain way of thinking, and not on rational choice theory.

In the sociological theory of rational choice, we include models such as: models of bounded rationality (Tversky and Kahneman, 1981), models of learning (e.g., Breen, 1999), etc. This special way of thinking includes research that uses a qualitative (rhetorical) model of action people (e.g., Hechter, 1987).

In the next section, we will present concepts and ideas about human behavior that have, until now, been neglected by the representatives of modern theoretical economics. More specifically, we will analyze these key aspects: (1) the concept of rule-following behavior; (2) the rational-heuristic model; (3) Elster's version of rational choice theory; and (4) ecological rationality models.

3.1. The concept of rule-following behavior

One of the most well-known criticisms of rational choice theory is that it cannot provide a proper explanation of rule-based behavior. It is interesting that this kind of criticism has been presented by theorists who have their "roots" in standard rational choice theory. For example, in *Rules and Choice in Economics*, Vanberg argues that the assumption of situational maximization is empirically wrong (Vanberg, 1994).

Although there are very simple situations (choices) where people not only act as rational choice theory predicts, but also reason in accordance with the theory, many situations are different and, more importantly, more complex. Most rational choice theorists would admit that people in these situations apply different, more or less simple rules when making decisions. It is true that the actual decision-making process is not always in accordance with rational choice theory. Rational choice theorists agree that it is not the psychological theory of the processes of deliberation (decision-making) in the mind of individuals (Burt, 2005:62). It only says that it is able to predict behavior under certain conditions, regardless of how individuals actually form their decisions. Therefore, rational choice theory is not a theory of decision-making that deals with deliberative processes, but, above all, deals with the results of these processes in terms of elections or sets of choices and, in this sense, is a theory of choices.

Rational choice theory indicates that people behave "as if" ("as-if" argument)[3] to make decisions in a deliberative or economically rational way. On the other hand, it is sug-

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3 We use the phrase "as-if" to emphasize that we cannot say with certainty that people always behave rationally (or that they always make decisions in a deliberative or rational way).

gested that the theory of rational choice is not only a descriptive theory of choice, but also a normative theory. Even if people do not decide (to) act according to the model of rational choice theory, the rational choice theorist says that they should do so.

Most critics reject the view that rational choice theory, based on the "as-if" argument, can be a valid (or analytically correct) choice theory. They agree that people, in essence, behave in accordance with the rules, and that the behavior of the individual, that depends on norms, rules and customs, cannot be understood "as if" and is based on maximizing the expected utility (Krstić and Pavlović, 2020a:75-76).

The representatives of the concept of rule-following behavior state that the theory of rational choice should be replaced by a more comprehensive theoretical direction that can, more or less, take advantage of some of the formal achievements of this theory. However, most representatives of the concept of rule-following behavior believe that there is a certain truth in rational choice theory (Opp, 2017). Although rational choice theory is not an adequate descriptive and general theory of individual choice, it can still be applied in specific situations.

We will deal in more detail here with Immanuel Kant's key views regarding the concept of rule-following behavior. Namely, Kant distinguishes between the rule that an actor actually adheres to a specific situation, and which he calls the "maxim of action", on the one hand, and the rule that is perceived as the universal and objective principle used by a rational being, and which Kant calls "command of reason", on the other (Kant, 1968). It should be pointed out that we refer to the maxims of action in any descriptive or explanatory approach to action, while we use the commands of reason to prescribe action; those are good reasons to act. The rational individual must understand the maxim of his action as a command of reason (Kant, 1968). Whatever we think of Kant's philosophy as a whole, it seems that his analysis of rational (deliberative) behavior is simple and thorough. In a broader sense, deliberative or rational behavior is rule-following behavior.

Two phases of the process of rational (or deliberative) decision-making can be distinguished. In the first (phase), the decision maker must consider information about the facts that could be relevant to his decision. The second phase links this information to the action to be chosen. It may be especially difficult and practically impossible to separate these two "parts" in detail in a specific situation, but, in principle, the distinction should be made between them.

Here we are especially interested in the second "part". It begins with information that is assumed to be represented by the collection of statements of fact, C_1, C_2, …, C_n. These statements refer to: (1) the choice situation; (2) the options given to the actor; (3) the possible consequences of the options and their "cause-and-effect" relationships with the options, etc. The deliberative process, which starts from these statements, culminates in the prescriptive (normative) statement of the form "I should do a".

If the deliberative process begins with "is" and ends with "should", this means that somewhere in the process (decision-making) there must be a transition from descriptive statements (about real things) to prescriptive ones ("I should do a") (Larrick et al.,

1993). Every rational or deliberative person must use, consciously or unconsciously, the rule that enables this transition.

In rational choice theory, only one decision rule applies, and that is the maximization rule, which states the following: "If the expected consequences of action *a* have the greatest value compared to the expected consequences of any other action that you consider feasible, do *a*".

It should be mentioned that other rules can be included in rational choice theory. But whatever rule is included in the theory, there must be a way by which this rule is reduced to the maximization principle. All rules that can be reduced to the maximization principle by one name are called instrumental rules.

Rational choice theory successfully explains people's behavior according to rules as long as the rules can be reduced to the maximization principle. Nevertheless, rational behavior can be guided by a number of rules. All these rules cannot be understood as a "shortcut" to the maximum expected utility. There are several reasons for this, and above all, there are situations in which individuals, based on a hierarchy of preferences, cannot determine the best action to achieve goals.

Another reason why standard rational choice theory cannot fully explain the "respect for rules" (rule-following behavior) is that the maximization principle does not solve the indifference problem. The story of Buridan's donkey is a good illustration of the indifference problem. The donkey is (only) interested in food. It wants more hay not less and the shortest route to its food. Facing two haystacks of the same size (the quantity), located in opposite directions but at exactly the same distance from the current position of Buridan's donkey, the donkey cannot decide which way to go. The claim that the donkey will starve to death because the maximization principle does not tell it what to do is, of course, incorrect. Rational choice theory (or the maximization principle) tells the donkey, at least, what not to do, that is, not to choose the option dominated by the other (option(s)). The donkey will not remain motionless, but the truth is that the theory does not tell it which of the two piles of hay to choose.

The normative shortcoming of rational choice theory is that it leaves some choices indeterminate. Since this theory does not allow non-instrumental rules of choice, there is indeterminacy in rational choice theory as a descriptive theory of choice. Since the principle of maximization assumes that there are several options (a minimum two) that are the subject of choice, the donkey needs a "maxim" that separates one choice. Here is an example of the rule that would be valid: "From two haystacks of the same size at exactly the same distance, take the one that is closer to the right line of view."

Living beings (especially humans) use many rules to solve the indifference problem. They choose the first alternative that comes to mind, let some "evolutionary mechanism" accidentally decide and so on. It is useful, and, in a sense, rational to apply these heuristics or provisional rules that offer additional support if the principle of rationality (or maximization of expected utility) is not sufficient to determine the best action (Tversky and Kahneman, 1974; Kahneman and Tverski, 1979; Bokulić and Bovan, 2013; Polšek, 2014; Haberstroh et al., 2005; Gawronski and Payne, 2011).

According to Bernd Lahno, a theory that contains the standard rational choice theory as its part and that allows an adequate analysis of heuristics or provisional rules is perfectly possible. Such a theory would not only be more complex than rational choice theory, but would also allow for more rules than those that can be reduced to the principle of maximization (Lahno, 2007).

3.2. The rational-heuristic model

The following rules of behavior that the standard rational choice theory does not include in its objective analysis of the entire economic reality, and which can significantly increase its analytical power, are rational heuristics. These are the logically correct and powerful rules of human reason that govern the decision-making process with the best chance to make a discovery of "successful actions" (Kiss, 2006). Here we are not dealing with "fast and frugal" heuristics that are usually applied in the decision-making process. Another difference between the model of behavior proposed here and the models developed within rational choice theory and behavioral economics relates to the observed kind of uncertainty. Although critics underestimate the kind of uncertainty that models of rational choice theory and behavioral economics can manage, the minimum requirement is that problems should be defined in terms of alternatives and the state of the world.

Experimental and behavioral studies on decision-making are focused on finding alternatives, giving experimental subjects *ex ante* defined problems to solve (Gaweł, 2020; Krstić and Pavlović, 2020b). The model of rational behavior that is mentioned in this (part of) paper is adapted to decision-making processes where problems should be defined (the *ex post* definition). It has been repeatedly observed that if problems are clearly defined, heuristics such as "satisfying strictly defined criteria", "limited search", "incrementalism" and the like do not "provide" the optimal choice (Baumol, 2004; Baumol and Quandt, 1964).

The distinction between the heuristic and the deductive (non-heuristic) approach becomes relevant when problems are not well defined (Arrow, 2004), or when they need to be defined (Grandori, 1984). This difference can be more precisely defined by using terms such as: "computational complexity" and "aleatory uncertainty", on the one hand, and "Knight's uncertainty" or "epistemic uncertainty", on the other. Computational complexity refers to the number of actions / states of the world (Simon, 1969). Computational complexity includes: (1) the number of alternatives available to the decision maker; (2) the number of parameters for their evaluation ("parametric uncertainty" see, e.g., Langlois, 1986); (3) the diversity of numerous exogenous changes of actions (see, e.g., Oberkampf et al., 2001), and the like. Knight's or epistemic uncertainty is, in contrast, the incomplete knowledge of the world or the lack of knowledge about cause-and-effect relationships and what the relevant alternatives are, and what the parameters are for their evaluation. This uncertainty is not the "result" of an inability to predict what will be observed in the future or an inability to consider a large number of alternatives, but arises from the epistemological problems related to the observing and the

measuring phenomena and the constructing of reliable and valid models representing those phenomena.

The conditions of Knight's or epistemic uncertainty cannot be "solved" by instrumental rationality alone, as economists admit (Arrow, 2004). The classical heuristics of "limited rationality" are applicable; however, they do not indicate the best patterns of reasoning. The classical heuristics of limited rationality denote biased actions that should be avoided, not rational actions that should be followed. This paper focuses on another kind of heuristics, i.e. the best patterns of reasoning in conditions of epistemic uncertainty.

3.2.1. Historical cases in innovation economics

This section presents some evidence of actual decision-making processes that are oriented on "discovery". The examples (or cases) given and discussed in this paper are real and, therefore, possible in terms of human cognitive abilities.

Case 1: Launch of a new technology for the extraction of polyphenols from olive water

"I am a chemist by training […] I am also fond of natural food and environment-friendly agriculture […] I was thinking of buying a piece of land in Tuscany to spend some holiday time at, cultivate olive trees, and produce extra-virgin high quality oil. In reading and studying about oil production I first discovered that in olden times, oil was not produced by pressing the entire olive, as is nowadays mostly done, but by pressing only its pulp […] Visiting some farms to see if any had kept some equipment for pressing olives separately from seeds, I made a second discovery. In the process of olive pressing (with or without seeds), the liquid produced is stored so as to let oil separate from water, and the water is thrown away […] My scientific and chemist mind made me advance the question: 'Do you know what you are throwing away? Have you ever analyzed that water?' […] The hypothesis coming to my mind was that that 'waste water' […] could contain precious chemical components […] I had the water analyzed. The answer was yes, olive water was very rich in highly beneficial polyphenol, with tremendous antioxidant capacity. The possibilities of uses were to be defined, but with that antioxidant capacity they couldn't be few […] I patented the process and constituted the firm, which extracts the polyphenol through a proprietary process and technology […] We also directly produce some dietary products employing the substance." (Grandori, 2010:483-484)

In the example of the launch of a new technology for the extraction of polyphenols from water contained in olives, the problem is defined as the assumption: "Olive water contains medicinal and beneficial substances." Alternatives are formed in accordance with this assumption. Here is an example of an alternative: "Polyphenols from the water that olives contain can be used for certain purposes (for example, for food production), which, in turn, should lead to consequences that can be assessed as desirable and valuable". All rules that serve to: (1) define the problems to be solved; (2) data collection; (3)

forecasting; (4) forming solutions and the like are described by Ana Grandori as rational heuristics (Grandori, 2010).

It is reasonable to consider that the rational heuristics in the example of the discovery of a new usable technology for the extraction of polyphenols from olive water are specific because they are characteristic of one case and because they relate to a knowledge-based economy. However, both limitations can be eliminated. The applicability of rational heuristics outside of one case can be ensured by establishing rules that improve industry innovation. The following example, which provides the description of the development of drugs in the 20th century, confirms this claim.

From the 1950s to the 1990s, the dominant approach in the pharmaceutical industry was random testing of compounds in the process of discovering new drugs. Thousands, if not tens of thousands, of compounds might be tested before substances that meet all the criteria for efficiency and safety of the drug are identified. However, the shift from the "traditional synthetic chemical world" to "biotechnology" increased the efficiency of the detection of compounds. Two new rules emerged on the "scene": (1) rational guided search; and (2) rational drug design. The first rule involves investigating the therapeutic properties of a known substance, and the second aims to find new drugs (Henderson et al., 1999).

Each decision model, with any assumption of rationality, should determine procedures (or rational heuristics) for defining problems (or formulating hypotheses), gathering facts, generating alternatives, forecasting, and so forth. Below we will present rational heuristics for defining problems and generating alternatives that have not found their "place" in rational choice theory and behavioral economics.

3.2.2. Rational heuristics for defining problems

In our opinion, two rational heuristics for defining a problem are important here. The first implies that the problem is defined as a potential performance or as a "gap" between the achieved and planned performance. Another heuristic (for defining problems) is the considering of specific problems as a "starting point" for some research and letting it shift according to experimental (physical or mental) results (Lakatos, 1976). This means that if researchers are unable to solve problem A, they can turn to the solving of problem B, and while studying this problem with little chance of success, they may suddenly come across (run into) the solution to problem C (Campbell, 1960). However, as evidenced by the review of the invention of JAVA – technological and business innovation, the effectiveness of this decision-making strategy is not just limited to science.

3.2.3. Rational heuristics for generating alternatives

Can alternatives be rationally generated? Are we limited by the dichotomy between the "alternatives" of rational choice theory, on the one hand, and the "set of alternatives" from which we make choices, behavioral economics, on the other? The question is relevant to the innovative environment, where a reliable and comparable experience may not be available (Bandura, 1986), and the recognizing of best reasoning patterns may not work due to a lack of accumulated knowledge.

Case 2: The invention of JAVA

"In 1990, Patrick Naughton, a top programmer at Sun Microsystems, told Sun's chief Scott McNealy that he was quitting to join NeXT Computer where he could work on more interesting projects. Convinced by Naughton's contention that Sun was becoming insufficiently innovative, McNealy told Naughton that he could have a million-dollar budget to put together a small team of outstanding programmers and engineers that would work without corporate interference from Sun […] Naughton recruited (James) Gosling and a few other top people […] and in 1991, they decided to build a prototype of a small device that could control everyday consumer appliances. To control this device, they originally decided to program the device in C++, a popular computer language. However, for use in consumer appliances, the program needed to be more reliable and simpler than was possible with C++, so Gosling decided to develop a new computer language. The was initially called 'Oak'. Oak was a simplified, more reliable adaptation of C++, but its major innovation was in the way it could be used by different kinds of computers. By August 1992, Naughton, Gosling and their seven-person team had produced a prototype personal digit assistant with a small, touch-operated screen that could control TVs and VCRs, but attempts to sell the device for use in interactive television and computer games failed. Then, in June 1993, the first Mosaic browser was released and the world-wide web began to take off. Bill Joy, Sun Microsystems co-founder, realized that Oak could be adapted for use on the Internet. By 1995, Gosling had produced a web-suitable version of Oak, now renamed Java, and Naughton had written HotJava, an interpreter for Web browsers […]" (Grandori, 2010:489)

Namely, cognitive research has shown that heuristics are effective for generating alternatives in these conditions: abduction and modeling. Abduction (or retroduction, as called by the primordial proponent of this concept Charles Sanders Peirce) can take two forms: empirical (forming new options, using available information at a given time, and creating theoretical laws that can regulate the implementation of new options) (Simon, 1977), or theoretical (Hanson, 1958).

Modeling should strictly imitate the scientific approach. In order for an individual to understand how to behave in a situation when they cannot rely on previous knowledge and experience, they should construct a model of the situation, including the definition of "independent" (alternatives, causes) and "dependent" variables (consequences, effects) (Bandura, 1986).

In the next segment, we analyze the key characteristics of Elster's version of rational choice theory.

3.3. Elster's version of rational choice theory

Rational choice theorists try to explain human behavior, and to achieve this, they need to take two steps. The first step is determining what a rational person would do in the given circumstances, and the second is determining if the person really did it. If a person has done what the theory predicted, then the assumptions of the theory are correct. Also, the theory of rational choice can "fail" in either of these two steps. First, its predictions may be undetermined, and second, people can act irrationally.

According to rational choice theorists, action can be considered rational only if it is the result of three optimal decisions. First, that action must be the best means for the realization of a person's desire when their beliefs are taken into account. Second, those beliefs alone must be the best possible, given the information available to that person. Finally, the observed person should gather the optimal amount of information. The optimal amount of information depends on both the person's goals (or person's desires) and the belief on the costs and benefits of collecting information (Figure 1).
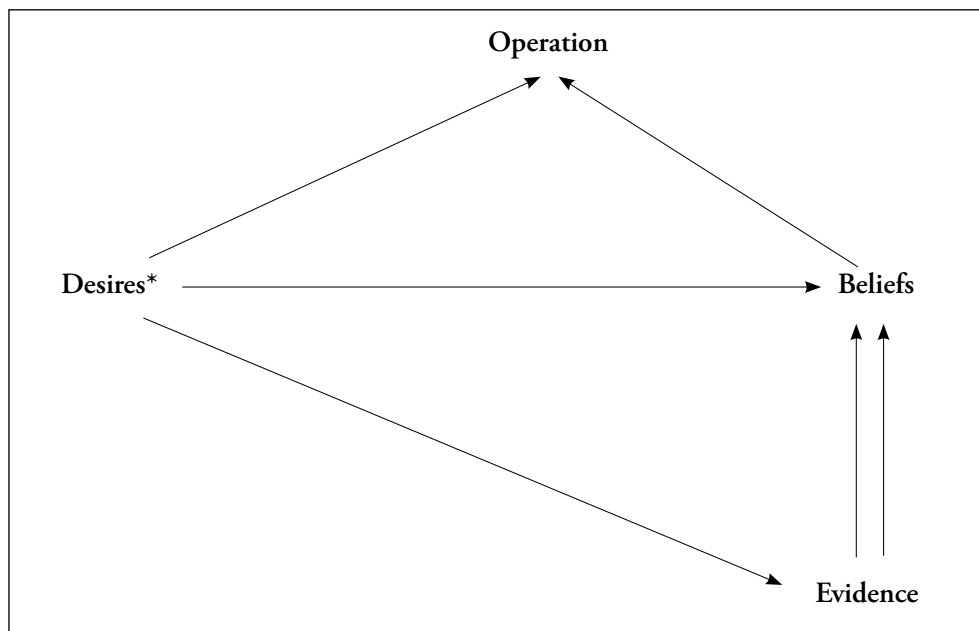
*A person's desires in the rational choice model are the only independent variable whose influence will change all other variables (actions, beliefs, and evidence or information). In addition, it is assumed that desires will not directly affect beliefs (see the blocked arrow), which is not the case with unfounded optimism.

Figure 1. *Elster's model of rational choice (Source: Elster, 2009)*

To minimize the likelihood of collecting poor insufficient and / or quality information, a rational individual should adhere to some rules of rational decision making. The first rule of rational decision-making is that an individual uses verified sources that guarantee the accuracy of information. If such sources are not available, it is necessary to find more

sources of information, compare the obtained information and draw a conclusion (Gunther, 2008). Another rule of rational decision-making is that before starting to collect factual material, the choice of method of collecting available data is made: measuring output or performance (experimental research), survey, interview, etc. The third rule of rational decision-making is to objectively consider the content of all data (Gladwell, 2006).

In the next part, the basic characteristics of the models of ecological or situational rationality are analyzed and investigated. To narrow our considerations, we focus on the contributions of Gerd Gigerenzer, a director at the Max Planck Institute for Human Development in Berlin, and Vernon Smith, an American professor at Chapman University, today one of the world's most well-known behavioral economists.

3.4. Ecological rationality models

The most important representatives of the ecological rationality model are Gerd Gigerenzer and Vernon Smith. Gigerenzer points out that ecological rationality refers to researching how cognitive strategies or heuristics are used to make good enough decisions in complex circumstances (Gigerenzer, 2000). On the other hand, Smith considers ecological rationality as a property of the social system that is the result of cultural and biological processes (Smith, 2003).

For Gigerenzer, the problem of primary importance is how an individual manages to achieve his or her goals despite limited knowledge and time. Gigerenzer's main focus is not on the cognitive abilities of individuals, nor on the institutional matrix in which economic choices are made. Instead, Gigerenzer focuses on the heuristics that evolutionary processes have "inscribed" in our minds. Using heuristics, people find shortcuts to the solution of a problem, where the obtained results do not differ significantly from the optimal solutions of rational choice theory.

Interestingly, evolutionary heuristics can lead to more accurate conclusions than decision-making strategies that require more information and processing (Thaler and Sunstein, 2008). The attitude that the accuracy of the outcome (result) of thinking will be higher if we invest more work is not a universal rule; there are situations in which we achieve greater accuracy with less effort. For example, "tallying" and "take-the-best" heuristics predict more accurately than multiple regression analysis, despite both methods using fewer indicators. More precisely, the results of multiple regression analysis fit well with data that are already known, but poorly predict new data. "Take-the-best" heuristics are the most economical of these methods. In conclusion, it uses, on average, only 2.4 indicators. In contrast, multiple regression analyses and "tallying" use an average of 7.7 indicators (Gigerenzer, 1991).

Let us now turn to Smith's conception of ecological or dynamic rationality. The subject of Smith's research is, above all, the rationality of social wholes (entities) and collectivity such as institutions, national economy, society, etc. Smith considers ecological rationality as a property of complex collectivity that is the result of interaction between individuals on the one hand, and institutions or rules on the other (Smith, 2003).

Let's say that in Smith's first experiment, the social environment (or collectivity) was a hall where subjects could move by choosing a partner and proposing a contract that would suit both. In the experiment, the focus was on how subjects use the rules, which are part of the environment, in their favor. Smith points out that the market structures in the experiment must be heterogeneous in order to investigate the consequences of different rules. Smith is not focused on real environments and does not emphasize information "signs" (incentives) as being key to rational action, but rather focuses on stylized environments reminiscent of real market institutions, as well on the rules that make up the structure of those stylized environments (Smith, 2015).

Another approach to institutions, one that is somewhat closer to the analysis of the rules conducted by Smith, concerns Elinor Ostrom's work. Ostrom argues that the leadership of an institution (or the leader of a social community) is particularly interested in individuals adhering to its rules. Her research focused in particular on institutions established to "deal" with some of the more difficult public policy issues – for example, the problem of "common resources" and the "tragedy of common ownership" (Hardin, 1977; Ostrom 1986, 1990) that can arise from the exploitation of those resources. In the context of public policies, rules governing the behavior of individuals when their rational tracking on the "path of individual utility" can lead to outcomes that would be collectively undesirable are crucial. In the context of the "common", a certain mechanism for making and implementing the obligatory decisions is crucial for the success of the institution. Without these rules, the policy area would be somewhat "degenerated" into "selfish smuggling and desertion".

4. CONCLUSION

The core premise of rational choice theory includes the following assumptions: (A1) behavior can be explained as a choice between alternatives; (A2) actors' preferences, beliefs and restrictions are the main determinants of behavior; (A3) preferences must meet conditions such as completeness and transitivity; and (A4) individuals choose the optimal alternatives, given their preferences, beliefs, and restrictions. In addition, many supporters of rational choice theory include concepts such as egoism, consequentialism, optimal beliefs, etc. in the basic assumptions of this theory.

However, the application of rational choice theory to a growing number of research areas has clearly shown the empirical inadequacy of this set of restrictive premises, which has led proponents of this theory to embrace a broader version that rejects hypothesis (A4) and allows for a wider range of preferences. Along with this metatheoretical reaction, another group of scientists proposes a more fundamental "overhaul" meaning that scientists go beyond explaining the behavior of actors based on maximizing expected utility.

In order to develop new ideas and attitudes, the activities of researchers dealing with the theory of rational choice in the future should be focused on: (1) affirming a new approach to the study of economic processes that emphasizes the importance of social

norms and mechanisms of changes; (2) refuting or modifying the assumption of the exclusivity of profit or utilitarian motivation and emphasizing complex material and immaterial interests, extrinsic and intrinsic motivation and incentives; (3) the development of the concept of non-maximization or satisfaction, as a more realistic alternative to the assumption of profit and utility maximization, that can offer an explanation of cognitive, informational and other problems; and (4) affirming ecological rationality models as an alternative to the rational choice model,, among others.

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TEORIJA RACIONALNOG IZBORA – ALTERNATIVE I KRITIKE
Miloš Krstić

Sažetak

Temeljne postavke teorije racionalnog izbora su sljedeće: (A1) ponašanje se može objasniti kao izbor između alternativa; (A2) sklonosti, uvjerenja i ograničenja aktera glavne su determinante ponašanja; (A3) sklonosti aktera moraju ispunjavati određene uvjete kao što su potpunost i tranzitivnost; i (A4) pojedinci odabiru optimalne alternative s obzirom na svoje sklonosti, uvjerenja i ograničenja. Međutim, primjenom teorije racionalnog izbora u sve većem broju istraživačkih područja sve je jasnija postala empirijska neadekvatnost ovog skupa restriktivnih premisa, što je zagovornike teorije racionalnog izbora potaknulo da usvoje širu verziju koja odbacuje pretpostavku (A4) i dopušta širi raspon sklonosti aktera. Osim ove metateorijske reakcije, neki autori predlažu temeljitiji „popravak" ove teorije tako što bi se napravio pomak od objašnjenja racionalnog ponašanja aktera temeljenog na maksimizaciji profita. Dva su glavna cilja ovog rada. Prvi je cilj pridonijeti razumijevanju novih koncepata, modela i teorija ljudskog ponašanja (koncept ponašanja slijeđenja pravila, racionalno-heuristički model, Elsterova varijanta teorije racionalnog izbora i modeli ekološke racionalnosti). Drugi je cilj na temelju sveobuhvatne analize sadržaja alternativnih teorijskih koncepcija racionalnoga ljudskog ponašanja dati preporuke za poboljšanje ove teorije.

Ključne riječi: *teorija racionalnog izbora, koncept ponašanja slijeđenja pravila, privremena pravila, racionalna heuristika, modeli ekološke racionalnosti*

THEORIE DER RATIONALEN ENTSCHEIDUNG – ALTERNATIVEN UND KRITIKEN
Miloš Krstić

Zusammenfassung

Die Theorie der rationalen Entscheidung beruht auf den folgenden Voraussetzungen: (A1) Das Verhalten kann als die Wahl unter mehreren Alternativen erklärt werden; (A2) Neigungen, Überzeugungen und Beschränkungen der Akteure sind die Hauptdeterminanten des Verhaltens; (A3) Die Neigungen der Akteure müssen bestimmte Voraussetzungen erfüllen wie z. B. Vollständigkeit und Transitivität; (A4) Einzelpersonen wählen optimale Alternativen hinsichtlich eigener Neigungen, Überzeugungen und Beschränkungen. Durch die Anwendung der Theorie der rationalen Entscheidung jedoch ist auf immer mehr Forschungsgebieten die empirische Inadäquatheit dieser Reihe von restriktiven Prämissen klar geworden und dies hat die Befürworter der Theorie der rationalen Entscheidung dazu bewegt, eine umfassendere Version anzunehmen, die die Voraussetzung (A4) verwirft und eine breitere Spanne der Neigungen der Akteure zulässt. Außer dieser metatheorethischen Reaktion schlagen einige Autoren eine grundlegende „Reparatur" dieser Theorie vor, indem das rationale, auf Profitmaximierung beruhende, Verhalten der Akteure darüber hinaus erklärt werden soll. Es bestehen zwei Hauptziele dieser Arbeit. Das erste ist, dem Verständnis neuer Konzepte, Modelle und Theorien des menschlichen Verhaltens einen Beitrag zu leisten (Konzept des regelkonformen Verhaltens, rational-heuristisches Modell, Elsters Variante der Theorie der rationalen Entscheidung und Modelle der ökologischen Rationalität). Das zweite Ziel ist, Empfehlungen zur Verbesserung dieser Theorie aufgrund einer allumfassenden Analyse der Inhalte der alternativen theoretischen Konzepte des rationalen menschlichen Verhaltens zu geben.

Schlüsselwörter: *Theorie der rationalen Entscheidung, regelkonformes Verhalten, vorläufige Regeln, rationale Heuristik, Modelle der ökologischen Rationalität*