

# 1 Rational Choice Theory and Methodological Individualism

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## Introduction

This article is an introduction to, and a review and discussion of rational choice *theory* (RCT), also called the theory of rational action or the economic model of man, and the rational choice *approach* (RCA). RCT explains the behavior of individual actors. It is applied to explain *macro* phenomena (such as economic growth or revolutions), a major goal of the social sciences. The RCA, also called structural or methodological individualism, claims that RCT can and should be applied to explain macro phenomena. After introducing and reviewing RCT and the RCA, their strength and weaknesses and possible alternatives are analyzed.

## What Is Rational Choice Theory About? The Basic Version

Critics of RCT usually attack “the” theory of rational action. This is highly problematic because there are several versions of RCT, and weaknesses of one version may not (and do not, as will be seen) hold for other versions. In this section we will present what one may call the core or basic version of RCT, that is, propositions that are shared by all versions.<sup>1</sup>

In this article, RCT is conceived as an empirical theory that addresses the causes of behavior. It must be sharply distinguished from *revealed-preference theory*, in which utility is not independently defined of choices. The theory gives up “any pretension to be offering a causal explanation of . . . choice behavior in favor of an account that is merely a description of the choice behavior of someone who chooses consistently. Our reward is that we end up with a theory that is hard to criticize because it has little substantive content” (Binmore, 2009: 20). In the present article this kind of theory is sharply rejected: the goal is to discuss a falsifiable theory (i.e. a theory that can be criticized), that has a high explanatory power and that can be applied to real-life phenomena.

RCT explains behavior (or, equivalently, action) that is not part of our biological endowment (such as the knee reflex). Voting, committing a crime, marrying, or

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buying and selling are examples. “Behavior” often encompasses also “inner” actions such as thinking, categorizing objects, or processing information.

The theory consists of three propositions. The first – the *preference proposition* – posits that preferences or, equivalently, goals or motives determine behavior. Whether goals can be achieved depends on behavioral *constraints* or *opportunities* – this is the second proposition. Money is a constraint or opportunity for attaining many goals. A prison sentence blocks the realization of many goals. The third proposition claims that actors *maximize their utility*. This means that among the available options, the one with the highest utility is chosen.

It is important to distinguish between *egoism* or, equivalently *selfishness*, and *self-interest*. Egoism means that an individual is only interested in his or her own welfare; self-interest refers to utility maximization. Thus, Mother Teresa is not egoistic but altruistic (i.e. mainly interested in the welfare of others), but self-interested because she maximizes her own utility.

Preferences and constraints have *multiplicative effects*. This means that the effects of preferences depend on the extent to which constraints exist, and vice versa. A goal can only be realized if there are opportunities, and opportunities are seized only if there is some relevant goal.

Let us look at some *implications* of the theory: (1) The theory is *interdisciplinary*. Behavior is the subject of all social sciences such as economics, political science, and sociology. (2) RCT is *neither purely sociological nor purely psychological*. It neither focuses on social structures (constraints) nor on goals. (3) RCT implies that *behavior can be deliberate or spontaneous*. “Spontaneous” means that there is no deliberation involved. Before buying a computer most individuals will probably think about which model is best suited for their needs. But everyday goods are bought without deliberating (i.e. spontaneously): at an earlier time, after comparing different brands (i.e. after deliberating), a decision was made always to buy the same product and no longer think about it. Thus, a *habit* has been formed. This is only changed if the situation changes, for example if the brand deteriorates in quality.

### **Extending and Clarifying the Basic Version: The Wide and the Narrow Version of Rational Choice Theory**

The version described in the previous section leaves several questions unanswered. For example, are internalized norms, that is the intrinsic motivation to conform to norms, among the preferences? Is altruism (i.e. worrying about the welfare of others) a possible preference? Different versions of RCT answer these questions differently.

Two versions of RCT are distinguished: a *narrow* and a *wide* version. Each version consists of assumptions that are not specified in the basic version. The narrow version resembles neoclassical economics, which focuses on egoistic preferences, full information, and “objective” utility maximization, that is, from the perspective of an informed observer. In a wide version such assumptions are not made.<sup>2</sup> The different assumptions are summarized in Table 1.1.

Table 1.1 *Assumptions of the wide and narrow versions of Rational Choice Theory*

Assumptions of the Narrow Version	Assumptions of the Wide Version
1a. Only egoistic preferences and preferences for material goods explain behavior.	1b. All kinds of preferences (including altruism) may be explanatory factors.
2a. Internalized norms are no determinants of behavior.	2b. Internalized norms may influence behavior.
3a. Only tangible or material constraints influence behavior.	3b. All kinds of constraints may influence behavior.
4a. Subjects have correct beliefs, at least in the long run.	4b. Subjects may, but need not, have correct beliefs.
5a. Objective constraints determine behavior.	5b. Perceived as well as objective constraints determine behavior.
6a. Only constraints explain behavior.	6b. Constraints and/or preferences may explain behavior.
7a. Individuals maximize their behavior, from the view of an informed observer.	7b. Individuals optimize or satisfice: They do what they <i>believe</i> is best for them.

Based on Opp (1999: 174)

An increasing number of scholars applying RCT use a wide version, albeit without mentioning this. An early advocate from *economics* is Herbert Simon with his idea of “satisficing” (i.e. finding satisfactory and not necessarily optimal solutions, e.g. Simon, 1997). Other economists broaden the range of application of the narrow economic model to explore, for instance, identity (Akerlof and Kranton, 2000), the impact of intrinsic and extrinsic motivation (Frey, 1997), the arts (Frey, 2003), and the kinds of incentives that explain human behavior (Fehr and Falk, 2002). *Game theorists* have included fairness norms in their explanations of behavior in ultimatum games. *Behavioral economics* (e.g. Thaler, 2015; Thaler and Sunstein, 2009), together with the work of D. Kahneman and A. Tversky, apply a wide version too. This also holds for a recent book from *social psychology*, *Why People Cooperate: The Role of Social Motivations*, which never refers to this fact (Tyler, 2013). Many *sociologists* use the wide version, again often implicitly. Examples include, beside work by the author of this article (Opp, 1999), Abell (2000), Boudon (1996, see the discussion in Opp, 2014), Coleman (1990), Diekmann (Diekmann et al., 2014), Ermakoff (2017), Esser (Esser and Kroneberg, 2015), Goldthorpe (1998), Kiser and Hechter (Kiser and Hechter, 1998), Hedström (2005, see the controversy: Opp, 2013a, 2013b; Manzo, 2013; Ylikoski, 2013), Homans (1974), and Lindenberg (2015). Although these and other authors apply a wide version, they are not a homogeneous group. They often express diverging views with regard to various issues connected with RCT.

### Egoism, Altruism, and Internalized Norms

Let us now turn to the differences between the two versions. The narrow version assumes egoistic (or selfish) preferences (i.e. consideration only of one’s own

welfare); the focus is on material constraints such as money, and internalized norms, that is, felt obligations to behave in certain ways, are excluded (assumptions 1 and 2 of Table 1.1).

The wide version does not claim that egoistic preferences or preferences for material objects are entirely irrelevant. Because the wide version includes any preferences as possible explanatory factors, those preferences must be taken into account in explaining behavior. It may then turn out that they are irrelevant. Thus, the wide version does not contradict the narrow version. On the contrary, the *narrow version is a special case of the wide version*.

How do we know which preferences are relevant for explaining a certain behavior? The answer is that *it must be determined empirically which preferences (and constraints) influence a behavior*. For example, whether market transactions are influenced by norms (such as to fulfill contracts) must be measured by applying the existing methods of empirical research. Without measuring preferences, the application of RCT (the narrow as well as the wide version) becomes ad hoc. We will return to this issue later when the measurement problem is analyzed.

### Reality and Beliefs: The Constraints

Assumption 3 addresses constraints or, equivalently, behavioral opportunities in return for realizing goals. Note that the kinds of preferences determine the kinds of constraints for a behavior. For example, the expected or real approval of others is a behavioral opportunity only for those who have a preference for approval.

The cognitive representation of constraints takes the form of beliefs. Proponents of the narrow version assume that beliefs adapt to reality because having false beliefs is costly. However, this is not always the case. If the likelihood of being arrested for a crime is overestimated and a person refrains from committing crimes, the false belief will probably not change. The wide version (assumption 4B) assumes that beliefs may be biased in the short as well as in the long run. These beliefs – even if they are wrong – are what influence behavior in the first place and not the real constraints (assumption 5b).

Economists in particular explain changing behavior as caused by changing constraints, and disregard preferences (assumption 6a). So the trend to smaller cars is often explained by a change in the price of gasoline. But in principle, as the wide version suggests, preferences could be relevant as well. The trend toward smaller cars may also be due to an increasing norm for environmentally friendly behavior. Again, whether this is the case must be determined empirically.

### Subjective Utility Maximization

According to the narrow version, people do what is objectively best for them, from the viewpoint of an informed observer. The wide version assumes that *people do what they believe is best for them* (assumption 7). This may, but need not, coincide with the objectively best behavior. People may thus make mistakes.

### Some Conceptual Clarifications: Costs, Benefits, and Rationality

RCT is often characterized as claiming that *costs* and *benefits* determine behavior. These terms have different meanings: (1) They refer to events that are valued by actors more or less positively. Punishment or approval from peers thus normally take the form of costs or benefits respectively. (2) Costs (or, equivalently, opportunity costs) refer to the utility forgone when an action is performed. The expression “opportunity benefits” is not used. (3) Costs often mean constraints, and benefits refer to behavioral opportunities. The term *incentives* denotes costs as well as benefits.

A frequent critique of RCT is that it assumes *rational* behavior. The critique argues that people are not rational. Because the rationality concept is often vague or has different meanings (see the discussion in Opp, 2017) this critique can only be evaluated if it is known what “rational” means. As a little exercise, the reader might judge whether the following statements are correct (the answers follow after the statements).

1. RCT’s claim that people are *rational* is wrong because behavior is often spontaneous, that is, no consequences are considered.
2. RCT’s claim that people are *rational* is wrong because action often does not yield the rewards people expect.
3. RCT’s claim that people are *rational* is wrong because their behavior does often not yield the best possible outcome.

Each statement implicitly assumes a certain definition of “rational” and that RCT claims that people behave in a “rational” manner according to this definition. In statement 1 it is contended that “rational” in RCT means deliberate behavior, *and* it is held that RCT claims that people behave deliberately. However, RCT neither defines “rational” in this way nor claims that people only behave deliberately.

In statement 2, “rational” means that behavior should yield the expected reward, and in statement 3 “rational” refers to a behavior that is objectively utility maximizing. Again, RCT does not contain any of these definitions, and neither does it claim either that people behave in a “rational” manner according to these definitions.

In the previous presentation of RCT “rational” was not used, and there is no need to employ this term. Nonetheless, numerous authors define the concept, but no author provides detailed reasons for their definitions (see Opp, 2017).

In view of this fact it is very awkward that the denotation of RCT contains the word “rational.” It is not clear how this label developed. To assign some meaning to it one might argue that “rational” means in some vague sense “reasonable” behavior. But “RCT” is generally accepted and a plea for changing it does not seem convincing. Neither are there any other terms that do not lead to misunderstandings. For example, one could speak of the “utilitarian” approach, but this term is associated with the philosophical school of utilitarianism.

### Varieties of the Narrow and Wide Version

There are different varieties of RCT. Each consists of the basic assumptions described before, but each formulates them in different ways. In this section, two of these varieties will be presented.

#### Value Expectancy Theory (VET)

This well-known theory in social psychology is formally equivalent to “expected utility theory” or SEU theory (SEU for “subjective expected utility”). VET (also called expectancy-value theory; see, e.g., Fishbein and Ajzen, 2010: 96–128; for its history see Stigler, 1950a, 1950b) assumes that before any action is performed the actor perceives behavioral alternatives. Which action is chosen depends on the perceived behavioral *consequences* or outcomes  $O$ , their *subjective probabilities*  $p$  and their *utilities*  $U$ . The overall (or net) utility of an action  $a_i$ , its SEU, is defined as

$$SEU(a_i) = \sum_{j=1}^N p_{ij}U(O_j)$$

Thus, the SEU of an action  $i$  depends on the number  $j$  of outcomes  $O$ , their utility  $U$ , and the subjective probabilities of each outcome for a given action ( $p_{ij}$ ). The probabilities depend on the kind of behavior chosen, whereas the utilities are general valuations of objects. The  $p$ 's and  $U$ 's stand in a multiplicative relationship: the impact of one of the variables depends on the values of the other variable and vice versa. For example, if  $p=0$  the utility of the respective consequence has no effect on the behavior.

The previous equation is a *definition* of the concept “SEU.” The *theory* asserts: if the SEU of a behavior  $a_i$  is greater than the SEU of any other behavior  $a_k$ , then  $a_i$  is chosen:

$$SEU(a_i) > SEU(a_k) \rightarrow a_i$$

Let us look at some implications of VET.

1. When we compare VET with the general (narrow or wide) version we see that VET is more informative: it states explicitly that  $p$ 's and  $U$ 's have multiplicative effects and that perceived behavioral options are important. The hypothesis that the action with the highest SEU is chosen refers to subjective utility maximization. The  $p$ 's are the perceived constraints – the beliefs – and the  $U$ 's the costs or benefits.
2. In social psychology VET is used as a wide version:  $p$ 's and  $U$ 's are subjective, and, thus, individuals do what is best from their perspective. Any kind of utility may be included, such as internalized norms or altruism. A behavior may have the consequence of violating a norm or affect the welfare of others. These consequences have a certain  $p$  and  $U$ .
3. The assumption that perceptions matter implies that an actor may drastically simplify situations and use various heuristic rules. A person who might take a vacation will not scrutinize all possible options. He or she might first decide to go on a skiing

vacation. The next relevant aspect may be distance to place of residence. This *elimination by aspects* is a common procedure to save (cognitive) costs and determines which consequences are considered and which decisions are made.

4. What the behavioral options, consequences, and values of  $p$  and  $U$  in specific situations are must be determined empirically. This is obvious for social psychologists, and there is no discussion of circularity or tautology, as in economics and sociology.
5. VET does not hold that individuals always deliberate, that is, weigh the advantages and disadvantages ( $p$ 's and  $U$ 's). Certain behaviors may have proved best in certain situations, have been stored in the memory, and then are activated in the respective situations and spontaneously performed.
6. The social environment is part of VET. Individuals may “care” more or less what the consequences of their behavior are for others. Furthermore, others' behavior (such as sanctioning) may be a behavioral consequence.

### Prospect Theory

Prospect theory (PT, see Kahneman and Tversky, 1979)<sup>3</sup> is seen as an alternative to expected utility (EU) theory, as it was formulated by von Neumann and Morgenstern in 1944 and by Bernoulli in 1738. In presenting PT, proponents always attack EU theory; they never discuss VET. In this section, PT will be briefly presented and compared with VET.

PT and VET hold that behavior depends on its consequences, their utilities and probabilities, that the  $p$ 's and  $U$ 's are subjective, and that there is subjective utility maximization. Differences lie in the kinds of effects of utilities and probabilities.

PT claims that individuals consider *reference points* and thus *changes* of utilities and not the status quo. A reference point could be “the outcome that you expect, or perhaps the outcome to which you feel entitled” (Kahneman, 2011: 282). For example, the additional (marginal) utility of an income increase of \$100 may be small when it is compared to the status quo; it may be negative if it is compared to the much higher increase of some reference group.

The assumption of reference points is not inconsistent with VET. Utilities are measured empirically, and actors may assign utilities in any way. The example of the previous paragraph is completely compatible with VET.

Another assumption of PT is that utilities differ for *gains and losses*. The “value function” (Kahneman and Tversky, 1979: 279) illustrates this (see Figure 1.1). It has the following properties: Values (or utilities) are defined as deviations from a reference point; the function is S-shaped, that is, concave for gains and convex for losses; and it is steeper for losses than for gains – it is steepest at the reference point.

In the right part of the figure, for gains, there is diminishing marginal utility. In contrast, for losses, a small loss decreases utility to a higher extent than a large loss – compare a loss of 100 and of 200.

The S-shaped curve implies different *attitudes toward risk* for gains and losses. The concave utility curve (right curve) implies that people are *risk averse*, i.e. the



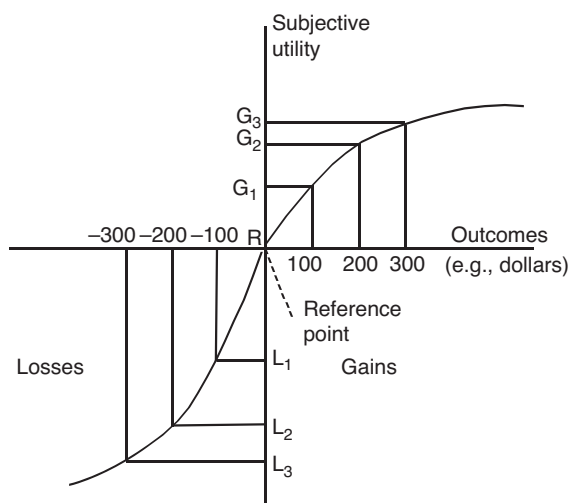
option with the certain outcome is preferred. For example, let students be presented with the following options (Kahneman, 2011: 279): (A) Get \$900 for sure (i.e. with probability 1) or (B) a 90 per cent chance of getting \$1000 (i.e. with probability .9). The expected values  $E$  are: (A)  $E_A = 1 \cdot 900 = 900$ ; (B)  $E_B = .9 \cdot 1000 = 900$ . Although both expected values are equal, most respondents choose the certain option. Thus, for gains PT hypothesizes that people are risk averse.

People are *risk seeking* when they prefer the risky option. For example, let there be two options (Kahneman, 2011: 279): (A) Lose \$900 for sure or (B) a 90% chance of losing \$1000. Again, both expected values are 900. But this time most respondents choose the risky option. In general, PT claims that for losses, people are risk seeking.

These results do not contradict VET, because this theory does not specify a utility function. Such functions can be empirically ascertained and so specify utilities and subjective probabilities.

VET consists of utilities and subjective probabilities. The findings of the previous examples are irrelevant for VET: they hold for monetary values and objective probabilities (presented in the experiment). They may differ from subjective values. For example, an “optimistic” person presented with a probability of .9 for a gain could consider this to be 1 if that person always thinks he or she will win.

Because of restrictions of space it is not possible to analyze the numerous other findings in the heuristics and biases research program and their relationship to VET. Such an analysis would be an important agenda for future research to follow. The result could be an integration of two theories that have so far been never compared systematically. At this point our conjecture is that PT’s assumptions can be used as a heuristic reservoir for formulating assumptions about utilities and probabilities when VET is empirically applied.



**Figure 1.1** Attitudes toward risk for gains and losses in prospect theory  
 Based on: Kahneman (2011: 283)



It might be argued that VET should be replaced by PT. This is not to be recommended, for several reasons: (1) VET has been well confirmed in numerous natural situations (as for the explanation of protest, see Opp, 1986). (2) It is very difficult to apply PT in order to explain real-life phenomena such as voting, crime, punishment, collective action, cooperation, revolutions, marriage, exchange, or migration. Research that supports PT refers to gambling or lotteries. It is difficult to see which natural situations these results can be applied to (Barberis, 2013: 178–180). One problem is, for example, that “it is often unclear how to define precisely what a gain or loss is” (Barberis, 2013: 178). However, there are now many applications of PT in economics (see the review by Barberis, 2013) so that one might be optimistic about new possibilities in terms of applying the theory to real-world phenomena. Nonetheless, at this point it is not recommendable to replace VET.

### Game Theory

Game theory models interactions between at least two actors. The question is which behavior by the actors has which “payoffs” (i.e. costs and benefits), given the behavior of other actors, and how actors jointly act (for an introduction see, e.g., Tadelis, 2013). We will illustrate game theory with the standard example: the prisoner’s dilemma (PD).

Assume that two male prisoners are in separate cells. They cannot communicate, are selfish, have no internalized norms, and there is no possibility of external sanctioning. The attorney assumes they have committed a crime but he cannot prove it. He tells the prisoners that each has two options: to confess or not to confess. If both do not confess the attorney will charge them with some minor crime and each will receive 1 year in prison. If they both confess they get less than the most severe sentence, namely 5 years each. If one confesses and the other does not, the confessor will be free and the latter will be sentenced to 10 years in prison.

The reader might think for a moment how he or she would decide: confess or not confess? Take the perspective of A and let A assume B does not confess. “Confess” is best for A because then he will be free. If B confesses, it is best for A to confess as

Table 1.2 *Cooperation and defection in the prisoner’s dilemma\**

Behavioral Alternatives of Prisoner A	Behavioral Alternatives of Prisoner B	
	Not Confess (= Cooperate)	Confess (= Defect)
Not Confess (= Cooperate)	1 year in prison / 1 year in prison <b>1, 1</b>	10 years in prison / Free <b>–2, 2</b>
Confess (= Defect)	Free / 10 years in prison <b>2, –2</b>	5 years in prison / 5 years in prison <b>–1, –1</b>

\*First entry in each cell is the payoff for A, second entry the payoff for B.

well, because he will serve a sentence of 5 years (instead of 10 years if he does not confess). Thus, whatever B does, it is best for A to confess. This holds for B as well. The “dilemma” is that not confessing would be better for both (1 year in prison each), but the prisoners will choose to confess (5 years in prison each) because this maximizes their utility. Thus, individual utility maximizing does not always lead to the best results for all actors.

Note that the example describes a certain situation – no communication etc. – and certain properties of the individuals (selfishness etc.). In terms of RCT, the individuals have certain behavioral options and preferences, and are subject to constraints (the situation). Assuming subjective utility maximization, the “outcome” of this situation is that both prisoners confess.

The situation of the prisoners can be described in a general way. The years in prison are transformed to (ordinal) payoffs: a low sentence has a relatively high payoff. The order of the payoffs for A runs from the lower-left cell (payoff 2) to the upper-left cell (payoff 1), to the lower-right cell (payoff  $-1$ ), to the upper-right cell (payoff  $-2$ ). The payoffs for B (second number in each cell) are highest in the upper-right cell. The alternative with the preferred payoff could be called “cooperation,” whereas the payoff with the actually chosen payoff, “defection.” Intuitively, “cooperation” yields the best result for both players, whereas “defection” is worse.

There are numerous natural situations that resemble this payoff structure. One is environmental pollution. Let “cooperation” mean not to pollute and “defection” to pollute. Assume now that A (a certain actor) assumes that the other members of the group (the B’s) behave in an environmentally friendly manner. A would be best off polluting: the payoff is 2 instead of 1. If others defect (“confess”), A would get  $-2$  when cooperation is chosen, otherwise (for defecting) A would get  $-1$ , which is higher. Again, pollution is the preferred behavior.

The assumptions of the PD are very restrictive. For example, there can be no threat of external sanctions. This would lower the payoff for defecting. Let the decrease be  $-5$ . For A, defecting would then have payoffs of  $-3$  ( $2-5$ ) and  $-6$  ( $-1-5$ ). Let this hold for B as well. Cooperation would then have the highest payoff and the PD would disappear. Similarly, strong altruistic motivations or an internalized norm to cooperate would make cooperation more beneficial.

This short outline illustrates the following points. Game theory is an application of RCT to a specific kind of situations. Inclusion of norms, altruism, and so on indicates that a wide RCT version could be used.

### **Agent-Based Modeling and Computer Simulation**

Agent-based modeling refers to computer simulations of complex social processes with actors (agents) as basic units (e.g. Axelrod and Tesfatsion, 2016). These processes may be so complex that game theory and mathematical tools are not applicable. RCT can (but need not) guide the formulation of assumptions that explain the behavior of actors.