

Review Article

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Cognitive Economy and Behavior of the Agents in the Decision-Making Process



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Abstract

As is known, by a few years the theory of unlimited rationality was subjected to many criticisms arising from empirical research in cognitive field. These can be summarised by characterizing the theory of the action in the three main components of causal reasoning, rating and choice: Shafir [1], Kanheman [2].

Introduction

Reasoning

Several years of empirical research have demonstrated a tendency in a systematic manner, of the individual to make mistakes in logical reasoning. There seems to be a greater ease toward some connective tissues as the conjunction - «and» - while you are experiencing systematic errors increasing conditional in - «If then» - in the disjunction exclusive - «A or B but not both» - and in the inclusive disjunction - «A or B or both.» The reasons for this behavior «illogical» can be explained according to two opposite hypothesis: the mind in logical reasoning applies a limited number of abstract rules that correspond only to a part of those of the deductive logic; there is no mental logic that guides the reasoning because it is based on the development of mental models that represent the situation [3].

Rating

Individuals tend to express opinions on the probability of the events that are correct when the importance of the principles of the probability calculation is made clear and transparent. On the contrary when the contexts of judgment are richer and more opaque is the evidence of the applicability of the normative principles, and then the subjects will tend to commit errors of judgment. These errors are made using the mode of thought heuristic calls. According to the most important of them, that of representativeness, it tends to assess the probability of the membership of an object to a category on the basis of its resemblance to state more representative. This leads to a series of errors of the statistical type, as the lack of appreciate the

phenomenon of statistical regression, the «overconfidence», i.e. the safety disproportionately high in judging the probability of an event (when the evidence is strong, but the reliability is low) and the «under confidence», i.e. the safety disproportionately low in judging the probability of an event (when the evidence is weak, but the reliability is strong) [4].

Selection

According to the rules of rationality the choice should be based on consistent preferences are elaborated on the basis of subjective utility of the expected results multiplied by the likelihood of their occurrence. Moreover preferences must satisfy the principle of the invariance of the description and of the procedure for training. In the reality of choice individuals tend to build your preferences on the basis of the nature and of the context of decision, with the result that they are often inconsistent and unclear [5].

According to the «prospect theory» the probability has an impact not linear on the decision. Fundamental to the decision are the changes of wealth as the gains or losses on the basis of a point of reference subjective and not for member of wellbeing. One prefers more risk when it is in conditions of loss with respect to those of gain. This affects greatly on how one decides in the various contexts of choice. Just change the «frame» to gain a loss, while maintaining the same final result, that you have responses discrepant («framing effect»). Kahneman, Tversky [2] Anderson, Milson [6], Sargent [7], Stigler [8]. The research of information must be limited because the decision-makers have only a finite amount of time, attention and resources.

The rules of arrest optimize research, i.e. calculate the benefits and costs of research for each piece of additional information and will stop as soon as the costs outweigh the benefits. This version of rationality puts constraints 4 or in the decisions of the actor or in arbitrary simplification of the environment. Both constraints are however represented with unrealistic rules, type optimizing, on a psychological level (stopping rule) or at the level of reality (arbitrary simplification of the environment) [9,10]. This version of rationality is still fully inside the vice of origin of unlimited rationality. The second is the program of Tversky and Kahneman 1974 of the heuristics of judgment. They have brought to light a number of inferential mechanisms responsible for incorrect in human reasoning because they violate some rule of the logic OR of the probability calculation. This is a model of rationality limited type constructed empirically. Is given a role to components not aware of judgment and choice (think «framing effect») [11].

However the version of rationality that derives there from is mainly intentional. In the empirical study of human reasoning, is used for comparison with the classic canons of rationality, i.e. the calculation rules of probability, the logic and the Bayesian decision. By doing so you end up to treat as irrational much of the inferential activity human without worry, instead, the success or otherwise of the inferences in the solution of problems and in giving answers adaptive to the environmental context in which they are generated. From this point of view the model of Kahneman and Tversky seems too worried about keeping the reference to the fees a priori of unlimited rationality and little concerned to elaborate a theory of independent action. The third is the famous theory of Limited rationality of Herbert Simon 2000 [12]. Although, in principle, as empirical theory par excellence, interested in the two series of bonds, those cognitive and environmental ones, puts the barycenter especially on first, and in fact it defines procedural. In this way is not very interested to develop aspects of the adaptive rationality. Moreover remains anchored to a theory of the action type intentional that leaves no space to the ball does not conscious and silence of the factors responsible for the action. The fourth and most recent is the program on heuristics frugal and fast Gigerenzer and group on Adaptive behavior and Cognition (ABC) 1999 [13].

It widens and extends the by Simon program with the aim above all to identify those heuristics that seem, on the one hand meet the requirements of limited rationality, i.e. the limitation of cognitive abilities, and on the other those of ecological rationality, i.e. the adaptability and environmental' of Inferences. As is known, a heuristic is a mode of judgment which sacrifices the formal rigor and completeness present in an algorithm in favor of speed and simplicity [14]. The heuristic «means-ends» of Simon is an example. In the case of the heuristic frugal and fast these rules easier to decide when there are pressing time constraints. This program replaces the criterion of consistency of the inferential activity with respect to the laws of logic and probability with the correspondence of decisions with respect

to the structure of the environment according to the principles of frugality, speed and accuracy. The program of Gigerenzer and ABC group would seem to deviate much from the bad habit of origin of unlimited rationality and a priori. In my opinion it remains, however, still conditional [15].

In fact his concern seems more legislation that experiment. Its greater concern, as do Tversky and Kahneman, seems to compare the heuristics with the canonical models of unlimited rationality and a priori. Moreover the heuristics to Gigerenzer are not so much the inductive result of empirical research on the cognitive activity human, because of the guesswork introduced on the basis of some clues arising from human psychology and animal and especially as deductive consequences of some principles assigned so a priori to the inferential activity human as the frugality, speed and simplicity [16]. Finally the suppository ecological rationality is concern legislation introduced more a priori that as empirical confirmation of the effectiveness of adaptive heuristics. What distinguishes the cognitive economy is precisely this awareness in the theory of economic action. On the contrary, generally, who has accepted the empirical results of cognitive sciences as the refutation of the theory of the rationality of the neoclassical economy is limited to add to the traditional model assumptions on cognitive limitations [17].

They served to explain the faults as exceptions to the rationality. This monistic conception of rationality is challenged by the knowledge economy. Do not deny the presence of a normative dimension of the modes of reasoning and judgment. It occurs when the individual has time to reflect consciously and develop probabilistic reviews or make their comments with respect to premises dates. But this represents only a small part of the decision-making activity human [18]. In the first place there are estimates and reasonings that fail to be normatively correct even after careful reflection and conscious. The underlying rules are in fact too complex and not very «friendly» by a cognitive point of view. In the second place a large part of the cognitive activity of all days occurs rapidly, in an intuitive manner and is influenced in massively from variables of emotional and affective. This type of cognitive activity does not generate, usually, reviews and correct decisions, from a regulatory point of view, but serves for practical purposes of everyday life. We could talk of a dualistic governance model of rationality: Type 1 of tacit type that is used in the intuitive decisions of all days and the type 2 explicit that serves to make analyzes and reviews of regulatory type [19]. Cognitive Economics prefer, however, to abandon the use of the term rationality to its essence, unwavering and of regulatory attribute decision-making ability human [20,21]. (See the essays of sack and Zarri and Bonini). Also the term Dualist is replace with double as the two components are not in antithesis, but integrated with each other. Instead of dualism of rationality, so it is better to refer to a cognitive duplicity of mind.

It is represented by a first component that corresponds to the activity intuitive, type tacit, modulated by affective factors

and emotional context dependent and a second component that represents the activity of conscious reasoning, dependent on rules and independent from the context. Evans, Over [22], Damasio [23], Lowenstein [24], Slovic [25], Finucane [26], Kahneman [27]. Cognitive Economics assumes in full this dichotomy in his theory of the mind. It is not possible to construct any theory of economic action without including the causal role of factors indicated by the mind intuitive. On the other hand has for years been that theorists of decision with psychological techniques and neural imaging» have recognized the intrinsic influence of these components. Damasio has assumed that the best decisions have need of a somatic marker or a visceral signal that allows anticipating the pain or pleasure resulting from the choice [28]. In fact, images connected to feelings and emotions positive or negative guide frequently decisions. The ease with which these images are represented at the mental level makes their role in decision-making processes, alternative to judgments based on formal rules followed so intentional it speaks of an «affective heuristics» (which explains the various phenomena such as the negative relationship between costs and benefits that manifests it under pressure time and affective reasons.

For example, contrary to the economic reality, where the ratio is generally positive, it has been found that often the people who love a technology think, especially when it is urged to respond quickly, that it should have low cost and great benefits. 10 These data are of fundamental importance for any economic theory that would explain the genesis of the preferences [29].

Prefer an option to another is a process that often is determined by the higher mental accessibility of certain images with emotional charge connected to choice. The intuitive mind is, in fact, structured on the basis of accessibility, i.e. the ease with which certain mental contents are represented. In the choices based on intuition, as most of the economic ones of the man in the street in everyday life, is mainly the mental content with higher emotional salience to be more accessible, then to determine the decision. From this point of view the operation of the mind intuitive allows us to explain in a more general way and simple the activity of many of the heuristic discoveries in recent years and in particular that of the «representative» [30].

This phenomenon of accessibility on the basis of emotional, typical of intuitive mind, is at the origin of a series of heuristics that are active in many economic decisions. This is the prototype heuristic that share a characteristic common psychological, the representation of a category of phenomena through their prototype. Whenever we look or feel a set of objects which is sufficiently homogeneous to get a prototype that li represents, automatically it becomes accessible to the mental level [31]. There are various hypotheses about what is a prototype. It may be defined in a general manner as characterized by the average values of the salient property of the members of a given set of objects or events. As is evident the emotional factors are intrinsically linked to the formation and revision of a prototype

by acting on the accessibility of salient properties which constitute the prototype. The greater the emotional valence of a larger property is its accessibility mental and thus more likely is its contribution to forming the prototype [32,33].

From this point of view the prototype does not often represents the properties more inherent and relevant from a regulatory point of view a category, but only those that have an emotional impact greater. This poor representativeness rules of the prototype is that when you judge an event, forming part of a category, the judgment is given more on the basis of the marginal properties of the prototype which on the basis of a thorough analysis of the relevant properties of the event. For example it is often frequent that the prototype heuristic lead to a negation of extensional properties of a category. In other words, when we add an element to a category has a increase of the total value of the category [34].

That is an increase in the extension of a category will increase the value of its extensional attributes (e.g. if we add one or more companies to a set of companies in a sector; this will increase the value of the total turnover of the sector). This is not the case when we use mentally the prototype of a category which by its nature is based on the average of the property and not on their extensionality. The prototype heuristics are responsible for a large number of reviews frequent in economic life. We can say that all choices that are based on the analysis of sets and categories stimulate the activity of this type of heuristics. From the evaluation of the inductive support to a hypothesis on the part of a set of data to estimate the economic value of private property and public there is the prevalence of choices elaborated by intuitive mind. In these cases it is judged with prototypes that have the dimensionality of individual cases and lack of the dimension of the extension. It is therefore not possible to construct a theory of beliefs and economic preferences without referring to the cognitive role of mind foresaw in preparing these reviews.

The intuitive mind is also the basis of another fundamental characteristic of judgment and economical choice: the tacit properties of much of the mental processes involved in economic action. This is the known problem of «tacit knowledge» (tacit knowledge) that has attracted the attention of many economists and social scientists, but that can find the explanatory solutions especially from the data of the cognitive sciences. Viale Pozzali [35], Zeman [36]. It is known that the cognitive activity of the subject can be affected not only by events perceived in conscious manner, but also from those received in a manner not aware. It is also note the presence of mechanisms of implicit memory. Subjects suffering from severe forms of amnesia may in any case expressions of the capacity to implement certain tasks previously learned. In addition there seems to be an asymmetry between the acquisition aware of certain abilities and putting in actual practice of same. Ultimately the tacit dimension of knowledge seems to play a substantial role in our decision-making

processes and the intuitive mind seems to be the owner of the cognitive processes that generate. If tacit knowledge is relevant, in general, in the decision making processes of economic life, it is in particular in those at high rate of knowledge.

In fact it is precisely in the routine decisions, as the behavior of daily consumption to a supermarket or repetitive that linked to the duties of executive type in an office, which would seem to be considerable component of the tacit decision. In fact in them is minimal size conscious and explicit, while most of the process is performed in an automatic manner and implicit. Instead in the activities that contain a high rate of knowledge, such as those related to research and technological innovation, the complexity of the problem solving activity and the need for an intense cognitive effort to achieve results presupposes the activation mechanisms of attention and inferential processes conscious, belonging to areas upper cortical, corresponding to the area of the mind.

Nevertheless it is precisely in the contexts of the generation of technological knowledge and processes of its transfer and diffusion in the undertaking that the tacit knowledge seems to play a crucial role in explaining the economic dynamics resulting. This bottleneck to change and technological diffusion is responsible for many aspects of institutional, organizational and economic affairs of the evolutionary dynamics of industrial development. In a selective environment such as that of the industrial undertaking the system that is more capable of generating, spread and use technological knowledge innovative, more will have a chance to establish itself in the market. In a few words the greater or lesser ability to minimize the negative impact of tacit knowledge about the processes occur in any way the presence of a correlation between the actual performance and the ability to respond to written questions. On the contrary the subjects who behaved better in carrying out actual task tended to be those who responded worse to written enquiries generation, dissemination and use of technologies is what characterizes the systems 1415 of innovation with greater or lesser success. See essays of doses, Malerba Gambardella Berry BroadbentIn [37] conclusion the economic action seems guided by psychological components belonging, often more to the sphere of intuitive mind than the mind.

Conclusion

Cognitive Economics, unlike other critical approaches toward the neoclassical rationality, is aware of this reality and moves the center of gravity of the theory of the mind of the economic actor from the aspects conscious, explicit, intentional and rational mind those tacit, sub-conscious, intuitive and emotional mind intuitive. Cognitive Economics, as empirical theory, par excellence, does not refuse to consider the contribution of mind to economic decision. Its role in many situations of choice is undeniable. It is not however the only cognitive reality responsible economic choices. From this point of view the same concept of Limited rationality, remaining within

a vision intentionality of cognitive activities, loses much of its explanatory capacity. One of the economic actors is not in fact only a limited rationality by reduced computational capacity and calculation of the conscious part and intentional of the human mind. It is also a limited rationality from the influence of factors that are intuitive, affective, emotional, silently that characterize what we have called the intuitive mind. The theory of the mind of the economic actor is therefore based on a cognitive duplicity strongly integral that sees prevail the component or the intuitive component according to the situations and contexts of decision. There are few, however, the situations in which we can say that the decision is taken by the component without influence of that intuitive. The small emerged part represents the mind that characterizes the surface image of the economic actor. But it rests on the big submerged body, mind, intuitive, not visible, but responsible for guiding the inferential paths of homoeconomicus. The' cognitive economy assumes this duality of the human mind and the primacy of the intuitive component in the explanation of the economic action.

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