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How Various "Irrationalities" Proven to be Rational

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Rising of behavioral economics over the past decades indicates that mainstream economists are coming to recognize the significance of various "irrationalities" (biases, anomalies, etc.; Samson, 2014-2021; Thaler 2016) in economic analysis, which is in line with what many other anti-neoclassical economic schools have emphasized, e.g., the "animal spirits" stressed by John Maynard Keynes (Keynes, 1936, pp. 161-162); or, the "unconsciousness", "instincts", or "impulses" in Freudian psychology. These "irrationalities" have always been deemed distinct from human reason or "rational thinking". However, another long-standing view is that "irrationalities" are really some kinds of rationality that just need to be somehow proven (Conlisk, 1996). It would be most satisfactory if the proof could be done because a successful proof can re-justify the mainstream rational principle, then minimizing the price of reform of economics – even of the whole knowledge system.

So how to prove it? The first factor that comes to mind among economists is the calculative or thinking cost (Conlisk, 1996), which prevents a thinking process from reaching its desired optimality. However, introduction of this factor results seemingly only an additional quantitative item for cost-benefit analysis, far from enough to overturn the static framework as was expected by the reformers. Therefore, it shall be necessary to introduce "thinking time" separately. Time, though a "cost", should not be considered fully monetizable and thus fully commensurable with traditional quantitative cost-benefit analysis. This plurality can be thought of as a consequence of bounded rationality. Hence, what is needed further is some proper theory of bounded rationality that can show how thinking goes dynamically.

Moreover, deviation of a thinking process from optimality implies that it is able to produce something unreal, mistaken, different from, or independent of the objective information from outside. That is to say, information does not work on itself as is hinted by current economic

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literature that unilaterally highlights only the issue of information supply, but is processed with some subjective, transcendental tools that differ from information and then impose something disparate on information (Mises, 1962, pp12-14); this is the basic idea of Kant's philosophy. Only when the two things adjust to each other into a particular status can an optimality be identified. If we can find out such tools, we will establish a production theory of thought, similar to the production theory of physical goods – The failure of mainstream dynamic theory was obviously caused by the incompatibility between physical processes and thoughtful ones, where only the former was deemed dynamic. And, such a production theory is inevitably also roundabout, it will give birth to knowledge stocks, just as physical productive processes endogenize capital goods (Böhm-Bawerk, 1923, pp.17-23), and the knowledge stocks will be both limited and developing over time, thereby arousing innovations. Innovation refers to the generation of new knowledge, which would not be explained without the limitation and imperfection of old knowledge. Clearly, the "irrational" tendencies emphasized correspond to the imperfection of stocked knowledge; once the latter is revealed and proved, especially in the analytical rigor as that of Neoclassical economics, the former would become "rational", quite acceptably.

Where can such a theory be found? It seems far away, but nearby really. Computer science provided a perfect model, which has not been perceived for a half and more centuries. It is, Thinking = Computation = (Instruction + Information) × Speed × Time. It means that human thinking is to use the innate, finite, universal and permanent Instructions serially, alternately, selectively, and repetitively processing information from the outside world.

An "Instruction" refers to a type of basic operation that a user "instructs" the computer to do. There are only dozens of core Instructions that are common to all computers, including those for mathematical operations such as "Add" and "Multiply", for logical operations such as "Or", "And" and "Not", and for functional operations such as "Move" and "Store". This weird terminology actually reflects some basic and general thinking tools of the human brain, which, combined with information or data, constitute most of the complicated thinking activities. This is what computer science hints. This can be a new edition of computationalism. The ongoing rapid development of artificial intelligence strongly evidences this perspective. For those who oppose computationalism, we can prudentially add an auxiliary assumption that the human brain has some "Artificial Instructions" that cannot be simulated by computers, but that operate in a discrete manner like that of computer instructions. Broadly, we can think of any verb that refers to a mental action (Imagine, Compare, Randomize, etc.) as an "Instruction", since both speakers and listeners know what it means and how to "execute" it – though not how it is realized biologically in the brain.

Under this introduced thinking theory, now, in order to prove "irrationalities" to be ratio-

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nal, we only need to demonstrate that various Instructions, namely, the basic thinking functions or forms that Instructions represent, are generally combined to compute for decision-making, rather than only the Instruction of "Deduce" is used.

Neoclassicism assumes a purely deductive system where thinking starts from reliable premises and ends up with equilibrium as the optimality, which, apparently, implies an infinite thinking speed, or zero thinking time. However, it is definitely true that thinking consumes time and takes many steps, and decision-making often has deadlines – otherwise the opportunities to act will lose. As illustrated by computer science, an Instruction processes no more than two data for an operation and getting no more than one result, therefore, a common thinking task often requires enormous computational operations that cost significant time. Therefore, one must conceive, examine, evaluate, and select on how to compute while alternately computing, and make decisions on time, economically. "Deduce", or deductive reasoning, as an "Instruction", produces quality results though, it requires strict conditions that are often unavailable; or, even if available, it entails too many steps, too long computing time, or toward the directions that cannot meet the problem to be solved, whereas other Instructions such as "Induce", "Associate", "Analogize", "Randomize", and "Imitate" are often quick to produce conclusions – though resultantly not so reliable as those from "Deduce". This means that various Instructions, like the various factors in physical commodity production, have various economic effects or comparative advantages in computing, which were eliminated from the neoclassical framework and now are revived. Hence, one or more Instructional combinations, rather than "Deduce" only, are usually used to solve a problem, despite some sacrifice of the quality of computational results.[1]

Besides practitioners, this consequence is true also to researchers. Although researchers are commonly not so urgent to reach conclusions as practitioners, their lifetime and worktime are finally limited, thus they must also conclude something, like practitioners. Thereafter, many flawed, imperfect, mistaken, or "irrational" computational results come into being and into storage as knowledge. The relatively "perfect" knowledge (e.g. logics, mathematics, science), if any, must be scant in quantity, existing locally herewith. Meanwhile, the "Combinatorial Explosion" will happen between Instructions and data, indicating infinite possibilities for knowledge development. Thus, divergent processes, beside the convergent ones toward equilibria, will emerge abundantly, and the knowledge system as a whole is then mixed, pluralistic, heterogenous, conflictive, and developing historically, similar to the "Big Bang" of the universe in physics.

The many deviations of thinking from the neoclassical deductive trajectory can be collectively called "Mental Distortions". This is the negative face of humankind knowledge system

[1]This was called and elaborated as "speed-reliability tradeoff" by Cherniak (Cherniak, 1986).

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that was quite ignored by the mainstream of intelligentsia. There are other multiple approaches to demonstration of the distortions. For instance, in this spatiotemporal context, providently, one has to consider the whole world and the whole history for any decision-making, with limited computational power and time, thus, he/she has to single out those important variables while neglecting others, or surmise fuzzily, like drawing a panorama of the world everyday while resultantly assigning the same variable differently with different supplies of knowledge stock, and at different days.

This suggests further that any extant knowledge stocks, seen from some ideal angles, are kind of rash, coarse, arbitrary, mechanical, rigid, or impulsive makeshifts, just like emotions, instincts, "animal spirits", biases, and so on. The "rational thinking system" actually resembles, instead of differs from or even counters, the Freudian psychological phenomena; this may surprise Freud himself.[2] Conversely, the innate Freudian "irrational" tendencies in human nature can be deemed what some hard-software causes. Because new-born infants have no time of, and are not capable enough of, acquiring knowledge by themselves, some primary and ready-made knowledge is condensed biologically into the hard-software and inherited from ancestors to support the infants to survive. This is why "human nature" are rationally innate, which is subject to the integration with acquired knowledge, but lagging far and far behind acquired knowledge that evolves quickly.

Readers may ask: how can this system containing conflicts and pluralities be called "rational"? Additionally, this is because the thoughts, as entities, now reside in space and time that both accommodate and separate them. It is as if a fire is placed in a position different from that of a dry wood, so that the wood is prevented from burning. Secondly, the conflicts or pluralities might exist temporarily, and could be resolved with subsequent computations as innovations – although new conflicts may occur again therein. Third, despite various ideas coexisting relatively, an Instruction processes the same data, hypothetically, always getting the same result; this means that computing correctness is distinguished absolutely from mistakes. All these views could arouse further philosophical discussions.

[2]From this perspective we can realize the flaws or insignificance of the existing mental dualisms (Frankish & Evans, 2009).

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