

Halina Świączkowska
University of Białystok

DO WE THINK ALGORITHMICALLY?

The title of the paper may suggest my approach towards the basis of recognition mechanisms, providing some arguments supporting the algorithm of thinking process thesis, or refuting it. The problem occurs, because radical decisions are currently under examination concerning recognition functions of the brain/mind, and the scientists studying this issue bring different, often in contrary to each other, theories and hypothesis. Those thesis are based on empirical material, but collected facts are the elements of some model, which shape depends on philosophical assumptions.

That how it is, as in an example of mind functions hypothesis presented by the American neurologist Antonio Damasio, which assumed close correlation between the body and the mind, and its philosophical base is determined by the negation of the Cartesian dualism. In a latest published book entitled "Descartes' Error...", Damasio shows the polemics with the basic assumptions of this kind of rationalism, which exists in the ideas of the West (Damasio 1999).

Damasio writes, that the mind finds its foundation on the determined brain systems, that is why there must be both: functional and anatomical connections between the mind, the feelings and the body. Therefore, we are absorbed by the passion of reasoning, and the impulse produced in the core of the brain, penetrates into other elements of the nervous system and occurs as feelings, or unconscious mechanisms directing the decision making process. The mind – from the practical one to the theoretical one – probably is based on the control of this inborn impulse. When the impulse disappears, you will never achieve mastery. But just the fact of possessing it, does not make a master out of you.

Damasio concentrates mainly on the emotions, questioning the dogma of the contrary between the emotions and the rational decision taking. He also determines the right function of feelings in the human acting, but he

analyzes as well this part of thinking processes, that we call reasoning. The purpose of the reasoning lies in taking decisions, and the essence of the taken ones states our choice reaction: non-verbal acting, words, sentences, or some combination of those elements, that belongs to a whole collection of the reactions in a given moments. Reasoning and deciding require from a resolving person a certain knowledge a) about the situation, which exacts taking a resolution, b) about different chances of reacting and about the consequences of choosing any of the possible options, according to the close and distant future. Therefore, reasoning and deciding necessitate possession of some strategy by a unit, based on the rules of logic (Damasio 1999, 191).

Damasio discusses the model of the decision making process based on the traditional mind fundament. Rational reasoning cannot be distracted by the passion. According to this approach human gathers various scenarios of the progress of the events and uses the right strategies, making the analysis of the profit and the loss. Taking into consideration “subjectively implied usefulness”, which he desires to maximize, he concludes logically, what is good or bad for him. The main part of this calculation is based on the creation of the other possible scenarios of the event development, founded, among other things, on the visual and aural pictures, as well as forming of the verbal narration, necessary to keep the process of the logic reasoning. Damasio states, that if this strategy was the only one, rationality in the given sense would not exist. In the best option, the process of making the decision would have taken extremely lot of time. As a barrier against the effectiveness of this model, there is also a limitation of the attention and the memory, as well as, suggested by the imperfection of our reasoning strategies, unawareness or wrong use of the probability and statistics theories. However, as Damasio notices, our brain often can take the right decision in within a second or a minute, depending on what time will be accepted as a right one according to the aim, we want to achieve. If it is possible, the brain ought to make miracles, not being limited by the “pure mind”. That is why, there is the need for an alternative model of its functioning (Damasio 1999, 198).

The option for a pure mind appears in a hypothesis of a “somatic marker”. In Damasio’s opinion, the somatic markers are the special kind of feelings generated on the base of the former emotions (Damasio 1999, 200). Those emotions and feelings were joined in a process of studying from the predictable future results of some event progress scenarios. The somatic markers do not help us out in reasoning. They go together with the considerations by the relief of some options (especially peculiar or profitable)

and quick elimination of them in a further analyzing progress. We may imagine them as an autonomic system of foreseeing and selection, which works whether we want or not, in order to estimate the extreme possibilities of the event development that may appear in the future.

Damasio proves, that the somatic markers have a close physiological basis. Some part of them came into being in the evolution process, the major part arose in our mind in the process of education and socialization by joining the particular category of the impulses with the categories of the somatic states. Therefore, the somatic markers are, in some sense, an effect of the cultural environment. On the neuron level, creation of the somatic markers is based on the process of system learning, that can gather some categories of existence or events with pleasant or unpleasant states of the body.

Damasio notices that evolution is rather economical one and prefers to improve and complete to build than to create from the beginning. It formed in the brains of many species, based on the body and orientated towards survival resolving mechanisms. Those mechanisms occurred to be effective in different types of ecological niches. The oldest decision mechanisms, from the evolution perspective, refer to the biological regulation, then to the private and social domain, and the youngest ones can operate on the collection of the abstract- symbolic elements, that is connected with the artistic creation, scientific reasoning, development of the language and mathematics (Damasio 1999, 217).

In Damasio's opinion there are three components that have an influence on the process of reasoning. These are: automatic somatic states, together with their directed mechanisms, operation memory and attention. All those elements interact in completing the assignment, that consists of selection of the parallel appeared representation. The problem occurs, because the brain construction allows conscious production of the limited stream of the mental and motive information. The images that compose our thoughts have to be constructed in phrases, which consist of the "sentence structure". The same thing refers to the movements, being exterior reactions, and supposed to bring expected results. The selection of the frames, in which those phrases, sentences of our thoughts and movements are to be created, is based on the parallel preview of the possible options. Therefore, both mind and attention require synchronous transforming, building of those arranged sequences remains uninterruptedly. The preview of the possible options depends on designating their order. Qualifying requires the criteria of establishment (preferences and values). Those criteria are provided by the somatic markers (Damasio 1999, 226).

Lot of decisions, made in a process of reasoning, have an influence on the future of the organism. It is right, in Damasio's opinion, that some of the criteria – directly or indirectly – are rooted in the biological impulses of the organism (that might be understood as its “mind”). The biological impulses may be expressed openly or secretly and can be used as a directed marker system, set in motion by the concentration of the attention on the representations kept by the operation memory in an active state.

Human acquired automatic mechanism of the somatic marker also thanks to creation of the culture and civilization. Although, its roots reach the biological regulation, it assumed cultural norms as well, created to survive in a given society.

The motion of the biological impulses, the states of the body and emotions compose as Damasio claims, a necessary basis of the rationality. Those lower levels control the direct, mutual connections between the brain and the body, positioning the body in the chain of operation, that helps in reaching the summit of the intellectual and creative abilities. Rationality, in another words, is shaped by the signals coming from the body. Damasio asserts outright, that the organism has some kind of the intellect, which has to be used by the mind. Verification of the justness of the taken decisions using the logic tools is a secondary process, decoding the rules of the autonomic preference (Damasio 1999, 229).

Damasio by describing the activity of the mind, assumed the existence of a close correlation of the mental and physiological processes. Intellectual processes are characterized by a high level of an automatic action ability, and this automatism has its biological basis. The same automatic action, in unison with the hypothesis, refers to the motion of the somatic markers, which were produced on the basis of the cultural experience.

Reviewer of the book “Cartesian' Error...” writes, that it became from the authors believe, that the traditional notion on the nature of the mind cannot be right – that is why Damasio questions dualism, explaining the right relations between the body and the mind, on the ground of the biology and culture.

Philosophical fundament of Damasio's theory proclaims a contestation with the Cartesian type of rationalism, a dispute leading to its declination. As an alternative we receive a theory, that can be called a theory of the “incarnated mind”, amazingly convergent to the Leibniz's version of rationalism, built on the negation of the dualism rule. However, Damasio does not refer to Leibniz's philosophical system, but Leibniz's ideas are worth mentioning, because they might be a historical and philosophical base of Antonio Damasio's theory.

Leibniz presented an idea of the universe as a harmonious system, in which we experience the existence of unity and variety, coordination and division of parts, and this great order results in the fact, that the nature is the God's clock.

Although his model of nature was based on the laws of the mechanics but, by accepting the beginning Leibniz emphasized that those laws do not depend on the mathematical extension, but on some metaphysical causes. In his opinion, the basic scarcity of the mechanistic physics was not taking into consideration some dynamic factors existing in the nature. By replacing the Cartesian principle of the maintaining motion with the principle of the perfect balance between the cause and the effect, Leibniz deduced some metaphysical consequences. Namely, that the power or energy, even measured, its future effect is something real, existing permanently in the substances. (See Świączkowska, 1998, 17).

In the language of Leibniz's metaphysics the term of power means tendency – that is one of the main attributes constituting the elementary unit of the existence, called by Leibniz a substance, or a real atom of the nature. The second attribute, is the perceptiveness which is always some consequence of the tendency.

The world of the nature, whose matters are indivisible metaphysical points – substances – is ordered with the rules of God's interference. Admittedly, it has an factual status, but it is the world of the occurrences well grounded.

Endeavour and perception, considered on the level of a substance, stay in a close relationship with the physical world. Leibniz emphasizes in many places, that “all souls and spirits, simple substances are always created in some body, and there are no souls that are completely separated from that” (Leibniz, NE, Preface). The term of the bodily substance introduced by Leibniz corresponds to any living thing. In the letter to Arnaud, he explains it as follows: “Je responds que supposant qu'il y a une ame ou Entelechie dans les bestes ou authres substances corporelles, il en faut raisonner en ce point comme nous raisonnons tout de l'homme, qui est un estre doue d'une veritable unite, que son ame luy donne, non obstant que la masse de son corps est divise en organs, vases, humeurs, esprits; et que les parties sont pleines sans doute d'une infinite d'authres substances corporelles douees de leur propres Entelechies.” (GP II, 120).

Leibniz by maintaining, that every substance deserves, in a general meaning, something that he calls endeavour (or tendency) and perception, forms from the cognitive substances the basis of their classification. The general term of monads or entelechies is kept for the substances,

whose cognitive activity is close to zero, and whose beginning is the ability of unconscious perceptions. Those monads, in which the perception is connected with the memory or sensation, Leibniz calls the souls; furthermore, those souls are equipped in the ability of perception connected with the memory and consciousness, able to reason, are called the rational souls, or the spirits (Świączkowska, 1998, 24).

Every inspection of the world, every perception stays in a perfect conformity with the perspective of God's possession, however the reality of "God's vision" states the guarantee of authenticity of the perceptions created by God substances.

Cognitive activity of any substances depends on the God's rule of the sufficient propriety. This activity, independent in some sense from the complexity degree of the organism, responding to God's order of the world. Whereas, this order, in Leibniz's opinion, is a mathematical sequence, and in the matter of reminding, when God calculates and makes thoughts, the world is created.

This metaphysical thesis on the algorithm of the perception processes occurs currently in a context of the evolution theory. Some of the scientists (for instance Daniel Dennett) by analyzing the theory of the natural selection claim, that only those species survived, which developed well functioning highly specialized perceptive mechanisms and they behave, as they recognized "propriety freely seized towards them". Referring to such approach Roger Penrose argues: "If we suppose that the action of the human brain, conscious or otherwise, is merely the acting out of some very complicated algorithm, then we must ask how such an extraordinary effective algorithm actually came about. The standard answer, of course, would be "natural selection". As creatures with brains evolved, those with the effective algorithms would have a better tendency to survive and therefore, on the whole, had more progeny. These progeny also tended to carry more effective algorithms than their cousins, since they inherited the ingredients of these better algorithms from their parents; so gradually the algorithms improved – not necessarily steadily, since there could have been considerable fits and starts in their evolution – until they reached the remarkable status that we (would apparently) find in the human brain." (Penrose, 1995, 454).

A question occurs, whether those cognitive processes, proper to all organisms on the different levels of their complexity can be reproduced using the tools of made by the creative mind. In other words, if organism's acting follows some rational plan, it is possible to stimulate it. Damasio speaks about automatic acting of decisive processes, that have the basic influence

on the future of the organism, which is possible by the mechanism of the somatic marker. He claims, that the logical principles, the rules of the pure mind may decide about the additional item of this mechanism, but they do not decide on the effective side of reasoning.

According to Leibniz's plot, rational souls, or the spirits joining the aggregates of the monads are able, in his opinion, to recognize and reproduce the mathematical plan of the creator. This plan, seized in the natural order of the idea, is memorized in everyone's mind. Leibniz assumed, that apperception, in other words thinking that leads to the idea, has an algorithmic character. The natural order of the idea is isomorphic with the universe order, and this order is a consequence of Creator's action, who by choosing the best from the possible worlds, created the one following the internal order of the thoughts. On trusting the power of the creative mind, Leibniz believed, that the human can reproduce this natural order of the idea and can recognize the complexity of universe on all the levels. On the other hand, there are still some essential difficulties in reconciling Leibniz's trust confidence in miraculous force of algorithm with the dynamic structure of cognition unfolded in "Monadology". He wrote: "It must be confessed moreover that perception and all that depends on it are inexplicable by mechanical reasons that is figures and motions". Mechanization of cognition process is therefore only imitating nature, it is the human ability of reconstructing God's order, likewise as "no machine made by human art is not a machine corresponding with the God's one which is a natural authomaton" (Leibniz, *Monadology*, Paragraph 64).

Therefore, we may repeat for Damasio, that the organism has some kind of the intellect, which must be used by the mind. The first one may be composed of monads' reasoning, that are integrated with the monad joining all the body with the mind, soul, or entelechy.

We can find a surprising resemblance to this idea, in Daniel Dennett's book entitled "The nature of the mind". He maintains that not only we come from macromolecular robots but we are composed out of them. And those collections of billions of macromolecular mechanisms evinces authentic consciousness (Dennett, 1997, 36).

To finish the discussion, we should consider just natural robots, meaning the God's machinery.

On the question stated in the title, it is possible to give at least a partial answer. Many research workers share the belief, that considerable part of the cognition processes and the undertaken actions, proceeds in the body automatically. It is accepted according to the lower organisms.

However, the problem refers to those cognition processes which determine the species' difference between human and animals' world. The issue still remains open.

Bibliography

- Antonio R. Damasio, "Błąd Kartezjusza. Emocje, rozum i ludzki mózg" (Descartes' Error: Emotion, Reason and the Human Brain, 1994) Dom Wydawniczy REBIS, Poznań 1999
- Daniel Dennett, "Natura umysłów", Wydawnictwo CIS, Warszawa 1997
- Gottfried W. Leibniz, "Monadology" in "G. W. Leibniz – Philosophical Papers and Letters", ed. L. E. Loemker, 2nd edition, D. Reidel Publishing Company, Dordrecht 1969
- NE – Gottfried W. Leibniz, "New Essays on Human Understanding", ed. P. Remnant and J. Bennet. Cambridge: Cambridge University Press, 1981
- GP – "Die Philosophischen Schriften von G. W. Leibniz", VII Vol. ed. C. I. Gerhardt, Halle (1846-1863) (repr. Hildesheim 1960), cited as volume, page
- Roger Penrose, "The Emperor's New Mind", Oxford University Press, 1989
- Halina Świączkowska, "Harmonia linguarum język i jego funkcje w filozofii Leibniza", Wydawnictwo Uniwersytetu w Białymstoku, Białystok 1998

Halina Świączkowska
Faculty of Law
University of Białystok, Poland
e-mail: halina@hum.uwb.edu.pl