

What We Do When our Brain Decides: Neurophilosophy Find the Answers

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ABSTRACT

Understanding the behaviour, their own and others, it gave rise along the entire course of human history, in various research methodologies. Over time they have developed two distinct cultures that have operated as if the human being was made up of two entities: on the one hand, the bodies, the object of study of the natural sciences, on the other, the mind, the object of study of the human sciences. Often, nature and culture, innate and acquired, genetics and environment have found ourselves in positions irreconcilable; however, thanks to the most recent findings on the functioning of the nervous system, it was possible to revolutionize the way we think about the relationship between mind, brain and behaviour. In this context, the "Neurophilosophy" arises as a discipline whose aim is to establish a relationship between neuroscience and philosophy. Neuroscience in fact, are influencing profoundly philosophical thought because, with their certainties, have questioned the classical view of the separation between mind and brain. The essence of Neurophilosophy is the thesis that knowledge of the mind essentially passes through the knowledge of the brain, but this does not imply that the neurosciences up the whole understanding of mental phenomena.

Recent developments in the neuroscience offer an increasing amount of "brain-based" explanations of decision-making in ethics (and economics). We reject brain-fundamentalism and we argue that neuroscientific developments support a moderate form of naturalism, according to which empirical results may indirectly influence moral reflection, but offer no direct evidence to radical reductive naturalism.

Key Words: Neurophilosophy, neuroscience thought, mind-brain, behaviour.

INTRODUCTION

Every living organism to form, develop, maintain their balance and reproduce needs energy. The evolution of different species allowed levels of adaptation to increasingly complex and sophisticated. It has gone from single-celled life forms to plants, until the appearance of the animals, which have a highly autonomous movement in the environment. So that the movements are deemed useful for the survival and reproduction of the organism must be chosen so as to produce

results adaptive and advantageous. Physical activity is functional to the collection of information related to the external environment through the different sensory systems. More complex and evolved are the sensory systems of the organism, the greater is the number of information collected and used to decide the movement to perform. The most relevant problem, then, is to be able to coordinate sensory input and motor output, is the ability to select, among all those possible, the appropriate movements, in response to inputs coming from the

environment, "selected and read", from moment to moment.

In animals, the specialized body in charge of this task is the Central Nervous System (CNS), a network of cells called neurons, specialized in collecting and processing information, as well as in modular, so complex, the different physical activities. The neural network of brain processes the information received and thus permissible to establish:

- a) when two different inputs require the same motor response (generalization) or different motor responses (discrimination);
- b) if and when correlate the different inputs (association);
- c) if and when correlate the present inputs with the past input (memory);
- d) if and when you select the input information (sensorial gating / information processing), so that the motorial response depend only on the choice (focus). [1,2]

Performed the processing of sensory information, the CNS sends appropriate stimuli to the motor system that, by controlling the muscles through contractions and relaxations appropriate and specific, produces the body's movements. React to sensory stimuli with appropriate motions, under the control of the nervous system, in biology is called behaviour. The behaviour of an organism has been always adjusted and objectively describable. [3,4] In the understanding of human beings, merely considering only the external behaviour is not enough, it must have information about their mental life or psychological. For "mind" we mean a complex set of tasks: attentional, cognitive and mnesic, emotions and intimate affects, private, subjective, that's not always and not necessarily translate into behaviour. [5] Every human being responds to external stimuli, in a subjective way, as well as its "mind" has them processed, based on their emotions and personal thoughts and specific memories. [6,7] In the opinion of Blaise Pascal, [8] the "mind" is not simply one of

the many aspects of reality, but is closely related to the representation that humans have of themselves. If only humans have a "mind", they have a standard of living "mental" that exceeds and transcends the mere biological life. So the man oneself describes as radically different from reality "mindless" surrounding it. Different mental representations of the self, culturally transmitted, as "the soul", "spirit" or "mind" have in common with one each other, the effect of keeping us away and separated from the rest of reality, from nature, and, from other aspects, even from our body and, above all, from the end of our body, that is from death.

Objectives

The goal to be pursued will be to connect more firmly the human sciences to the natural sciences, the "mind" with the activity of the nervous system: [9] any conduct, simple or complex, is the product of a specific neural activity.

The interpretation of human behaviour, in the light of current knowledge on the functioning of the nervous system, it has become possible only in recent decades with the overwhelming progress of knowledge from the neurosciences (Nobel Laureate Eric Kandel), which became an instrument of general interpretation man and the world. [10-14] The pedagogy itself is increasingly assuming a perspective founded on neuroscience, using programs and methods of evaluation that make direct reference to the theories of learning, in terms of the relationship between mental processes and brain structures. Neuropsychology, created for the study of disorders, which occur as a result of specific brain disorders, has become the study of human behaviour in all its forms. The cognitive neuroscientists face the question of how psychological functions are generated by neural circuits. The emergence of powerful new measurement techniques, such as those of neuroimaging (ex. fMRI functional magnetic resonance imaging, PET, Positron Emission Tomography SPECT Single Photon

Emission Computed Tomography), electrophysiology and human genetic analysis combined with sophisticated experimental techniques cognitive psychology, allows neuroscientists and psychologists to deal with abstract questions such as cooperative behavior, social morality, selflessness, awareness, religious feelings, etc., that is the way human cognition and the emotion are mapped to specific neural substrates. [15-17] With these methods, the clinical study of pathological conditions, such as amnesia, aphasia, sensory neglect, helps to identify the morpho-functional correlations.

Alongside the basic neuroscience, as neurobiology and Neuropsychology, are emerging and new disciplines such as high-impact neuropedagogy, the neurosociology, the neuropsychanalysis to arrive, with Patricia Churchland, the "Neuroethics" and the "Neurophilosophy" neologisms coined in an attempt to overcome the distinction between the natural sciences and the humanities. [18-21] Molecular biology has progressively expanded our understanding about how the brain develops and which generates several complex behaviours, from the early stages of life. [22-24] The human nervous system has many complex skills, which include sensation, perception, learning, memory, planning, decision making, and complex actions, such as the ability to be awake, asleep, dreaming, pay attention and be aware. Our neurobiological knowledge is still insufficient to understand how any capacity is attributable to neural functioning; the neuroscience may, therefore, provide important information to come to understand the power of the mind, that is, the mechanisms by which we can try perceptions, sensations, emotions, thoughts, memories and motivations. [25-27] In the coming decades, the neuroscience could develop more techniques in the study of the biological basis of the mind and of the consciousness. [28-30]

Admitting that neuroscience can reveal the mechanisms underlying the psychic functions, it is argued that the

ability of the human mind is in fact capacities of the human brain. The reductionist strategy tries to explain the macro (neuropsychological and cognitive ability) in terms of micro levels (neural network properties). Patricia Smith Churchland in an article critically evaluates the arguments that deny the neurobiological interpretation of the mind. Reconcile aspects of individual subjectivity of behaviour with those of biological determinism is difficult in the context of psychological and psychiatric sciences, but also in contemporary philosophical thought. It 'difficult to reconcile the natural reality and objective with a subjective and an individual mind. [31-33] In recent decades, several philosophers have expressed reservations about the opportunity to explain the psychological skills, including the ability to be aware, through neurobiological mechanisms. Searle is unable to give up the idea that man has a free will, the belief that a person who performs a certain behavioural choice is given the opportunity to do things other than the one already made. On the other hand, however, he argues that: all of our mental states are caused by neurobiological processes that occur in the brain that can only be the product of brain activities regulated by physical laws. We are therefore faced with a conflict between the experience of the autonomy of choice and determinism of physical phenomena. Searle argues, however, suggested that aspects of the brain related to the assumption of a voluntary decision not deterministic"; the reasons that determine a specific decision constitute, in itself, cause necessary and sufficient to impose that particular choice, and that, in the same way, the decision is not sufficient due to force a particular action. Therefore the possibility of intervention of a free agent is linked temporal aspect, separating the various states of the brain, leading to a particular decision; each functional state of the brain is not sufficient cause to give place to the next condition. Only by postulating a self relatively autonomous from physical

phenomena and deterministic it is possible to assume a certain degree of freedom in choices and decisions, therefore, a free will. A self-conscious, not reducible to the brain, for Searle is the fundamental premise of the exercise of freedom, but it is also true that every conscious state corresponds directly to what happens in the brain. The brain remains, in any case, in his vision, different from the self-conscious. Searle himself has recently revisited the dualistic approach arguing that the problem of human consciousness could receive a scientific solution, despite the scientific and philosophical obstacles to overcome. In a recent article, he offered solutions to the philosophical problems and proposals for approaching the scientific problems.

The reasons to condemn the strategy of neurobiological research, defined reductionist, can be summarized in the following statement: ... I cannot imagine how you can get awareness out from a piece of meat. ^[34] In fact, since we know little about the way the human brain incorporates in its neurons its diverse capabilities, it is obvious and predictable the difficulty encountered in imagining the neural mechanisms. The inability to understand and imagine not giving information about the existence or non-existence of what you cannot understand and imagine. As it can provide information about our inability to imagine. The implicit idea is incorrect and that what is impossible or very difficult to design provide sufficient information and decision about his inability to exist in reality. Many certainties and many doubts "a priori" prove, in the history of science, serious failures, at the empirical verification. The assertion, apparently intuitive and understandable, that "no grave can fly" is contradicted, today, simply by numerous fleets that ply the skies incessantly.

The possibility of a real space is not Euclidean (in contradiction with our perceptions); the reduction made by the relativistic physics, time for a simple dimension of reality, not absolute, but relative to the state of motion of bodies in

space; developments in theoretical physics and subatomic twentieth century, as well as many scientific discoveries confirm that our intuitions immutable (or our cultural bias?) can be simply erroneous. Similarly, "our" interpretive insights about "our" the mind and "our" the consciousness, can be quite misleading.

Dennett argues that the study of the physiological and anatomical brain does not lead to an understanding of the nature of consciousness. ^[35] The premise of consciousness is in the acquisition of language and the human capacity to speak to others or to themselves. The parallel machine, that is to say the neural networks of the brain would create, a machine virtual serial according to which the operations are performed, one at a time, according to the rules, in a time sequence. Acquire a language and speak silently to themselves, in a kind of internal dialogue, it is to create a virtual representation, sequential, the historical consciousness in the brain. In fact, the claim that consciousness, and human mental life is equivalent to the acquisition and to the expression of language (internal and / or interpersonal) is contradicted by the simple observation that people with global aphasia or left hemispherectomy, total absence of language, are certainly aware and keep some cognitive functions than languages. Only the baby has simultaneously inability linguistic and low awareness, but still incomplete development of the central nervous system. ^[36] Against the hypothesis of Dennett, in addition, some studies seem to show that Beer neural networks can produce temporal sequences, without necessarily implying the existence of a virtual machine serial. ^[37-39] The consciousness has become, in recent years a topical issue, for various reasons, including rapid advances in neuroscience, the initial approaches to the artificial intelligence, but, above all, for the unsatisfactory dualistic separation of mind from body. Consciousness is an ambiguous term. You can refer to: 1. the waking state, 2. the experience, 3. possession of any state of

mind. Self-consciousness is equally ambiguous in relation to subjective feelings, including:

- A. the preparation of embarrassment in social contexts,
- B. the ability to identify our feelings and remember our recent actions,
- C. the self-recognition,
- D. the sense of awareness,
- E. the self-knowledge, in the broadest sense.

Clinical studies have defined the main pathologies of the watch: coma, persistent vegetative state, the "locked-in syndrome", akinetic mutism, brain death. The interest for the neural basis of sensitivity and perception focused on the vision. Experiments that take advantage of the circumstances in which the experience subjective visual changes, while external stimulation is kept constantly provide valuable experimental information about the link between consciousness and its neural correlates.

Working on the unconscious neural processes the experiments provide a complementary approach to research. Stimuli "uncollected" have detectable effects at the neural level, but also on related behaviours and later, in a variety of circumstances. In general scientific theories on consciousness include theories about the neurobiological mechanisms underlying the supervision, theories focusing on the role played by knowledge in the processing of information and theories about the functions of consciousness in a social context. Certainly it can be said about of consciousness:

1. It is a phenomenon is asking explanation;
2. It is intimately connected to the activity of the brain;
3. It has an important influence on behaviour. ^[40]

MATERIALS AND METHODS

Within of the neuroscience are many acquired data, which have their own intrinsic importance in the definition of the

problem of consciousness. The phenomenon of blind sight, the emineglect, cases of split brain and anosognosia (unawareness of neurological deficit in place) are extremely challenging for theoretical reflection. Numerous studies of neuro-functional imaging in vivo in humans, using magnetic resonance imaging (MRI) and positron emission tomography (PET) have allowed us to correlate specific functional damage with particular regions of the brain.

Francis Crick, in search of the neurobiological basis of consciousness, has proposed an attractive and simple: it is necessary to adopt an experimental approach, developing testable hypotheses, which can connect the macro-behavioural effects (mind) with micro-structures and the micro-dynamics of neuronal (neurobiology). In practice, according to Crick, we should define nuclear psychological phenomena:

1. known in experimental psychology;
2. connected to circumscribed lesions, present in some patients and reproducible in experimental animals;
3. connected to brain regions well known on the neuroanatomical and neurophysiological level, which are known connections with other brain regions.

The basic hypothesis is that the awareness of a stimulus, in terms neurobiological correlates, to functional variations of specific brain structures, distinguishable from the condition in which you are awake and alert, but not aware of the stimulus. The search for such functional differences may use data from studies of neuro-imaging tools such as functional MRI, PET, magneto encephalography (MEG) etc. The experimental evidence of these differences, in the context of neurobiological data generally, could guide the development of a general theory about the basic mechanisms of consciousness.

The construction of a general theory of consciousness, verifiable with test objectives, should be supported, of course, by data at many levels of complexity of

brain organization. A general theoretical approach to consciousness will not include a number of functional aspects of consciousness, for example, attention and short-term memory. The approach of the initial research could address, however, a partial aspect of awareness as the integration of sensory data in space and time. Any hypothesis, verified or falsified by experimental evidence, could represent, in each case, an effective, albeit partial, scientific progress. [41,42]

For some processes, including metacognition, introspection and awareness of emotions, for example, although relevant aspects of consciousness, we have not enough data about their main neurobiological correlates, so they must be better investigated in the future. Instead visual awareness can be investigated by referring to a huge literature on the neuroanatomy and neurophysiology of the visual system. [43]

Llinas has proposed to give priority, in search of the neurobiological correlates of awareness of differences - subjective and objective - between sleep, dream and waking. This working proposal is striking because the natural reduction of awareness, their deep sleep, could easily be compared to the brain function in a state of dream and waking. The neuropsychological phenomenon "sleep" is present and be studied in many subjects and in many animal species. It 'likely that the hypothesis of Time Synchronization, a phenomenon highlighted in the neurons that carry signals in the CNS evoked by external stimuli, as proposed by Crick, neurobiological correlates of consciousness, may be related to the hypothesis of the involvement of Llinas-cortical circuit intralaminar. [44-46] Connections between brain stem structures and the intralaminar nucleus of the thalamus may have a synergistic role in modulating alertness (arousal), and, therefore, the level of awareness.

It remains to be addressed, however, in terms not only experimental but also theoretical, the fundamental question in the

relations between mind and brain: the brain can generate consciousness only if / and only when, the nervous system also generates a representation of self. In this context, the neurobiological mechanisms of vision-inducing visual awareness, for example, only if / and when interconnected with the mechanisms underlying the representation of themselves, of everything that takes up space and lasts in time, that feels, experience, that reminds and design.

Suppose that the only sensory awareness can be understood independently of a representation of itself is unreasonable. Striking is the experience and reflection of Damasio, [47,48] about the relationship between brain damage, body representation and awareness related to self-representation. The representation of the body, which is consistently bodily stimulation and information on the state of the body, provides the basic structure for the self-representation and it is self-representation that precedes and allows for full self-awareness.

The representation of the body may be investigated, in fact, with the combined techniques of neuropsychology, neurobiology and the study of the neural network modeling. [49,50] From this perspective, the neural mechanisms of self-representation could be the subject of scientific research. [51]

RESULTS

The three general approaches to neuroscience, Crick, Llinas and Damasio, can be considered complementary, investigating different segments of the grand and complex problem of consciousness. Each of them focuses its attention on specific aspects and details of the problem, but does not exclude, in its essence, the contribution that can come from others.

The neurophilosophy embraces the hypothesis That what we call "the mind" is in fact a level of brain activity. The term "neurophilosophy" was coined more than twenty years ago to feature a new

interdisciplinary field. The term reflects developments potentially revolutionary, in terms not only theoretical, about the mind-brain interaction in the light of advances in neuroscience. A synergistic approach between the neuroscience, psychology, genetics, evolutionary biology and philosophy, in this view, could lead to a better understanding of the human mind. In its simplest form, the idea of "nuclear neurophilosophy" is that if you want to understand the nature of mind, you must understand the nature of the brain: the "mind" is actually a function of brain. [52] A corollary of this hypothesis states that we can learn much about the reality of mental function by studying the brain at all levels of organization. Until fairly recently, many philosophers preferred to believe that important domains of mental function could never be addressed using the tools of empirical science. Many philosophers argue, even today, that the study of important areas of mental function can never be addressed using the tools of empirical science. However, the progress of the co-evolutionary psychology and neuroscience on many issues, including the consciousness, free will and the nature of knowledge, have suggested the need to reorient or update these beliefs.

Some large-scale mind-brain problems have not yet been solved, and do require significant theoretical innovation. Some important issues in the mind-brain have not yet been resolved. Such solutions, probably, will require a considerable theoretical innovation. [53]

In particular the problem of how to understand the true nature of representations remains unsolved. Today, the "neurophilosophy" is a fundamental part of the research about the philosophical aspects related to mental processes, such as consciousness and meaning, the decision-making process, the nature of the self, etc., and includes many important sub-sectors such as the neuroeconomics, the neuroethics, and the neuropedagogy and the neuroaesthetics. One of the most important

features of "neurophilosophy" is its rejection of all forms of dualism that attempts to erect walls between a priori studies of the mind and brain studies: the dualistic interpretation still seems to reign in the contemporary philosophy of mind. From the neurophilosophical perspective, however, dualism does not seem plausible: with this in mind it is a natural phenomenon. And 'the brain "that thinks, feels, decides, sleeps and dreams"; mental activity is brain activity, a certain level of functional organization of the brain. The antidualism and naturalism are certainly essential in "neurophilosophy", but, in its own context, the problem of reductionism deserves particular attention. In particular, one may wonder if the different sciences, contributing to the "neurophilosophy", cannot be reduced, ultimately, to a science of the brain. In a study of the neurobiological basis, underlying the human decision-making in "neuroeconomics", some Italian authors argue the need for an inter-theoretical model across different disciplines (neuroscience, psychology, and economics) that characterize the "neuroeconomics". The theoretical approach of integrated disciplines, in fact, more than a reductionist approach pure, appears to provide a better explanation of the natural human decision-making. [54] P. Read Montague [55] has explored new developments in the emerging field of "neuroeconomics" and their relevance for neuroscience of higher functions. From the point of view of "neuroeconomics", the brain is basically a machine decision whose choices are guided by interoceptive states, perception and memory of past prize-gratification. Using quantitative standardized behavioral tests, while surveys are conducted neuroimaging and / or neurophysiological, the experimenters are able to study the different evaluation strategies employed in the field of choices between options. The "computer modeling" can provide a brief description about the relationship with structures and neural functions. According to Montague, in this convergence of subfields we have a

clear example of the theoretical advantage that you can get from the "fusion of two distinct intellectual traditions".^[56] In a recent study of neurophysiology we were highlighted results on the functional properties of the cortical motor system, which challenge the traditional concept of human action, based on the meta-capability of representation of the act. According to the paradigm proposed by these authors, you can "understand the actions of others through our" motor knowledge - a mechanism that allows us to have an immediate understanding of the intended meaning of the action of others.

The basis for this distinction is the contrast between two types of problems: "what we can do problems" and "what we know problems". The first kind of issue concerns what is allowed to do thanks to neuroscientific findings; the second thing that we have to think of these discoveries. On the one hand, we then moral reflection on the consequences of the application of neuroscience: the legitimacy of pharmacological or genetic techniques for the enhancement of mental traits such as intelligence - what we might call "intellectual doping" -; the legality of the "mind-reading" made theoretically possible by neuroimaging techniques. On the other hand, searches of neuroethics challenge our ordinary ideas about the nature of conscious rationality and even freedom. According to many scholars, the science of the brain would show a person weakened by a plurality of neural agents, who decide and orient themselves based on logic and mechanisms very different from those who naively ascribe to ourselves. All this opens the door to the potential conflict between scientific and models of the mind ethically sensitive. It should be reported as the neuropsychology has identified various disorders of consciousness - including hemineglect, "blind sight" (blindsight), disconnection syndrome interemispheric (the so-called split brains), anosognosia, prosopagnosia, "leaks" seizures, etc.. - which make a lot of what we think about

how our ego extremely far from the model of the unitary subject in possession of the ability to equitable and rational deliberation.

Neuroethics is another subfield of neurophilosophy. Neuroimaging techniques have been used to highlight the neural correlates of moral decisions, highlighting how individuals make these decisions. These results begin to raise questions about the type of brain activity underlying, indeed, the reasoning and the role played by emotions, in so-called "rational choices". M. Reichlin^[57] defines neuroethics as the "most spectacular" attempt to return to nature: the naturalization of ethics, that is, "the descent from heaven of the morality of religion to the bare floor of our natural condition".

From a strictly scientific point of view, however, despite this progress, there are reasons, not only practical but also epistemological, so the mind-brain relationship could never become completely decoded, in the individual, with finite procedures of investigation. Features self-consciousness and self-referential representations, involved in strategic thinking and provisions, may remain intractable in their essential aspects, when investigated with the proper methods of neuroscience. It should be emphasized, however, like any scientific representation of reality, and thus also of the human mind, to the limits objectives, intrinsic to the objects of analysis and methods of the natural sciences, would not allow a full understanding of mental subjective.^[58] So intrinsic part of our nature as human animals, that our nature as individuals and people is open to complementary education. It asks the plasticity of the brain, which has co-evolved with the complexity of our cultures. This asks the opening environment of our cognitive structure, which delegates to cognitive artifacts outside of the computational tasks supported by brain. In a picture of this magnitude, the question "what does my brain when I make a decision?" does not have a simple answer - and it passes through the clarification of the relationship between the self and its brain.

An analysis which leaves open many options on how to respond to the neurophilosophical challenge.

CONCLUSIONS

The question of the relationship between neurobiology and mind, in view of its complexity, may seem irresolvable, although already Freud argued, in his "Project for a Scientific Psychology", in 1895, that: "One day it will be possible to represent the psychic functioning in the elements Organic Nervous System".^[59] Based on the evidence from physics, chemistry, evolutionary biology and neuroscience, it seems very likely the hypothesis that the ability of the human mind are determined neurobiologically. Affirming that this "biological reductionism" remains a hypothesis, neuroscientists are increasingly complementing the other disciplines investigating the human mind. Interdisciplinary areas of neuroethics and neurophilosophy are beginning to address some of the most complex issues, involving the interactions of the brain with the mind and consciousness. Eric Kandel, a neuroscientist and Nobel Prize, the latest edition of its "Principles of Neuroscience" wrote: "The last frontier of biological sciences, the ultimate challenge is to understand the biological basis of consciousness and mental processes by which we perceive, act, learn and remember." Recently, in fact, they have made their ability to calculate a moral impersonal seems to rely more on cognitive processes "cold" and rational.^[60]

The heliocentric hypothesis of Aristarchus of Samos (about the appearance on the international stage a series of studies that allow elucidate the brain mechanisms underlying moral reasoning [suggesting That there is a brain-based account of moral reasoning]. [...] These new data show that when an individual decides to act on a moral belief is because the brain areas involved in emotion are activated during the evaluation of the moral question involved. Similarly,

when presented a moral issue on which the individual decides not to act, because you do not activate the emotional areas of the brain".^[61] It has been suggested that when we are involved in situations involving a greater personal involvement on an emotional level, our reaction appears driven by a "system" of government action based instinctive, automatic and visceral. On the contrary, if we can distance ourselves from ourselves, our ability to calculate a moral impersonal seems to rely more on cognitive processes "cold" and rational. The heliocentric hypothesis of Aristarchus of Samos (about the third century BC.) has collected evidence only after thousands of years; the humanity took thousands of years of culture before defining the table of the chemical elements!

It 'clear that deep truths are all at the same time, simple and difficult to grasp; also the problems faced by neuroscience and neuro experimental philosophy, today appear complicated and difficult, but the scientific and technological advances that have allowed access to noninvasive functional processes in the brain in vivo in humans, could lead, in the near future, a synthetic vision and objective on sound science. What now seems obvious it was considered an incredible novelty, for the generations that preceded us. What until a few years ago it was a difficult subject to research, it is now the subject of educational learning. Thus you can feed a cautious optimism about the possibility that scientific progress can provide, in the near future, surprising news about the nature of the human mind and consciousness. To date it remains unresolved the fundamental question: is the self placed in the brain, or even identifiable with its functions? Perhaps this question will accompany a long research in the scientific and philosophical debate on the subject.

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