

New bioethical challenges in neuroscience

Novos desafios bioéticos em neurociência

António Jácomo*

ABSTRACT: Modern developments in the neurosciences raise a number of ethical issues, not always discussed in a dispassionate way. The most pressing interest lies in the fact that ‘neuroethics’ condenses an interdisciplinary scientific-philosophical reflection. Encouraged by neuroethics, new data on brain function promote a review of neuroethical “actus humanus”, and a new vision about anthropological dualism. One of the main implications of contemporary advances in neuroscience is the awareness that traditional philosophical questions are not able to give a good foundation for valid moral discernment. Moreover, neuroethics has a magic charm not just for ethical deliberation, but the cases that fall within its jurisdiction include some of the most controversial and strange issues, such as the question of dualism. Since Neuroethics, as a “neuroscience of ethics”, clarifies the constraints of human action, we can easily understand that the more we know about these conditioning factors the more we are able to affirm and justify the limits of ethics in neuroscientific knowledge. Faced with this dichotomy challenges, how do we justify ethics in the neurosciences? The link that we propose in the article is to make a synthesis of the “brain of the ethics” and the “ethics of the brain”.

KEYWORDS: Ethics. Cerebrum. Bioethics. Neuroethics.

RESUMO: Os desenvolvimentos modernos das neurociências levantam um número de questões éticas nem sempre discutidas de um modo imparcial. O interesse mais urgente reside no fato de a ‘neuroética’ condensar uma reflexão científica e filosófica interdisciplinar. Estimulados pela neuroética, novos dados sobre a função cerebral promovem uma revisão do “actus humanus” neuroético e traz uma nova visão sobre o dualismo antropológico. Uma das implicações principais dos avanços contemporâneos da neurociência é a consciência de que as questões filosóficas tradicionais não são capazes de fornecer um bom fundamento ao discernimento moral válido. Além disso, não só a neuroética tem um encanto mágico para a deliberação ética como os casos que estão incluídos em sua jurisdição envolvem algumas questões mais controversas e estranhas, como a questão do dualismo. Como a Neuroética, na qualidade de “neurociência da ética”, esclarece as restrições da ação humana, podemos facilmente entender que quanto mais sabemos sobre esses fatores condicionantes, tanto mais capazes somos de afirmar e justificar os limites da ética no conhecimento neurocientífico. Diante do desafio dessa dicotomia, como justificamos a ética nas neurociências? A conexão que propomos no artigo é fazer uma síntese entre o “cérebro da ética” e a “ética do cérebro”.

PALAVRAS-CHAVE: Ética. Cérebro. Bioética. Neuroética.

INTRODUCTION

Modern developments in neuroscience raise a number of ethical issues, not always discussed in a dispassionate way. The most pressing reason for this conceptual dyslexia lies in the fact that ‘neuroethics’ condenses an interdisciplinary scientific-philosophical reflection.

A primary indicator of the importance of neuroscience is that our brain is the “booster” of our body, and guides intellectual activities such as language, recognition of forms, or resolution of problems.

Jean-Didier Vincent defines the brain as “the land of the self’s body”. We can say “I” because we have a

brain that feels everything that happens in the body and through the body¹.

This short introduction will shock all those who do not recognize the dichotomy between “body” and “mind”, and the consequent dissociation from the “organic” and “neuronal” approaches. Two distinct pathways discriminate between “organic” and “neuronal” perspectives: From the brain to the thinking and from the thinking to the brain².

On each of these approaches the brain is not a “substance” separate from the body or some miraculous software that controls the machine. The brain is the centre of our world.

Jean-Didier Vincent, in his book “Voyage extraordinaire au centre du cerveau”, tells us a little story that

* Doutor em Filosofia e Mestre em História da Ideia de Europa do Instituto Superior de Estudios y Derechos Humanos Europeos – Universidad Pontificia de Salamanca. Professor e investigador no Centro de Investigação de Bioética (GIB) – Instituto de Bioética da Universidade Católica Portuguesa. Docente e Coordenador do módulo Jean Monnet no Mestrado em Estudos Europeus – Universidad Pontificia de Salamanca, Espanha. Professor Convidado da Escola Superior de Educação – Instituto Politécnico de Viana do Castelo. E-mail: abferreira@porto.ucp.pt

O autor declara não haver conflitos de interesse.

shows us the direct relationship between thought and language as expression of thought.

One day, Vincent's grandfather bought a parrot. The street merchant told him that the parrot spoke "like a big boy". Days, weeks passed, and nothing! The parrot definitely didn't say a word! Angry because he felt cheated, he asked the seller to take the bird back. On arguing, the shrewd salesman threw the following argument: "It does not speak, but it thinks." Without getting the money back, he returned home with the parrot.

By the end of his life, Vincent's grandfather commented that he had learned a great lesson in neuroscience from that uneducated seller. That parrot truly "spoke", because it distracted him from the chatter of his wife, who spoke without ever having had a significant thought.

THE MAGIC CHARM OF THE BRAIN

We all know that the main business of neuroscience implicates three sorts of areas: nervous system, neuronal work, and the importance of cells called glial cells or neuroglia. Although the aim of this paper is not to understand the mechanisms of memory, or how emotions are generated, or the mechanisms of neurodegeneration that occur in diseases such as Alzheimer's and Parkinson's, such processes of the brain are a major reason why the development of the neurosciences is associated with concerns about the quality of life as people age. The extension of average life expectancy means an increase in the number of new cases of degenerative diseases which compromise the quality of life, particularly because there is still no cure for these complex diseases.

The need for neuroscience to handle assorted themes, and interdependent ones, at the same time, leads us to discuss the concept of the mind and its disorders. Besides the complexity of neural connections, the debate is not just in the neuroscience fields, (such as psychiatry, psychoanalysis, cognitive psychology), but also in sociology and theology. It spills over into areas without social boundaries, through education, family and religion.

From neuroscience to neuroethics: the problem of consciousness

Neuroethics considers the impact of neuroscience, in the context of philosophy and ethics. Thus, neuroethics becomes an interpretive key to a holistic view of humanity. Sometimes we believe that we have broken the old dualism of body and soul just by replacing "soul" by "brain", as if the brain were not part of our body and, first and foremost, the key of our lifetime.

Encouraged by neuroethics, new data on brain function prompt a review of "the sense of self"³, without leading to a "solipsist" view of reality. The implications for society of the growing knowledge about brain function are another aspect that must be taken into account in the current debate.

Despite science and philosophy proposing different ways of studying consciousness, there is a growing consensus, at least in two respects:

1. The "primary consciousness" is a cognitive process that emerges from a complex neural activity;
2. The distinction between two types of consciousness, arising at different levels of neural complexity, as higher-order consciousness and reflective consciousness.

These points of convergence contain philosophical perspectives that shape new neuroscientific interpretations. Among them we can summarize the four models of thought:

1. Neuro-reductionist. This model is the most traditional one, and the proponents are figures such as Patricia Churchland and molecular biologist Francis Crick⁴. It reduces consciousness to neural mechanisms. Crick explains how consciousness reduces the activity of neurons, but also states that conscious experience is an emergent property of the brain as a whole;

2. Neurofunctional. This model is called "functionalism". It advocates that the preservation of mental states is defined by their "functional organization," namely by moulds from causal relationships in the nervous system. Functionalists are not Cartesian reductionists, because they pay careful attention to the Nervous System Non-linear Phenomena⁵.

3. Neuro-dualism. For this model, consciousness is a deep mystery which human intelligence will never understand. The cause of these limitations is an irreducible duality, which in practice means that there is nothing other than the classical Cartesian duality between mind and matter.

4. Neurophenomenology. This is a method of studying consciousness which combines the disciplined examination of subjective experiences with the analysis of models and corresponding neural processes. According to Michel Renaud, phenomenology, heiress of the discoveries of the modern philosophy of subjectivity, has had, and continues to have, a considerable impact on our awareness and understanding of the world.

To understand the complex body-consciousness, contemporary neuroscience finds in Damasio's thinking the attempt to explain the origin and sense of self as a central element of consciousness and shows that this effect is related to the ability of the human brain to allow individuals to perceive themselves as living organisms.

Damasio, from the example of the Phineas Gage case, concluded that the human mind has the ability to perceive the existence of an interaction between body and environment, and that it can react based on facts that the body harvests through sensations, perceptions and emotions.

Attempting to respond to this change, Damasio suggests a link between body, consciousness and identity. The body is the point of convergence of the various relationships and the place where emotions are built. Perceived as the gathering point, human consciousness becomes a "biological advantage" related to life support and, at the same time, the certainty that we share with other animals the same sense of belonging to the world. Damasio's argument is thus a strong attempt to bridge the Cartesian dualism, to clear the continuity between body and consciousness and the body's role in world knowledge.

Moral decision comes from some kind of conviction about certain facts. While it is true that the ethical consideration is founded on a set of intuitive moral demands – not only on considerations of bio-

logical genetics – it is therefore true that knowledge of certain facts derived from experience and scientific research may help to clarify some of our ethical and moral content.

NEUROSCIENCE AND ANTHROPOLOGY

One of the main implications of contemporary advances in neuroscience is realising that traditional philosophical questions are not able to give a good foundation for valid moral discernment.

If we observe the great dream that guides neuroscience or genetic engineering, we can see that these "new life sciences" seek to uncover the channels through which vital information becomes human. The need for moral values and moral education about the serious implications of science and technology in vital areas is a universal and very urgent concern, with a special relation between ethics and teaching, and a mutual influence between education and morality. The human being is, by nature, a moral being, but must be educated to morality. The natural behaviour of humans is egocentric (Piaget), in the sense that the first human impulse is for individual needs to take precedence and guide people's actions.

Neuroethical "actus humanus"

Freedom, as an expression of the human being, has the power to convert the natural world in a world of artefacts. The main task of ethics is to provide guidance for full freedom.

The history of philosophical thought provides us with a variety of interpretations of ethical motivations and perspectives that underpin their foundations and ideals. In ancient Greece we find in Aristotle's ethics a relationship based on equity associated with the good of mankind; St. Augustine has fixed the ethics on the basis of the relationship of love; Kant conceived the ethics of respect; in contemporary thought, respect, love, justice and dignity took the name of "anthropocosmic solidarity". On this holistic view of ethics, neuroethics becomes a new scientific field, which, by the uniqueness and interest of its object of study is

not only an important sub-section of ethics, but also a fascinating branch of ethics^a.

It is accepted by all the specialists that William Safire introduced the term “neuroethics” in 2002 when he used it in an article in the *New York Times*⁶, but, in fact, Safire recognizes that the term existed before. Going beyond this controversy, the date of 2002 is most significant. Early in the new millennium we are witnessing an unruly development of new issues raised by the advance of the science of the mind.

The term “neuroethics” has two interesting interpretations in hermeneutics: the path that leads from ethics to neuroscience, and, secondly, the way from neuroscience to ethics. Although that hermeneutic understanding could appear to be a mere play on words, the clarification of this distinction makes sense.

Neuroscience ethics concerns the field of neuroethics that seeks to develop an interpretive framework to regulate the advances in neuroscience and its application to humans; on the other hand, neuroscience of ethics concerns the scientific assessment of the neurological effect on the ethical choice itself. On this vector there is a primary emphasis on the neuronal base of the moral agents. From that point of view, neuroscience aims to illuminate the key elements that shape human action, the freedom of will, the ability to reflect, and the evaluation of our actions.

The discovery of the neurological basis of moral action can be considered an essential tool for a different understanding of human action, for it enables the perception of what can be understood as “actus humanus”. The interface between the brain and action, seen in neuroethics, illuminates the self-ability to control actions, with the exception of those which are unpredictable.

When we look into the very essence of humanity, neuroethics assumes a central significance. No matter how important other branches of ethics are, we can never reach the ground of the neurological conditions that underpin the justification of ethical choice in the other areas of operation. The branch of neuroethics is

the science which deals with precisely this anthropological background.

Because the “neuroscience of ethics” clarifies the constraints of human action, we can easily understand that the more we know about these conditioning factors the more we are able to affirm and justify the limits of ethics in neuroscientific knowledge. Although it may seem that these perspectives are completely diverse, we can justify the need for a neuroscience ethics. Neuroscience can help make essential progress on neuroscience ethics.

Founded in the advances of science, neuroethics is not just a branch of applied ethics, but occupies a prime position since it illuminates the human activity and the rationality of freedom and choice. Neuroethics is therefore much more than a branch of the applications of ethics.

The neuroscience input in dualism

Neuroethics is not just essential to unravel deliberations in ethics. Neuroethics is fascinating: the cases that fall within its jurisdiction include some of the most controversial and strange issues, such as the question of dualism.

Even though we do not intend to present a comprehensive review of the theme of dualism, it is important to note that, as an immemorial philosophical concept, the first use of the term starts in a research paper entitled “*Historia religionis veterum Persarum*”⁷ by Thomas Hyde. From the perspective of the Persian religion, this book contemplates the intensity of the deities Hormuz and Ahriman, who symbolize Light and Darkness, Good and Evil. Hyde holds that dualism embodies the history of philosophy in opposition to monism, developed by Spinoza. (From Spinoza’s point of view, the spiritual and material phenomena are attributes of an underlying substance).

Throughout the history of philosophy dualism was considered an abstract approach between two irreconcilable tendencies: good and evil, matter and spirit, body and soul, one and multiple, freedom and determination, subject and object.

a. Consider the case of Antonio Damasio, “Self Comes to Mind: Constructing the Conscious Brain: The Evolution of Consciousness”, in just over one week it sold 10,000 copies. The issue is quite complex and certainly only a small group of specialists will be able to understand the book. This publication success is very much related to the attractiveness of neuroscience.

For centuries, the issue of the link between “body” and “soul” was described as a religious phenomenon or, at the best, a spiritual fact. In consequence, this connection was studied and defended by theologians and spiritual thinkers and denied by all thinkers called “materialists”.

Currently, the approach is made from a neuroscientific perspective. More than a theory that explains soul/body dualism, it is presented as a principle of reality underlying a type of relationship that is antithetical and irreconcilable: this most fascinating form is the relationship between brain and mind².

The basis of dualism is the perception that the mind cannot be reduced to a physical substance, but is another non-physical substance. The truth is that, for many people, mental issues such as beliefs, feelings, or desires, can be explained by physical terms. On the other hand, others may say that almost everything will be explained in physical terms, as for example subjective feeling, or the fact that we have conscious experiences.

Although permeating the entire history of Western thought, it is in modern philosophical thought that dualism invaded philosophy under the baton of Descartes. After the author of the “Discourse of a method for the well guiding of reason, and the discovery of truth in the sciences”, we witnessed several attempts (more or less bizarre) to solve the main problem raised by him: the problem of causal relationship between mind and body. To Descartes, mind and body are two distinct substances. The mind is the *res cogitans* and the body is the *res extensa*.

In this passage we can clearly contemplate the Cartesian dualism where the mind is indivisible and more easily known than the body which by virtue of being in space is divisible. Despite this dualism, even in Descartes’ time, the interaction between mind and body was not considered as a final solution.

In addition, Spinoza advocated a different philosophy of mind based on an ontological model: the order and connection of ideas is the same as the order and connection of things. Mind and body are not two different substances, but two different attributes of the same substance. This substance unit is named

“God”. Substance thinking and substance extended are one and the same, comprehended through one attribute or through another⁸. This connection helps to understand the relationship he sees between mind and body.

One of the most interesting attempts to respond to the Cartesian dilemma is Nicolas Malebranche’s Occasionalism. *On the Treaty of nature and grace*, of 1680, the theory is held that all activities of the soul that seem to cause effects on the body and all the “actions” of the body on the soul are, in fact, caused by God’s occasional will. Malebranche believed in the existence of two distinct substances, an extensive and a thinking substance.

However, one problem remains in all these forms of dualism: the problem of mental causation, where the roots of thinking are. Without an answer to the problem of causality, dualism does not seem a viable alternative.

The development of neuroscience, particularly brain mapping, brought with it the impossibility of ignoring the study of the biological activity of the brain¹. In fact, the relationship between thought and the brain is one of the greatest expressions of the applicability of anthropological dualism, because through the mind, the body is not an object. So, the main problem lies precisely in the concept of identity between sensitive body and lived body, the perception of body as a self. This “self” is the meeting point between these two realities separated by an artificial approach.

Although this question remains valid and without a complete answer, one of the most exciting answers lies in Damasio’s thought. Dialoguing with Western cultural heritage, Damasio is trying to unravel the “Descartes’s Error”⁹, and to discover the “Feeling of What Happens”³.

According to Damasio, consciousness is a natural and biological phenomenon which emerges in living creatures which have a certain degree of complexity. This idea is not original, but what is innovative is that Damasio submits a detailed development of this idea by firmly founded experimental data, and by various speculations, eminently scientific in the sense that they are likely to be tested empirically. Thus, the

identity of self results from the identity of the body in the same way that consciousness itself arises from the need to regulate the biological body.

Consequently, consciousness is the result of the need to regulate any biological organism. What's amazing in any organism is the fact that internal body states do not show large variations. This is the body homeostasis: if the internal body state of an organism exceeds certain values, it dies. In contrast to this internal constancy we notice the inconstancy and variability of the environment. Consequently, organisms have to maintain very accurate forms of internal regulation, in connection with information received from the exterior. Simplifying the explanation of this phenomenon, we can say that consciousness (extended or nuclear) arises from the need to simplify the process of internal regulation.

THE SOLUTION OF THE MIND

Time is lost in the speculative work done by philosophers and thinkers about the nature and structure of the mind. Throughout this process, the history of thought has developed a set of distinctions and approaches that now present themselves as indispensable to illuminate the theme of ethics in general and, in our case, of neurosciences in particular.

Although aware that we need to sit on “the shoulders of giants”¹⁰ of culture, we must not forget that philosophical reflection must be supplemented by empirical research. Besides, modern empirical advances could improve philosophical reflection.

The mind, as a state of consciousness or sub-consciousness that allows the expression of nature¹¹, is quirkier than many of us could conceive, because we all accept that there is a lack of data in neuroscience. In the middle of this “unknown strange marvel” that is the brain we have two ways of reality perception: the conscious way and the unconscious way.

Scientifically considered, understanding the function of the brain is often problematic, since we see the human weakness: everything we value (as sensual experience, art, literature), and that makes us valuable (especially our independence) depends on

the continued integrity of this delicate and infinitely complex organ.

Faced with such complexity, neuroscience leads us to a kind of humility. When we understand the copious ways and procedures that filter our external information, we perceive how poor our introspective knowledge is. A lot of what happens around us happens in the inside area of the mind, and cannot be looked at closely, at least not directly. The mind is the guardian of our inner world¹.

Humility, influenced by knowing the limits of introspective knowledge, should make us less confident of scientific experience and memory. The real triumph of neuroscience would be to make us aware of “how” we can discover: using correct methods, and relying on the structure of science as a basis of knowledge, we can understand not only the world but also the experience of ourselves.

The neuroscience of ethics

When we consider ethical problems, we are led to believe that ethical decision is conditioned by a set of factors external in nature, such as culture, personality and environment. This interpretation, which seems clear and distinct, is refuted by some thinkers who argue that mind sciences are gradually revealing that we cannot continue to have so rigid an insight. Neuroscience and social psychology show that our ethical judgments are often (or maybe always), unjustified and unreasonable.

Although it could appear that neuroscientific advances could come to give a hand to some theories that support the universality of ethical values, the truth is that these sciences destroy the illusion of the same impersonal universality.

According to a revisionist view, the lesson of mind sciences is that all moral theories are based on irrationality. On this point of view, some authors argue that mind sciences provide decisive support for the defence of traditional ethical reasoning.

From another perspective, some authors advocate an eliminationist vision, where mind sciences show that all moral theories are unwarranted.

Faced with this dichotomy, how do we value ethics? From Neil Levy's point of view, the challenge of

neuroscience in ethics focuses on the concept of intuition^b. Neurosciences show that moral intuitions are reliable, at least in some circumstances. But here lies the biggest problem: if our moral intuitions are systematically unreliable, then moral thinking is, at bottom, a moral intuition.

Ethics and Intuition

Ethical thinking advocated by John Rawls¹³ influenced radically the focus of ethical foundation. Rawls argues that the validation of moral theories could be found on “reflective equilibrium”^c.

So, what is intuition? There is no universally accepted definition. Some philosophers identify intellectual intuition with appearances: an irrevocable impression imposed because of a circumstance which may or may not cause a corresponding belief^d.

From a moral point of view, intuitions are often characterized as “gut feelings”^d. This definition implies a misleading perspective, for it suggests that intuitions lack a cognitive content. Damasio’s research on somatic markers indicates that the content is guided by a set of somatic responses such as skin and heart rate which indicate that an activity has been intensified.

Perceiving (as intuition) that an action is right or wrong is not necessarily the same as believing that an action is right or wrong. This distinction implies that it might be quite possible that people can have moral intuitions that do not conform to their moral beliefs (similar to the optical illusion). However, the moral intuitions are usually considered to have strong probative value. Intuitions have the force of self-justification. Intuitions play an important role in many research areas. According to Rawls¹³, moral theories are related to the intuitive nature of perceptions. But what kind of principle can explain moral judgments?

Two philosophical movements dispute this reasoning. One is the Utilitarian. According to Bentham, the greatest benefit for the greatest number is the measure of

right and wrong. An action is correct when it produces more happiness than any alternative.

Another principle is the Consequentialist. This is a principle that is based on the appreciation of the action by its consequences.

In front of the arguments that disparity can justify, or not, the choice for one or another model, the search for “reflective equilibrium”, lies in finding an underlying set of principles that harmonize. Although it may seem strange, balance lies in intuition, understood not as sacred or esoteric, but it is a possibility that a moral principle is so intuitively plausible that, when it conflicts with an intuition of a particular case, it must maintain the principle rather than modify it.

Some utilitarians, like Peter Singer¹⁶, suggest that this moral theory avoids reliance on intuitions, rejecting them as irrational prejudices, or as products of a cultural doctrine. However, it is clear that utilitarianism itself is as dependent on intuitions as any other moral theory.

Singer rejects intuitions in favour of “self-evident moral axioms”. The problem in this sentence is that self-evidence is in itself an intuition. Therefore, the appeal to self-evidence is an appeal to intuition. Hereby, the problem for utilitarianism is based, for example, on the intuition that pain and pleasure are, respectively, good and bad.

No moral theories seem to be able to dispense with intuition, although some give more weight to casuistic intuitions¹⁷; others, such as utilitarianism, rest the justification for moral choices in a great intuition, the particular moral principle¹⁸. Whatever the ideological options could be, all moral theories seem to be based on moral intuition.

In their most radical form, the challenge of the moral intuitive choice is based on this fact: if our intuitions are reliable guides of moral truths, then all moral theories are in trouble.

b. Intuition is the act by which the mind perceives the agreement or disagreement of two ideas. When using only intuition, the truth of the proposition is immediately known the moment it is presented¹².

c. According to John Rawls, reflective equilibrium has the role of establishing consistency between the agents of particular moral judgments and ethical principles established in this case, the principles of justice, as in a procedural schema guiding rules for action moral, so as to establish the complementarity between the political culture of a democratic society and the normative ideal of person and well-ordered society.

d. The word is usually reserved for the conscious subjective experience of emotion¹⁵.

CONCLUSION

It is unquestionable that the researches of neuroscientists – as the researches of others – are not performed in a neutral way, because they are influenced by institutional interests and economic, political or religious orientation. Sometimes, the frivolous way in which discoveries in neuroscience are published mean they reach the public as self-evident and thus have a strong potential to cause jumping to conclusions.

The problem of consciousness, which for centuries has been the exclusive domain of philosophy, has become a subject of scientific research. Theories about the physical nature of consciousness, defended for example by Damasio, try to demonstrate how consciousness is built into the human brain. The route of the physical nature of consciousness, especially understood by neuroscience as synaptic activity¹⁹, is presented as a strategy for improving scientific and philosophical understanding about mental phenomena. We cannot ignore this process.

Since the brain gives us the sense of morality, providing us with the skills to live in society, it is not possible to enter a discussion about ethics and switch on philosophical discussions about rights, duties, justice and morality without a strong neurological basis.

Throughout this article we have drawn attention to the complexity of understanding the moral act insofar as it is interfered with by measurable and immeasurable phenomena. This evaluation makes us believe that neuroscientific research about ethics opens the door to a better humanity.

Humanity results not only from a very complicated combination of genes and neurons, but also from experiences, values, learning and the influence of socio-cultural life. Each of us is a mystery to himself. Neuroscience can help us understand a number of elements that make up the mystery, but do not eliminate it. It is up to neuroethics to monitor and reconcile scientific advances with human dignity.

REFERENCES

1. Vincent JD. *Voyage extraordinaire au centre du cerveau*. Paris: Odile Jacob; 2009.
2. Renaud M. Do pensamento ao cérebro. In: Archer L, Biscaia J, Osswald W, Renaud M, organizadores. *Novos desafios à Bioética*. Porto: Porto Editora; 2001. p. 266-71.
3. Damasio A. *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. Harvest Books; 2000.
4. Crick F. *Astonishing Hypothesis: The Scientific Search for the Soul*. New York: Touchstone; 1995.
5. Putnam H. *Pragmatism: An Open Question*. Oxford: Blackwell; 1995.
6. Safire W. The but-what-if factor. *Times*. 2002 May 16.
7. Hyde T. *Historia Religionis Veterum Persarum, Eorumque Magorum Ubi etiam nova Abrahami & Mithrae, & Vestae, & Manetis, &c. Historia, atque, Angelorum Officia & Praefecturae ex veterum Persarum sententia. Item, Persarum annus... Zoroastris Vita, Ejusque Et Aliorum Vaticinia De Messiah & Persarum aliorumque Monumentis eruuntur*. Oxford: Oxford Univ. Press (E Theatro Sheldoniano); (First edition on 1700).
8. Spinoza B. *Spinoza's Ethics*. Translated and edited by G.H. Parkinson. Proposition 7 from part 2. New York: Orion Publishing Group, (revised edition October 15); 1993. p. 37.
9. Damasio A. *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Penguin; 2005.
10. Hawking S. *Aos Ombros dos Gigantes. As Grandes Obras da Física e da Astronomia*. Alfragide: Texto Editores; 2010.
11. Dilthey W. *Historia da filosofia*. São Paulo: Hemus; 2004. p. 27.
12. Giannini AJ, Daoud J, Giannini MC, Boniface R, Rhodes PG. Intellect versus intuition – a dichotomy in the reception of nonverbal communication. *J Gen Psychol*. 1978;99:19-24.
13. Rawls J. *A Theory of Justice*. Cambridge: Harvard University Press; 1971.

14. Bealer G. Intuition and the autonomy in philosophy. In: DePaul M, Ramsey W, editors. Rethinking Intuition: The Psychology of intuition and its Role in Philosophical Inquiry. Lanham Md, Rowman & Littlefield Publishers; 1988. p. 201-39.
15. Vandebos G. APA Dictionary of Psychology. Washington, DC: American Psychological Association; 2006.
16. Singer P. Practical Ethics. Cambridge: Cambridge University Press; 1993.
17. DePaul M. Why bother with reflective equilibrium? In: DePaul M, Ramsey W, editors. Rethinking Intuition: The Psychology of intuition and its Role in Philosophical Inquiry. Lanham Md, Rowman & Littlefield Publishers; 1988.
18. Pust J. Intuitions as Evidence. New York: Garland Publishing; 2000.
19. LeDoux J. Synaptic Self: How Our Brains Become Who We Are. Essex: Penguin Books; 2003.

Recebido em: 04 de janeiro de 2013
Versão atualizada em: 30 de janeiro de 2013
Aprovado em: 05 de fevereiro de 2013