The history, not so short, of neuroethics

Francesca Donato[1], Simona Domenica Corrado[2], Annalidia Donato[2], Luigina Volpentesta[3], Giuseppe Donato[2]

[1]Foundation CeRPS (Research Centre for psychiatry and human sciences), Nocera Inferiore; Italy [2]University Magna Graecia, Catanzaro, Italy; [3]Centre for Mental Health, Cosenza, Italy

Abstract. In this paper, the authors examine the discipline recently defined "Neuroethics". In the main of its meanings, it relates ethics to its neurological basis. The awareness of this relationship between the brain and moral choices emerged anciently and progressively in the history of science and philosophy. Given the great development of neuroscience and the variegated articulations of moral philosophy, the term *Neuroethics* is still in search of its meaning.

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Introduction

With Presidential Proclamation 6158 of July 17, 1990, the then President of the United States George Bush defined the next decade, that is the time span between 1990 and 2000, as "The decade of the brain". With such a definition he wanted to emphasize that neuroscience was a fundamental and emerging sector in the panorama of our knowledge. The announcement was followed by great commitments and progress from the world of research, not only in the United States and not only by public bodies. And indeed, in those ten years, our understanding of the brain made enormous progress, perhaps unprecedented in the history of science. The results obtained, however, did not allow, as hoped, to defeat the most important neurological diseases, nor to clarify all aspects of basic research on the functioning of the brain nor those of a more purely philosophical nature, such as its relationship with the mind. An undesirable result of this development has also been recorded by some scholars who have noted the great difficulties of neuroscience, old or emerging, to integrate into an overall vision (1).

Probably the result of that epistemological impetus was the emergence of new areas in neuroscience such as *Neuroethics*. It can be considered a borderline discipline between philosophy and sciences such as the philosophy of mind.

Neuroethics is a relatively new discipline. The term is believed to have been coined by William Safire, in a 2002 article that appeared in the New York Times. However, as Safire himself acknowledges, the term had been in use for some time and had at least been used in a discussion, held a few months before the publication of the article, at the Library of Congress between neuroscientist Michael Gazzaniga and the scholar. by law Henry Greely.

Neuroethics can be understood as the ethics of neuroscience or the neuroscience of ethics.
The first aims to develop an ethical framework on the basis of which to regulate the conduct of scientific research in the field of neuroscience. The second concerns the impact that scientific knowledge has on the understanding of ethics itself (2,3).

Recent reflections and definitions regarding neuroethics show that such a clear distinction is not ever possible and that sometimes the ethics of neuroscience overlap with the neuroscience of ethics: "Neuroethics is a field that systematically explores how neuroscience and neuro-technologies impact our value systems as a society and as individuals. Further, neuroethics explores the value conflicts and tensions between neuroscientific discoveries and society" (4).

Moreover, some disciplines such as neuropathology, neurology, neuropsychology, psychiatry, and neurosurgery are a bridge between the ethics of neuroscience and the neuroscience of ethics. Clinical observations regarding the sites of central nervous system lesions, which began in the nineteenth century and were soon related to behavioral changes in subjects, continue to be used through today's sophisticated neuroimaging techniques in studies regarding the neurological basis of choices and behaviors and morals. On the other hand, the lesions caused by psychosurgery for therapeutic purposes have always generated ethical problems due to the consequences on the psychic level which were caused in addition to the desired effects.

Currently, some of these techniques have been replaced by Brain Neuromodulation which, however, in turn, is not without side effects. Neuromodulation can also play a role in psychiatric treatments by influencing aspects such as empathy that are important from an ethical point of view. Brain Neuromodulation techniques, however, in turn, can be applied from the perspective of the so-called "moral enhancement" (3).

As can be observed, Neuroethics as "ethics of the neurosciences" is much more recent than the "neuroscience of ethics", so this paper will mainly take into account the latter aspect to study the historical development of this discipline.

The aim of this paper is uncovering the historical roots of the neuroscience of ethics beyond the emergence of the discipline of neuroethics. It refers to a historical space in which the philosophical gaze about man meets the scientific one to integrate into the view of a progressive clarification of human nature as an individual and as a social being. Furthermore, we will demonstrate that Neuroethics in its philosophical and scientific aspects can represent an interesting basis for discussion to reach shared moral choices in the field of bioethics.

Neuroethics and Metaphors in Ancient Thought.

Around 530 BC Pythagoras, to escape the regime of the Tyrant Polycrates, fled from Samos towards Magna Graecia where he founded a philosophical and spiritual community in Kroton, which decisively influenced the development of Greek thought. Pythagoras affirmed that the "arché", the basic principle of everything, was the number, not as an immaterial entity, but as a multiplicity capable of generating the universe as a harmony of a geometric and, to a certain extent, hierarchical character. Such divine entities, mainly the first ten numbers, were considered the building blocks of the "kosmos".

Pythagoras, perhaps more due to Orphic influences than those of his alleged stays in Egypt, believed in metempsychosis, which is the theory that a soul can transmigrate from one body to another. This appears as a sign of a dualistic conception of the relationship between body and soul (5). As often happens in the ancient Greek language, the term used for the soul, "psyche" and the root from which it is generated has a polysemic character.

Its derivatives, including "Psychology" and "Psychiatry", can be found in classical philosophy and in mythology. In the current studies on the brain and mind, there is a gradual transition from the psyche to the specified descriptors defined by the Neurosciences (6). Modern philosophy of the mind with its principal theories, the computational theory and the connectionism, may be an important basis in order to understand neuroethics, but its roots lie in Greek thought. In fact, the idea that mental processes are localized in the brain dates back to Alcmeon of Kroton, a physician and disciple of Pythagoras(7). Alcmeon is considered a kind precursor of neurophysiology for having emphasized the relationship between the sensations deriving from the sense organs and the brain.

Moreover, the dossographer Aëtius affirmed that according to Alcmeon the *directing part* is the brain (8). This statement by Aëtius, formally similar to later Stoic thought in identifying a guiding principle, seems to signal the beginning of the link between psyche, brain, and ethics that can be found in Greek philosophy.

Such a link is metaphorically established by Alcmeon himself and subsequently by Plato through two famous metaphors: The body is like a city and the city is like the soul.

Aëtius also reports that according to Alcmeon "what maintains health is the equality (isonomia, literally: equality before the law) of the powers, of the moist and dry, cold and hot, bitter and sweet and the other

ones [opposites] while the monarchy of only one among them causes sickness" (9). The political terminology is evident, as it is also evident that maintaining the balance between opposites is crucial for the health of the organism. Some of these concepts will remain basic in the corpus hippocraticum, influencing Western thought.

The Hippocratic view about the brain and ethics was expressed in the treatise *On the Sacred Disease*: "men ought to know that from the brain, and from the brain only, arise our pleasures, joys, laughter and jest, as well as our sorrows, pains, griefs and tears. Through it, in particular, we think, see, hear and distinguish the ugly from the beautiful, the bad from the good, the pleasant from the unpleasant" (10).

In the Fourth Book of the *Republic*, Plato introduces the concept that the city functions as a soul and the soul as a city. The *rational* soul and the philosophers will have to govern taking into account the real condition generated by the tripartition of the soul itself and the tripartition of the social body of the polis. Such tripartition allows Plato to identify, in the indeterminate complexity of psychic phenomena, the three major motivational centers of individual behaviors, precisely rationality, the aggressive instinct of self-affirmation (thymos), the sphere of desires closest to corporeality (epithymia) (11). Interestingly, in Plato the relationship between body and soul is not conceived in a totally metaphorical way, but in such a way as to form a unified psycho-somatic structure, suggesting a kind of psychophysiology. This unification of soul and body is proposed as a model for understanding the structure of the just and virtuous city - a sort of ethical macro-individual with his own body, his own soul whose parts are linked by a relationship of empathy that seems to prefigure the perspective of the future Scottish naturalism (462b-d),

Surprisingly, this line of thought concerning the triad *brain - psyche - ethics* was interrupted by the reflection of Aristotle who, through Galen and Avicenna, far beyond the Middle Ages, put forward his theory that placed the guiding principle and the basis of human neuropsychological functions in the heart, reducing the brain to an organ with the function of filtering and cooling the blood (12).

We believe, however, that over the centuries another naturalistic tradition has brought within itself characteristics of neuroethics.

Christian naturalism and sentimentalism

As David Hume's coffin was carried out from his house, one man shouted, "Ye ken he was an atheist!" To which another responded, "Aye, but he was honest!". Certainly, such people were not reflecting on the fact that Hume's moral philosophy had a central element in common with Christian morality. This element is called "sympathy" or, as it was preferably later defined, "empathy".

It is a psychological factor that can be grasped by the observer of human nature, but also by any person who, is accustomed to experiencing it, and pays attention to it.

What must be taken into consideration, however, from a philosophical point of view, is that the idea of finding the basis of behavior and moral choices in our mental processes can be traced back at least to the Scottish philosopher Adan Smith (1723-1790) and David Hume (1711-1776). Their vision of ethics can be defined as naturalistic and, as it focuses on the "passions", it is called "Sentimentalism".

Terms such as *sympathy* have been used ever since to identify fundamental "feelings" in the field of morality. In his Treatise on Human Nature, Hume states: "*No quality of human nature is more remarkable, both in itself and in its consequences, than that propensity we have to sympathize with others ...*" (Section XI, Part I, Vol. II).

Terms such as *sympathy* or *empathy* remained at the basis of the naturalistic view of ethics.

He outlines the various natural virtues and by identifying among them a basic human tendency which he calls *sympathy* and defines it as an inclination to share the sentiment of others. Hume recognizes two aspects: sympathy as an *emotional contagion* and as *imaginative participation*.

Hume, establishing a relationship, recognizes two components: the first is the emotional contagion which is the elementary, more instinctive aspect, that allows access to passions and emotions causing the transmission in an immediate and automatic way between human beings. Hume tries to make us understand the concept better by providing some examples, such as when, citing Lucretius's de Rerum Naturae, he deals with the participation and involvement of some people who witness a shipwreck from a rock.

The second component that characterizes the concept of sympathy is more complex and does not operate as an immediate and automatic force but in an indirect, mediated and above all needy way.

of the imagination. In fact, the difference between rational and irrational forms of sympathy is based on the imagination, understood as a continuation of the process of communication and participation with the emotions and passions of others. This aspect of sympathy is what Hume considers most important because it generates the space for the intervention of moral feelings that will evaluate the conduct, allowing discernment between the virtuous ones and the vicious ones (13).

Hume's position on the basis of morality is related to his assertion that no "ought" can be deduced from an "is", which identifies the so-called *naturalistic fallacy*.

The essential aspects of Humean moral philosophy are currently central to current studies concerning the neurological basis of ethics. Some authors have tried to attack the concept of *naturalistic fallacy* by asserting that it refers to a rejection of the derivation of values from facts and not of an "ought" from an "is"; others have referred to an alleged "anti-naturalistic error" by Hume which would describe the *values* as "unnatural facts". A third group of authors underlines that all moral arguments boil down to moral intuitions and unraveling the causal mechanisms of these intuitions is the place where the "is" of neuroscience and the "ought" of ethics can meet. Patricia Churchland's work establishes a neurobiological platform of morality where our environment interacts to generate moral intuitions on which our ethical judgments are based, such a platform might be similar to neurolinguistic brain structure in Noam Chomsky's theory (14-15). The hypothesis of the existence of universal moral grammar (UMG) is specifically related to language by research in the field of cognitive psychology. Such an interesting approach needs new data to corroborate the hypothesis which will certainly be provided in the coming years (16).

In the most ancient Christian tradition, in controversy against the alleged formalism of the Jewish tradition, the believer is urged to go, in his own moral choices, beyond the deontological vision. Human natural feelings such as compassion and attitudes of empathy are called into question for this purpose. In the gospels, terms derived from the Greek root "σπλαγχ-", are indicative of empathic behavior both for Jesus Christ (Mk 1, 41) than for good people which spontaneously make the will of God (Lk 10, 30-36) (17-18). This tradition that has points of contact with Hume's sentimentality has remained intact in Christian thought through the centuries, well represented for example by Francis of Assisi up to the present day with the references of Pope Franciscus (19-20). On the basis of these considerations, it is possible to think that a naturalistic vision could be a useful common space for discussion between secular and religious positions in the solution of bioethical problems also concerning problems of a neuropsychiatric nature.

The observations of Hume, and of ethical naturalism in general, seem to be supported by recent experimental data that outline real neuroanatomy and neurophysiology of morality.

Recently, Functional Magnetic Resonance was used to test subjects in the act of simulating moral decisions, showing that the brain areas associated with emotions are the first to become active. If the intuition of Kant and Rawls that justice is rooted in a sense of fairness and impartiality is true, this sense is not the application of a rational principle, but rather the result of an emotional processing that validates the theses of moral Sentimentalism (21). In this type of studies, the importance of brain structures such as the insula and the cingulate gyrus as the basis for the implementation of affectivity linked to moral behaviors was later confirmed. With regard to empathy, the function of the anterior cingulate gyrus and the anterior insula was highlighted (22).

Free Will

Folk psychology is predominantly rooted in the thought that human actions result from free choices. However, both common sense and philosophy recognize the existence of determinism that irremediably conditions the facts that make up our world. This conditioning can be considered partial and compatible with individual freedom and characterizes the position of the so-called *determinists' compatibilists* or total

characterizes the position of the *determinists' incompatibilists* (23).

Currently, most scholars are rooted in deterministic compatibilist positions, thus admitting the existence of an imperfect free will, that is, of a partially conditioned human will. Only a few authors, like Sam Harris, from the findings of neuroscience, argue that we are not free and freedom is an illusion (24).

The historian of philosophy Jean-Pierre Vernant had identified in the thought of the Greek tragedians a position that we might consider to some extent similar to that of contemporary compatibilists. He described in the antique tragedies an "ébauche" of will, a sketch; in fact, the Greeks used various terms such as hekôn, proairêsis, èthos. Not a will as we can identify in Augustine, Descartes, or Kant, but something more indeterminate and dependent on many factors, capable of expressing itself in various forms. All this, certainly was not the result of a lack of precision, but on the contrary of an enormous capacity for psychological introspection (25).

The problem of free will in a moral and religious key has reached dramatic aspects in Christian thought. In this context, free will is linked to the mystery of evil and sin. In response to the "heresy" of his contemporary Pelagius, an Irish monk according to which man's will is free and he can save himself by virtue of his adherence to the Gospel and its precepts, Augustine emphasizes the gratuitous nature of Grace which alone can lead to the salvation of man corrupted by original sin. The doctrine of predestination connected to this vision would have been resumed centuries later by Martin Luther in the battle against Erasmus of Rotterdam expressed in the two works "De libero arbitrio" and "De servo arbitrio" (26). These contrasting positions left their mark in future centuries in the landscape of the various Christian denominations.

The Christian religious and moral dimension will one day deal directly with neurology and brain development in primates and humans. The Jesuit philosopher, paleontologist and geologist Pierre Teilhard de Chardin (1881-1955) built his visionary and ingenious doctrine in an evolutionary key. He underlines the centrality of the appearance of psychic life in the universe and of the brain in evolution. The development of the brain in primates and apes is the most relevant event for Teilhard. The man, the "key to the universe", opens the door to the mystery of its author. Thus, was born the religious sense and love that corresponds to a new psycho-moral energy of a free and conscious subject (27).

In 1983 an article published in the journal *Brain* appeared to provide experimental proof of the absence of free will (28). Libet and coworkers planned an experiment in which the subjects had to make a voluntary movement, noting the moment in which they had made the decision to implement it. The datum that was considered relevant was the appearance of an electric potential that could be recorded through the subjects' scalp and preceded the awareness of wanting to make the movement by 400 milliseconds. Based on this experiment, many thought that consciousness would be informed of the "decision" and not create it. However, the preparatory potential of Libet's experiment may have more meanings and nothing obliges us to consider it an unconscious command prior to awareness of the decision. Therefore, as we have already pointed out, currently most scholars can define themselves as *compatibilists* (29).

Discussion

In the previous paragraphs, we have seen that the problems of ethical nature have always been linked, with relation to the scientific knowledge of each age, to the psychological dimension and the structures of the human nervous system. the problems of ethical nature have always been linked to the psychological dimension and to the structures of the human nervous system. The term *neuroethics* is just over twenty years old, but it is difficult to say what is the precise historical moment in which an attempt was made to relate man's moral choices to his brain. The greatest difficulty, on the other hand, is perhaps that of relating a finite system such as that of the structure and physiology of the nervous system with an infinite system that is that of the moral dimension of man. Then, perhaps, *neuroethics* can be partially assimilated into mechanisms of neurolinguistics. Morality shares with languages that it is too complex to be learned by trial and error, and it is too variable to be genetically programmed. Perhaps we are not born with specific social norms, but with

a learning program that tells us what information to absorb and how to organize it. There is an analogous learning program for language, so a moral ability could be analogous to a linguistic ability (30).

Environment and various circumstances are one of the many factors that influence the onset of psychiatric illness. Controlling the methylation of the individual's genes is a well-known mechanism by which the environment acts on humans (31).

Moreover, in the history of science and philosophy, rationality and emotions have been placed as the basis of moral action, giving them a different weight. We have seen that this dates back to the origins of the Greek civilization. Western thought has always reflected on these problems through Christian religious thought and through philosophical and scientific ones. What these reflections have in common is that *man* is an object of study and reflection. In some cases, it may be surprising that philosophers, wrongly considered atheists like Hume, can find themselves in agreement with some ancient cornerstones of Christian thought. But to be surprised by this is wrong in the same way that it is wrong to be surprised that Teilhard inserts the evolution of the brain into his immense theological vision.

In conclusion, we can say that the term "Neuroethics" defines a field of philosophical and scientific interest in continuous expansion and renewal, but also a field of interest that has deep and ancient historical and philosophical roots.

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Corresponding author:
Francesca Donato
Foundation CeRPS (Research Centre for psychiatry and human sciences), Nocera Inferiore; Italy
email: fninadonato@gmail.com