

SCIENTIFIC RESEARCH, TOWARDS A GREATER AWARENESS OF CONSCIOUSNESS

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Imagine being in the presence of two giants of modern thought, cognitive neuroscience and philosophy of mind. The discipline and logic that characterize their methods of investigation, make that these fields of research are examined with care and attention . But what can they answer if we put the question: "What is consciousness?".

We could imagine the unfolding of a situation in which both parties , the little man who asks , and giants , look at each other confused.

Emily Dickinson , writes: "The brain is wider than the sky , For put them side by side , The one the other will include With ease, and you beside."

Although illogical, it seems that a poet of the late nineteenth century have clearer ideas about a possible definition of consciousness.

The importance of putting the slide of consciousness, under the watchful eye of research, is demonstrated by the disciplines that are wondering about it. Psychology, neuroscience , medicine and philosophy, from days gone by, they try to understand the ontological sense and the structural and functional components of self, in order to answer the questions of all time, namely: "Who are we?" and "Where are we going?", in other words, what is the human being and how it works.

There are many theories that attempt to move closer to a comprehensive definition of consciousness.

Among these, on the basis of its validity, the Darwinian theory has inspired what is the proposal of the U.S. biologist Gerald Edelman, about the evolution of consciousness.

According to the Nobel Prize for Medicine, through a mechanism of re-entry, the brain would make use of synaptic plasticity and epigenetic processes, in order not to lose the race to evolution.

The intergrazione studies G.Edelman with those of neuroscientist Antonio Damasio, allowed to consider the work of the central nervous system in place in relation to the individual with the environment in which it is inserted. The organism-environment interaction, in fact, would have

reason to be, thanks to two levels of synchronization : the dyadic and the group level.

The first level would be handled by the limbic system through the simple emotions, that inter-individual reported physical activity through activation of visceromotor.

The second tuning system, that group all, take its starting point from the frontal cortex LMOs; at this level, the simple emotions are associated with maps of gestures and postures; being inserted in a complex situation, would become complex emotions, that is, resulting from processes of thinking and reasoning.

The integrated processing of the two kinds of tuning then, would be the result of innate predispositions and allow the individual to understand the intentions of conspecifics by means of mirror neurons.

The normal social and emotional functioning of an individual, not surprisingly, is based on elements like activity of mirror neurons, signaling the emotional value of a stimulus by the so-called somatic marker and the individual's ability to attribute mental states to others, intentions, beliefs and desires, faculty called "theory of mind" (TOM).

According G.Edelman fact, the evolution of the human brain provides a job to divide the objects into categories experienced. The process just described, it would be necessary to the proper functioning of the individual, from the fact that in reality we are inserted in a world in which the objects have no "labels" real.

In detail the man would make use of a faculty called "self": section brainstem deputy to the detection of internal stimuli repository of information that allows the body to ensure himself the internal homeostasis .

There would then be a so-called "non-self " , located in the thalamus - cortical . At the "non-self " has the duty to detect external stimuli and their subsequent categorization aimed at adaptive purposes in the environment in which the individual is engaged.

Knowing and understanding in the field of experimental and clinical, the internal organization of the individual described above , you can easily understand its daily operation, and to protect, if necessary, this process.

The work of this fascinating machine that is the brain, however, is not limited to this , and moves on.

It seems that, like any living system, the brain has gone to a meeting functional evolutionary development. Neuroscience research then shifts his watchful eye, to a ontogeny of mind. The process of categorization, used by

the brain, is divided into hierarchical levels: perception, simple emotions, complex emotions, language, consciousness.

The consideration of this organizational process, allows to have a critical eye towards different cognitive-behavioral deficits defined at this point as secondary phenomena with alterations of one of the various levels. It follows that, in addition to the alteration of functions handled by the specific broken level now, within the framework of etiological these diseases, there will be a release of the functions of the structures hierarchically below.

In the human brain, it is possible to differentiate three levels of evolution, appeared at different times. The homeostasis brain, the most archaic, allows a perceptual categorization using vegetative - sensorimotor schemas. The evolution then proceeds with a limbic brain, which allows a simple categorization of emotions. The evolutionary tree, he sees on the highest branches the neocortical brain, which manages and processes the complex emotions, linguistics and consciousness.

We are here, to an exceptionally refined and very "Human" . At this level of processing, can be investigated the politician, the man who thinks himself, the artist, the one who puts the big questions : "Who am I and what am I doing here?", The doors are open to revolutionary man who poses himself as an object of study.

With the language and consciousness, in fact, it comes to the ability of a combination of concepts and the foundation of a new world, one of the meanings. Of fundamental importance is the concept of socio-emotional intelligence, this term is meant the ability to understand the feelings of others, once the unfolding of effective interactions and functional.

The study of brain mechanisms, allows us to trace the evolutionary path of the nerve cells during their embryonic stage and consequently understand the process of normal and pathological development of an individual placed in a time and space, allows us to understand the significance of the inputs epigenetic and mechanisms of memory and learning that manage the structural and functional component of the nervous system.

Based on what has been said so far, it is clear that to date, the cognitive sciences that attempt to explain the mind and consciousness, remain faithful to what Charles Darwin meant by saying, "The Descent of Man is now demonstrated. Metaphysics must flourish. He who understands baboon metaphysics contribute to more than Locke."

The research proceeds effectively, and after his theories, G.Edelman relies on the collaboration of Giulio Tononi, a psychiatrist and neurologist.

This association brings to light to be the Integrated Information Theory of consciousness (IIT), one of the most valid theories designed to increase understanding of consciousness.

In the book "Galileo and the photodiode" G.Tononi begins to lay the foundations of his theoretical approach. His reasoning is based on evidence that some parts of the central nervous system does not appear to be directly involved in the management of consciousness.

G.Tononi examines the component that neuroanatomical and neurophysiological.

As regards the former, notes that the thalamocortical system is made up of more than 20 billion neurons, weighs about 1400 grams and has a mass of about 77% of the SNC . The cerebellum however, compared to the first district considered, would have a much higher number of neurons, but lower weight and mass.

In examining the second component, Tononi focuses on the phases that unfold during sleep, as these conditions are characterized by lack of altered activity of consciousness . The alternation of sleep-wake it allows you to observe that consciousness can "disappear" without that there are anatomical changes and pathological conditions.

From the above considerations regarding the evidence of neuro-anatomy and neuro-physiology, it seems legitimate to conclude that consciousness depends on changes in functionality in some areas and not by their specific structure in IT et nuch.

From experimental studies, therefore, come to the conclusion that the area thalamus - corticulae, manages the activities of self-awareness, thanks to a specific kind of organization between nerve cells that make up the area.

Tononi explicit the relevance of its experimental research, proposing an exercise of imagination that lies at the heart of his theory describes the fundamental difference between a naturally intelligent and an artificial one. The experiment requires that a human being, is not chosen at random the mother of modern science, Galileo Galilei ,and a photo diode, a diode photodetector, indicate when it shows whether or not a light onto a white screen. Both systems are able to complete the job in the best way. Galileo however, possesses a brand in more, it is able to discriminate the color of light that is presented and make note of this difference explaining it to the

examiner. The fundamental difference between its subjects of the experiment therefore, is the amount of information which they can process.

The exercise described above, demonstrates the relevance of an experimental study aimed at understanding the mechanisms underlying consciousness. The validity and the realization of such a path, provides for the intervention of different disciplines. The theory of Tononi fact, is enriched by studies of the two engineers, C.Shannon and W.Weaver, which summarizes all approaching the concept of information, to that of entropy.

Entropy is the amount of uncertainty in the system under consideration. The concept can be understood starting from the theories of probability.

The authors develop their reasoning asking for help to the two sides of a coin whose launch will be able to drop the coin on the side of the head or that of the cross. We will then create a situation of uncertainty, in which the two possible outcomes, heads or tails, are equally probable.

A similar situation is described between Galileo and the photodiode: the two systems are in a relation of equi-possibility because they can choose whether to answer "light" or "dark".

Is at this point that the ability to process more information of Galileo makes the difference: this will have the ability to provide all the possible answers that can and will give once placed in front of a screen that presents colored lights. Imagine proceed with the trial and wished to replace the photodiode with a camera.

The capacity of the new artificial system is greater: the camera has a resolution that discriminates easily a light on the other. By multiplying the number of pixels of the camera to the number of possible responses: "dark" or "light", the estimate of the work done by this object is equal to that of the photoreceptors in the retina of Galileo.

The theory of consciousness as integrated information, however, does not fall; Galileo is significantly different even from this high-resolution camera. The research in the field of neuro-psychological allow us to prove it. Cut into two equal parts at the camera, his performance does not change. Galileo subjecting the same procedure, you would have a dramatic result and questionable whether it would lead to a neurological condition known coma "split brain".

The scientist would begin to have double consciences and in conflict with each other. The fundamental difference between the two systems, therefore, is not in the ability to encode the input is received, but in the fact

that the camera is a unique system and stable, while Galileo is a system that can build a large amount of possible states.

Through research on the field and then, it changes from evaluating the conscience as the amount of information that a system X is capable of receiving from a system that sends output, to consider it in terms of the amount of information within the same receiving system.

The theory proposes that G.Tononi has a huge scope in terms of understanding of what is consciousness, but also within a philosophical discourse aimed at understanding the experience of man in the unfolding of its existence.

It is in the world of neuroscience research that makes use of visualization techniques structural and functional central nervous system, in order to understand the normal and pathological brain function.

In these terms, we can think about a proliferation of scientific research, and most thorough diagnosis of abnormal conditions. In a speech aimed at the understanding of consciousness, develops the ability to observe with an eye more alert and attentive, the neurological conditions such as coma, vegetative state, locked-in syndrome but also degenerative diseases such as that of Alzheimer's disease. This reality pathological provides for the opening of the patient's mind to a world of nonsense, and a gradual impairment of that which is yet another unknown factor that science will have to solve, consciousness.

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