

CONSCIOUSNESS – INFORMATIONAL PERSPECTIVE¹

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Abstract: The article is the result of successive attempts to theoretically integrate several perspectives in the study of the complex phenomenon of consciousness. It concerns the informational perspective, but also the structural, functional and the action-focused perspective. Each perspective is the result of an integration of specific research, but also includes interdisciplinary ones. Because the results of using several types of methods are emphasized, the methodological perspective of study also matters. Thus, the construction of a meta-integrative research is described. The paper summarizes the main trends developed in the field, illustrating that from divergent theories one can select convergent contributions forming the source of a coherent meta-theoretical whole. It is argued that a science of consciousness is possible, with its theoretical and meta-theoretical levels. The informational integron is then introduced, the other three integrons being included in a meta-integron capable to gather all the perspectives practiced in the study of consciousness.

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INTRODUCTION: DIVERGENCES AND CONVERGENCES BETWEEN THE VARIOUS APPROACHES TO THE STUDY OF CONSCIOUSNESS (BIOLOGICAL, PSYCHOLOGICAL, SOCIOLOGICAL AND TECHNOLOGICAL)

Both tendencies – divergent and convergent – develop with the attempt to explain the emergence of consciousness through biological evolution, respectively through the formation of subjective experience, seen as relevant to consciousness from a psychological perspective. Thus, on the one hand, it is considered that consciousness appears in organisms endowed with a complex brain and, on the other hand, it is claimed that all living beings have a minimum of subjective experience.

More specifically, the variety of theoretical positions and methodological approaches is mirrored in different but ultimately convergent conclusions. Thus, Henri Ey describes the transition from sensation to knowledge and then to consciousness, even in the case of the amoeba, and Roger Penrose argues that if consciousness is supported by the reticular formation of the brain, fish, frogs and snakes would be conscious beings (Penrose 1996, 414). More recently, Peter G. Smith shows that subjective experience and consciousness have appeared several times, in different phases and on different branches of the biological evolution, marked by successive informational revolutions (Smith 2017, 124).

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Other scholars make a clear distinction between the subjective experience and consciousness, but consciousness continues to be understood differently: part of them considers that the subjective experience is a stage in the emergence of consciousness, while another part postulates that consciousness is only a form of subjective experience, calling it “conscious experience”.

Smith also states that the first phenomena of consciousness are related to internal states, not to external events, i.e. to the recorded and used information (Smith 2017, 126). Other scientists and thinkers deepen this direction of research considering that the cognitive subject itself is a source of knowledge, and consciousness is what makes knowledge possible. In this regard, however, again, different orientations appear: on the one hand, the experience of awareness is thought to progress from the perception of reality to the representation of the ego and then of the self or the path traveled is represented as having the exactly opposite sense. Even the two mentioned concepts of psychology and the role of those experiences in the process of self-awareness constituting are seen differently. According to Carl G. Jung, the only form of existence known immediately is the psychic one, seen by him in a more general way. According to others, the self is seen as gradually forming and developing distinct components, such as sensations, feelings, and self-awareness. Authors like T. E. Feinberg and A. Damasio follow up this research topic by studying “How the feeling of the self develops?” The ego, in turn, is understood as a series of connected conscious experiences, not as a central and permanent psychic state. At this point, the paths leading to the explanation of consciousness break up again: Stanislav Grof, among others, speaks of the continuous search for the self, while Albert Einstein emphasizes the importance of freeing the person from his or her own self. Regarding the means of approaching these objectives of cognition, John Dewey emphasizes the role of internal language, while Lev Vygotski highlights the role of externalized language.

However, the path of biological research also offers new data that, far from giving way to reductionist interpretations, in fact broadens the perspective of studying consciousness. Thus, while some authors try to make generalizations meant to facilitate the research, stating, for example, that the same brain map is present in three large biotic genres (fish, birds and mammals), others argue that it is possible to exist inclusively a *multiple consciousness* in the case of the same living being. This finding is based on the fact that, for example, the octopus has, in addition to two brains and three hearts, even eight nervous systems, more neurons being in the arms than in the brains (Smith 2017, 69, 96, 154).

The idea of the close and exclusive link between the brain and consciousness – the basis of the biological perspective in explaining consciousness – is strongly challenged by authors such as Searle and Dennett, who show that the study of the brain will not solve the theoretical problems regarding consciousness. However, biological research is reviving with the development of neuroscience, especially since the latter is strongly supported by technology or even takes technical forms such as neuroinformatics and neurotechnology. More recently, in order to explain consciousness, researchers have remade even further the path of evolution,

regressing to the physical level of existence. But an intermediate phase of the research, which fills, in a way, the gap between the biotic and the physical level, was the orientation that we will here call the functionalist one. Thus, Roger Penrose, proposes the microtubule hypothesis, characterizing consciousness as the effect of quantum gravity in microtubules in the brain. In turn, Ray Kurzweil reuses the platonic theory of recognition and describes a series of ideal experiments suggesting that the brain contains a hierarchy of pattern recognizers in the form of millions of recognition circuits that could be reproduced through technical methods in order to create artificial intelligence (Kurzweil 2012, 38 and 128). The repeated attempts of Bernard J. Baars, followed by Dehaene and Naccache, to show how consciousness works can be framed in the same research direction. Consciousness occurs when the necessary information is disseminated in all areas of the brain, not only in the restricted workspace suitable for solving a specific problem: it is the one that integrates them into a coherent architecture. This intellectual construct coined by B. J. Baars in 1997 is known as the global internal workspace theory.

The physicalist orientation in the study of consciousness aims at relying its explanation on the discovery of its deepest roots, but sometimes reaches statements that, taken in themselves, are not considered acceptable by all members of the scientific community, although they have the advantage of leading to some technical approaches of the problem. Thus, Danah Zohar tried to impose the idea that there is an inferior but interior quantum component of consciousness, in her book *The Quantum Self* and Ray Kurzweil defined consciousness as an emerging property of a complex physical system. In turn, Max Tegmark takes into consideration physical states which make up systems that can integrate, store and process information, such as gas, liquid and solid, but also memory, computer and consciousness. He analyzes some of their qualities, his finding being that all these qualities are present together only in consciousness (Tegmark 2015, 240). In the same group of theories can be included that coined by Richard Amoroso, who participated in some activities of the Romanian Academy, one of his works being translated in Romanian under the title: *What Consciousness Is? Steps in the Cosmology of Mind* by members of the Interdisciplinary Research Group of RCHPHST (Iosif Adrian, Nicolae Bulz, Alexandru Giuculescu, Călin Hilohi, Corneliu Milo and Laura Pană). In the footsteps of John Eccles, who used the name *psychon* for the quasi-particle which represents, in his vision, the unit of the mental experience, Amoroso appreciates that the specific carrier of consciousness is the *menton*. He also gives a partial list of particles possibly implied in this cosmology, these being both bosons and fermions (which have the suitable properties). Among the mentons are mentioned the so-called corticons, excitons, phonons and solitons, but also noeons. The psychon would be, in this context, a bundle of noeons. (Amoroso 2000 a, 42). As psychological, neuropsychological and neurotechnological approaches that lead to technical achievements related to consciousness, there can be mentioned first of all those that dealt with the study of human and artificial intelligence and consciousness, and sometimes even with consciousness engineering.

In that regard, we recall the pioneering work of Marvin Minsky who described the cognitive system as a complex society of entities and processes called “agents” which produce together the main abilities currently attributed to the mind, such as intuition, intelligence and imagination and which work together to achieve a common goal (Minsky 1986, 17–18). Today one can also add some Romanian results of applying an engineer perspective on the mind with effective technical means by which in an artificial system, clusters of neural networks and computing nodes / specialized functional modules / agents are built in order to perform various tasks (from speech to action), agents characterized by autonomy, reactivity, productivity and social skills (Dumitrache and Arsene 2017, 76).

From the technical direction of the research aiming at deciphering consciousness and more, to implement it in the so-called intelligent machines (virtual or robotic ones), the most abstract attempts will be illustrated here, such as the outstanding orientation towards creating *Machine Consciousness*. In this context, abstract but functional models of some processes that imply consciousness were created. Thus, as a basis for hastening the emergence of machine consciousness, the two-level model of concurrent communicative systems was built by Pierre Bonzon, starting from an analogy between the abstract, syntactic properties and the topology of synaptic connections, by using π -calculus (Bonzon 2011, 8–9). He illustrated the application of this method by language implementation in virtual machines meant to communication in order to pass from the reactive behavior to the dialogical one, specific to conscious beings.

Modeling of some activities, such as conscious reflection is tried by other authors starting from the idea that “different entities in the universe manifest different kinds of consciousness or awareness”, thus assuming that consciousness is manifested at each level of existence – physical, biotic and social. Among them. Ben Goertzel uses autoreferential mathematical structures (hypersets) in searching the adequate model of the reflectively conscious experience, which can be achieved, in his vision, by successive hyperset-type constructs (Goertzel 2011, 34).

Realistic rationing techniques are proposed for robots with advanced abilities that can move from representing spaces, objects and actions to establishing motives and goals, by using mind maps and stepwise reasoning, which equate to becoming aware of a problem and to select an adequate action (Mastrogiovanni, Scalmato, Sgorbissa, Zaccaria 2011, 100–102). Obtaining consciousness by integrating cognition and emotion through universal conceptual space using, in which all possible kinds of human conscious states can be mapped is proposed by other authors, for modeling of natural and artificial consciousness. Emotions and feelings are considered independent functions that can be integrated with cognitive ones through brain mechanisms, in this context being argued the superiority of the proposed model over the inter-subjective validation experiments (Pereira and Almada 2011, 130).

The scientific literature dedicated to consciousness does not lack studies that approach it from a social perspective. Some of them are present in Romania through the works of Mihai Drăgănescu, well known by his concerns for the *knowledge society* and subsequently for the *society of consciousness*. In the volume dedicated by the

fellow academicians to his entire activity, his response can also be read. In this context, he refers both to the possibility that in the universe, on the scale of the animal kingdom “mental beings much stronger than man” can exist, and to the *social consciousness* “without material support” or “partially artificial” (Drăgănescu 2004, 256).

Today there is also a whole scientific movement of studying the *social mind*, rather from the perspective of social psychology. However, the newest concern is an institutional one, endorsed by the European Commission. It is called *Collective Awareness* and is, at the same time, an EU initiative, project and platform for socialization and communication². The domains that can be accessed on this platform are multiple, each offering a number of links. Such domains are: Doing things together mindfully and promoting privacy and inclusion needs; New models for economy, society and democracy; Improving public services, urban environment, internet-based open data ensuring (12 links); Providing key technologies, ensuring free access to knowledge and connecting people (4 links). The platform also hosts studies, conferences and think tanks on ICT and sustainability etc. (7 links).

Such kinds of topics are also debated on a global scale, once it was discovered that “the state of our consciousness is the main problem that underlies all others”. To the question launched by Ervin Laszlo, if there is a chance of a major change of consciousness, Stanislav Grof answers: “I am convinced that there will be a profound transformation of individual consciousness and this will increase our chances of survival, if this change will occur in a quite large population segment and in a fairly short period of time”, the human personality being the one that could mediate such a transformation (Laszlo 2009, 16).

WHAT ARE THE CHANCES OF DEVELOPING A THEORY OR EVEN A SCIENCE OF CONSCIOUSNESS?

The scientific study of consciousness did not give a scientific theory of consciousness, said Donald D. Hoffman in his article on consciousness and the mind-body problem. (Hoffman 2008, 87–120). More specifically, David J. Chalmers showed that contemporary sciences such as neurobiology or cognitive sciences failed to explain how and why mental events emerge from physiological occurrences in the brain. That is why he proposes a completely different solution to the problem, namely, the understanding of conscious experience as an independent way of being, similar to physical properties such as space, time or mass, which manifest themselves at the fundamental level of existence (Chalmers, 1996). In his highly acclaimed book, Larry Dossey laments the fact that “science does not know where to stop: it has attempted a double murder, eliminating first the self and then the consciousness” (Dossey 2016, 201). He argues that the idea that the conscious, the preconscious, the subconscious and the unconscious, as well as the collective conscious and unconscious are subdivisions of the mind is not acceptable either.

² Collective Awareness Platform at <https://ec.europa.eu/digital-single-market/en/collective-awareness-platform-sustainability-and-social-innovation>; last access: October 25 2021.

All the less convincing is Francis Crock's opinion that mental activity is equivalent to the behavior of a set of nerve cells, as well as the even sharper statement attributed to him, according to which "we are just a bundle of neurons". In turn, Marvin Minsky shows that the mind is what the brain does. He also believes consciousness can be identified with abstract thinking of the highest level.

Of course, there are also adequate responses to "challenges" such as the ones above. Thus, Charles Taylor distances himself from them, saying that "The brain is a biotic structure, while we are interested in consciousness". For his part, Carl Jung argues that "it is absurd to assume that existence can only be physical" and Roger Penrose states that "any physical theory that does not make room for consciousness fails to accurately describe the world". John Eccles finds a Solomon-like solution: "We are spiritual beings in the spiritual world and material beings in the material world". Together with Karl Popper he gives his decisive verdict when they title the jointly edited book *The Self and His Brain*, in which the link between brain structures and processes, respectively mental states and dispositions are discussed.

The reductionist perspectives are receiving not only declarative or implicit, but also explicit and meticulous responses from other scientists and philosophers. Since 1986, Patricia Churchland Smith showed, by her most representative work, that a unified science of the brain and mind is possible. Although her sharp statement that "in reality there is nothing specific to call mind" could be categorized as reductionist, it must be said she reached this conclusion by α – studying the results of several experimental researches and β – integrating the conclusions of some competing theories on the topic, what entitles her to conclude that she actually achieved an "inter-theoretical reduction" (Churchland 1986, 278).

However, her so contested statement can here receive an appropriate reply: by reality she understands only the material reality which can be perceived by natural living beings and by those robotic, artificial ones. But reality is more complex and comprises inclusively the ideal reality, which can also be an objective ideal reality, such as that made up of scientific truths generated by/in the human mind, which is, in fact, a system of activities. These activities are virtual ones, but can cause actual changes in the material objective reality. The following table can illustrate the richness of the forms and levels of reality from the perspective of the Philosophy of Science.

The internal structure of ideal reality and its components	
Objective components	The mental environment Mind as a system of activities The theoretical and meta-theoretical level of cognition The conceptual model in use within the scientific community The virtual network of scientific research
Subjective components	Motivations of individual/team research in progress The finality of various personal concerns Professional goals and projects, relations and communication Social and professional prestige Interiorized cultural models

1. The ideal reality that consists of and is made up through scientific activity

Consciousness is also often minimized, not always with this intention, but to highlight research results that focus on some “precursors” of consciousness such as sensation, perception and representation, as well as the full range of cognition forms and levels. Thus, Baars, but also Dehaene and Naccache consider that a small part of the processes that take place in the brain become conscious. In a hyperbolizing formula, Dennett says that we are all “metaphysical zombies” (Dennett 1991, 406), but his statement is supported, for example, by Peter G. Smith, who notes, during some scientific activities, that the whole body participates in the processes of awareness, some creatures even having “a body with endless possibilities” (Smith 2017, 65). Benjamin Libet in turn mentions, in his book on the temporal factor in consciousness, that movements of the body are signaled in the brain before the conscious decision is made in problematic situations. Some clinical psychiatrists confirm that to a large extent the body’s response to environmental demands is unconscious or prior to conscious decision.

On the other side, some scientists distinguish different levels of consciousness: up to 54 levels of empirical consciousness are inventoried, as well as other 40, of transcendental level, by authors inspired by the Indian tradition of the Vedas. Among them, Amid Goswami also describes some dimensions of consciousness. A series of authors who belong to the European intellectual tradition rather by their speculative works, remain in the spotlight of scientific and philosophical research, such as Pierre Teilhard de Chardin, who proposed the study of the noosphere generated by the *Human Phenomenon* or David Bohm, who speaks of the “consciousness of mankind”, raised by participatory thinking (Bohm 1994, 4). New authors also appear, such as Larry Dossey, who tries to impose the idea of a unique mind. Other authors, such as Dorothy Cheney and R. Seyfert, in their work *Baboon Metaphysics*, based on experimental but unconventional research, speak of an “inclusive non-local consciousness”. Moreover, although a science of consciousness has not yet been developed and accredited, a new science of consciousness is announced by D. Miller, Ch. Berner and C. Draut, who consider a nonphysical reality as support of consciousness.

Exploring the multitude and diversity of the literature dedicated to the psychic phenomenon, which also includes consciousness, shows that studies focused specifically on consciousness are relatively rare compared to those dedicated to the brain, mind and knowledge, as well as to those aimed at transferring the properties that characterize them into artificial entities. Among the philosophical and scientific works directly dedicated to consciousness are those designed by Daniel Dennett – *Conscious Explained* (1991), David J. Chalmers – *The Conscious Mind* (1996) and the volume co-edited with others – *Towards a Science of Consciousness* (2000), as well as Francis Crick and Christof Koch – “Consciousness and Neuroscience” (2001). Among the Romanian philosophers of science, Mihai Drăgănescu stood out in this sense. He wrote meta-theoretical works such as *On the Structural-Phenomenological Theories of Consciousness* (1997) and *The Interdisciplinary Science of Consciousness* (2000). A synthetic presentation of his contributions in this matter was made (Pană 2012, 13–45),

as well as a survey of the progress from studying consciousness to conceiving the Society of consciousness (Panã 2013, 31–47).

PERSPECTIVES IN CONSCIOUSNESS STUDYING: A SYNTHETIC APPROACH

Over time, scientific, philosophical and technical ways have been practiced in the study of consciousness. In the following some of the perspectives from which consciousness was approached will be explored in their general features, so that the proposed and sustained perspective can be more precisely circumscribed and presented. The selected and illustrated perspectives are those that deal with 1) consciousness as a property of existence; 2) the emergence and evolution of consciousness; 3) the explanatory and projective theories of consciousness; 4) the action focused perspective in studying consciousness and 5) modeling the status and role of consciousness in relation of other human capacities. This article will focus especially on the first, the fourth and the fifth category of theories and the associated methodologies.

The perspective that starts from the idea that consciousness is a property of the natural, cultural and human universe (individual and societal), is a repeatedly renewed perspective, as it seems that consciousness itself appeared many times and on different branches of the evolution of the living world. Indications of the presence of consciousness at the level of

- inorganic matter;
- unicellular organisms;
- animals with cerebral cortex;
- artificial systems

have been presented by different researchers in successive stages of consciousness studying.

Given the multiplicity and diversity of these options, as well as the fact that many of them have led to the formulation of coherent theories, the question arises: what areas of research should be concerned with explaining and possibly replicating consciousness? And even further: what can mathematical models, physical discoveries, biophysical and psychophysical experiments or sociological studies tell us about consciousness? They address the quantum level of the physical reality, explore the universe with bio-cosmological means, and for the design of artificial consciousness use mathematical means, biophysical and psychophysical studies, as well as technical instruments. Which scientific discipline can synthesize all these types of knowledge, in order to capitalize on the results of as many fields of study?

Aiming to explain consciousness, some contemporary theories cross the boundaries between ontology, gnoseology and praxiology in order to build a science of conscience (a syneidology, if the Greek name of this one – *syneídisi* – is considered). These theories have variants, depending on the emphasis they place on consciousness as A. a form of existence closely related to the matter or as B. a form

of existence unrelated to a physical support. The most widespread, but also the most diverse is the first option, in which the formulated theories are based on:

a. a. **states of matter** studied as supports of consciousness such as gaseous, liquid or solid (Tegmark, 2015);

a. b. **material particles**, such as electrons, fermions, bosons;

a. c. **“psychic” particles**, such as *corticons*, *psychons*, *mentons* or *noeons* etc. Other material supports considered are:

a. d. **the cortico–thalamic complex**, as well as

a. e. **the computer**, respectively its hard drive that includes structures that generate memory or execute programs, some of which can be “smart”. In variant A also integrates the theories that appeal to

a. f. **properties** attributed to various material structures, which can be complexity, dynamism, continuity, and an information content, as well as descriptiveness (the quality of being “writable”).

Among the theories of type B, trying to identify the nature of consciousness, can be mentioned those that:

b. a. consider a nonphysical reality as support of consciousness fall, like that sustained by D. Miller, Ch. Berner and C. Draut;

b. b. others refer to properties of living beings such as subjectivity, reflectivity, integrativity and a common factor for both types of approach – information. The amount of information contained in a physical system (Φ) is considered as an indicator of its degree of consciousness by Giulio Tononi. He uses thought experiments meant to introduce qualitative aspects, as those which differentiate between primary and conceptual information (Tononi 2012, 294–295, 303). Other authors consider information only a precondition of consciousness (Amoroso 2000 b, 319). Here is also placed

b. c. the cognitive neuroscience, which understands consciousness as an emerging property of complex biotic systems that have neuronal systems. Neural systems can be created artificially on physical bases; these can support not only consciousness, but even spirituality in the “era of the spiritual machine”, according to authors like (Kurzweil 2012).

This multitude and diversity of approaches and ways of treating consciousness is accompanied by a series of inaccuracies and inconsistencies, as well as by the lack of a systemic vision and a unitary methodology in explaining it. Thus, terms such as mind, consciousness, intelligence, self and ego are used for the same phenomenon, in the same work and sometimes on the same page, thus giving them the same meaning. This is one of the extra reasons why the conscience seems difficult to understand.

The described situation also results in a large number of definitions that have been given to consciousness, part of them being signaled in the above made introduction. The philosophical – more exactly ontological – definition of conscience remains the classical one: Conscience is a product of the functioning of a universal property of existence (reflection) at the highest level of its organization, that of man and society. It follows that consciousness integrates in itself all these ways and levels of being identifiable in the whole existence.

The appropriate attitude towards the complex situation described could not be to look for an answer, certain and permanently valid, but to formulate a new perspective on the problem. The perspective proposed below is mainly that informational, associated with the actional one, from a theoretical point of view, and an interdisciplinary and integrative one from a methodological point of view. The structural and functional perspectives, which describe the conditions for emergence and development of consciousness, are also considered.

AN INFORMATIONAL PERSPECTIVE ON CONSCIOUSNESS

The proposed perspective is itself the result of a succession of integrations. In what follows the sequences of integrations required to outline this perspective are described, the four levels of integration being also highlighted.

This perspective is an informational one because, in addition to being based on the concept of information, this concept receives an explanatory role, by means of which the fact that information is part of each level of the studied specific human activities can be shown. From this perspective, the analysis of the informational structure and functions of the activities specific to each level of integration is made on the basis of the definition of the concepts that describe each of the levels studied in informational terms.

The definitions of information are highlighted here as they were formulated in different contexts and periods throughout the undertaken research. Thus, information was thought of as a fundamental form of existence, along with matter and energy (Pană 2017, 4464); it was considered a fundamental property of existence, which can be called *informativity* (Pană 2017, 4469). Information has been defined and as the essence of the existence, because it is internal to each level of it, and at all these levels one can identify informational properties, relationships and functions (Pană 2000, 430). From another research perspective information was conceived as an active principle of the structuring and dynamics of existence (Pană 2000, 429).

In these contexts, a number of information forms have also been defined.

Structural information is the type of information present at all levels of existence, natural and societal, and in the latter framework, in all areas, from the human brain to the technical domain (Pană 2004, 25).

Systemic information is characteristic of various social units, from civilizations, cultural areas and historical formations to educational models or scientific disciplines. It includes the spiritual level of information generating and using (Pană 2010); (Pană 2005–2006); (Pană 2004, 41–49).

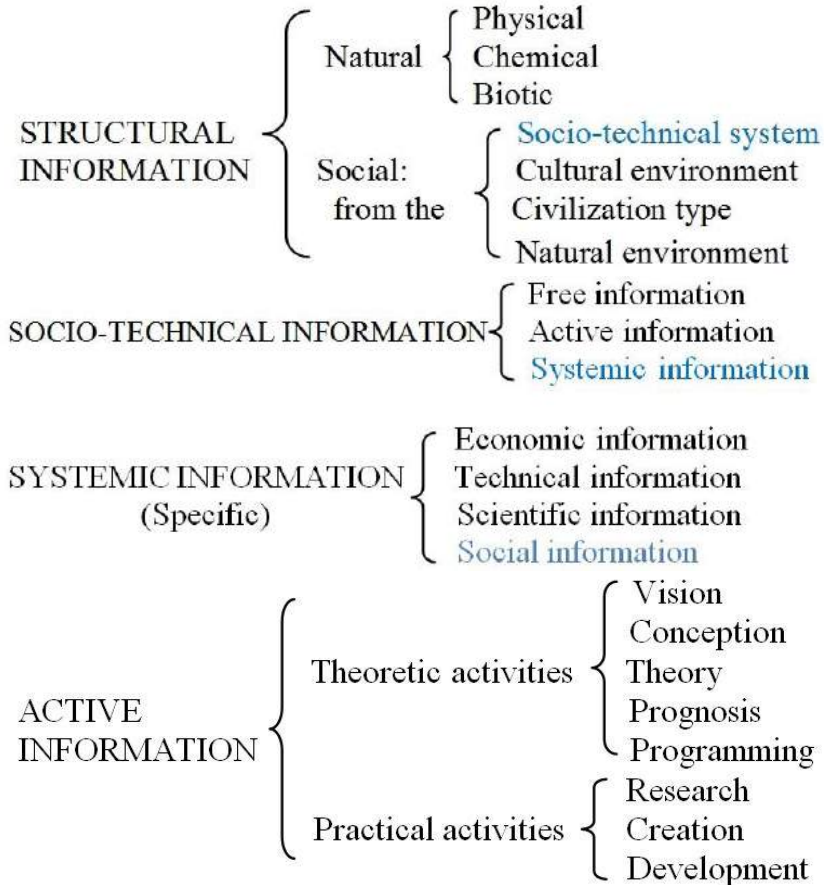
Social information is a continuous flow and a complex, multilevel, multidirectional and multifunctional network of information (Pană 2007), globally presented in (Pană 2004, 17–30) and analytical studied in (Pană 2004, 21–32). It forms a complex infosphere (Pană 2002).

Active information expresses the fundamental relationship between structure and dynamics in the whole of existence, but mainly at the human level. Especially today, information manifests itself as an active principle or even as a driving

principle, not only as a common factor of human activities (Pană 2004, 26–28); (Pană 2000, 429).

Free information occurs in society through high-level intellectual activities which generate and include it in values. It is then cultural information that is also liberating (Pană 2000, 423). This type of information is capable of self-generation, in specific human states or in technical, artificial conditions as already anticipated by Stefan Odobleja.

It is now possible to integrate the levels and forms of information, represented in the following scheme.



FREE INFORMATION

2. Integrating information levels and forms. The informational integron

The theoretical and linguistic source of inspiration of this concept is Francois Jacob's book "The Logic of the Living World", Bucharest: Romanian Encyclopedic Publishing House, 1972, a volume dedicated to "decrypting nature", but which takes into account every level of integration. In his vision, evolution occurs by successive integrations, through which new integrons appear, superior to

the organism (pp. 335–342). Thus, a new hierarchy of integrons is established, one made up of social units, such as the family and the state or the ethnic group and the nation (p. 343), which operate according to another code, a cultural one. The present study adds, in fact, a new level of integration, respectively a new integron, the one made up of the activities and systems that compose the higher level of human behavior.

AN INFORMATION AND ACTION-CENTERED INTEGRATIVE MODEL OF SPECIFIC HUMAN ACTIVITIES

During the present study repeated references were made to the modeling of the phenomenon of consciousness by different authors, starting from different perspectives on it, these models aiming at explaining and representing each time the newest theory of this complex human reality. Based on the informational perspective presented in the above scheme, it becomes possible to achieve a complex integrative model, which will here be called the **multi-integrative model**, as it can include several types of explanations, such as informational, structural, functional, as well as one action-centered, which is shortly summarized below.

INFORMATION	SUPPORT	STRUCTURES	ACTIVITIES	FUNCTIONS	PRODUCTS
Free partially self-generative	Spirit and Creativity	Constructive	Superactivity	Creation	Values Inventions Discoveries
Social and global information	Individual & group conscience	Conscious	Attitudes and actions	Motivation and anticipation	Volitional affective & heuristic pr.
Active information forms	Minds and machines	Cognitive (logical and psychological)	System of activities	Other functions coordinating	Theoretical & practical products
Functional information Structural information	Brain	Functional Centers and blocks Activation areas	Activism Activation	Adaptation Evolution Progress	Continuous vital processes

3. The informational, structural, functional and actional meta-integron

The analysis of this representation of the upper level of human conduct allows the formulation of the informational definition of conscience, which is based on a new, active perspective on information itself.

Information is the generative structure through which the world is self-organized into increasingly complex systems, which make up the successive levels of existence (Pană 2017, 4464). The sets of internal possibilities that appear by selecting the contents and properties specific to these levels open several ways of evolution for each organizing level, capitalized or not by specific “agents” (laws, conditions, leaders). Thus, information gives both the “matter” and the form, as well as the sense of the evolution in existence. Information is today the main object/ matter of social action.

The actional perspective in consciousness studying is present, for example in Schelling, who even establishes the moment in which consciousness and liberty emerge concomitantly by the same original action (Schelling 1995, 157–159). This perspective is also characteristic to a book recently translated in our country, in which the intentionality of consciousness is considered a faculty that conditions the formation of motivations, the conception of action projects and the effective transition to action which, in turn, has as finality to generate values (Moutsopoulos, 2017, 24–29). Conscious thinking is also linked to action in neuroscience, for example by S. Dehaene and L. Naccache, its function being to make new actions possible. It is worth noting here that the action-focused perspective is also present in the theoretical writings belonging to the technical field of culture, which speak of “Informing Science as a Conceptual Framework for Developing Information Systems” (Dobrescu and Iordache 2010, 61–71).

Moreover, we can speak not only of *active information*, but also of *active knowledge*, which is not specific only to the technical, political or moral culture, but to all fields of culture, including the philosophical one (Pană 2019, 392–396).

From this enriched informational perspective consciousness can also be redefined: Consciousness is a fourth-order information state and activity with structuring and orienting role in the whole human existence, spiritual, psychological and societal. This definition shows that:

- consciousness is superordinated to the brain, mind and cognition, which are the levels of specific human activity that it subsumes. This definition also implies that

- conscience depends, in a way mediated by the previous levels, on the physical, chemical and biotic world, in the sense that the components of these lower levels of existence are internalized within it. From the same perspective, it can be said that

- consciousness makes the connection between information, energy and substance at the human level. As a first conclusion allowed by this definition it can be said that

- conscience is the specific way of man to correlate the fundamental forms of existence. This concluding formula is supported by the entire content of this study.

Based on the theoretical findings, constructions and reflections made in the research undertaken, the general structure of the fourth level of human activity can be highlighted.

This includes the **unconscious** – a set of processes and states that make up the infrastructure and intra-structure of the unconscious was identified in

(Henri Ey 1983, 320–323) and the **preconscious** has been studied, in addition to the **consciousness**, especially by psychologists. In their attention, and later in that of the experimentalists in this field, the **self-consciousness** also came, even in many forms, inclusively that of **sensory self-consciousness**. This one in turn comprises the awareness of different types of sensations, some of them, such as the visual and auditory ones being studied also by (Tononi 2012, 310–311), while the research of the visual ones had already been deepened by (Crick and Koch 2001, 258). The same two authors make a precious remark according to which usually a single conscious interpretation of an ensemble of sensations is imposed (Crick and Koch 2001, 257).

The **individual self-consciousness** is very important, this becoming obvious if looking at its complex internal structure, which includes a series of elements that develop in different degrees from one individual to another: a – awareness of one’s own possibilities; b – awareness of the person’s place in the near environment; c – awareness of his/her position and role in relation to other individuals; d – awareness of one’s own interests and goals; e – awareness of one’s own value.

The **collective self-consciousness**, which is specific to teams, groups and communities such as the virtual ones formed on the web today, is also studied in various social sciences. **Reflective self-consciousness** is considered, by some authors, as the highest form of consciousness.

Meta-conscious states appear in deep meditation practices, studied, among others, in (A. Lutz *et al.* 2007, 92). A structural and functional block of meditation is identified by Brefczynski and his team. They show that a large number of cortical areas are involved in these types of meditation; in addition, the most activated areas differ in the trained practitioners, respectively in the novices. Both the surface and the intensity of using the cortical areas decrease with the experience of those who practice meditation (Brefczynski-Lewis *et al.* 2007, 11485). There are even **other types of consciousness**. Thus, in addition to extrasensory knowledge, there is also *extrasensory consciousness*, and the so-called *evolved consciousness*, which is being developed in a directed way, within some NASA projects.

An extraordinary evolution, starting from researching the “depths of the material world” and reaching the heights of the spiritual life, can be highlighted in the scientific thinking of Mihai Drăgănescu. He proposed, in this context, explanatory concepts such as the “informatter”, as well as the postulate that in the universe there is a fundamental consciousness, which evolves from “infra-consciousness” to conscious forms of organization and even to a society of consciousness. Thus, he not only went on the footsteps of the contemporary science, formulating original interpretations of its results, but he created, coining the suitable language, his own scientific universe.

CONCLUSIVE REMARKS

The results of the research undertaken show that consciousness is a superior-order informational state, an idea launched by the author and debated

online on the occasion of the 5th European Computing and Philosophy Conference held on June 17–18, 2008 in Montpellier, France. Consciousness is superordinated to the brain, mind and knowledge, the informational states that precede it. In turn, it is dependent on the physical, biotic and social forms of existence, but these inferior levels are actually internalized by it. Thus, in fact, consciousness makes the connection between information, energy and substance at the human level. Consequently, consciousness is also a specific way of man to correlate the fundamental forms of existence. The brain is the common substrate of the mind, cognition and consciousness, and the mind itself is a system of activities, the one that generates the environment in which consciousness emerges. The mind, like consciousness, does not exist independently of a material, natural or artificial brain and therefore both are meta-type existences of a different order. A more general conclusion, deriving from three of the current types of research (theoretical, experimental and technical) is that consciousness is a characteristic of all levels of human activity. This conclusion has important practical consequences for the science and engineering of consciousness, because it shows that consciousness can be developed or even built at any of the previously studied levels. The same research highlights that, in fact, consciousness is present in the development of nervous processes, in realizing the proper function of cognition, as well as in the use of the person's creative skills. In other words, consciousness is present in the brain, mind and, obviously, the spirit. These conclusions, in turn, are promising for future theoretical and practical research on the topic of human and artificial consciousness.

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