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THE ENIGMA OF HEMISPHERIC PERCEPTION OF THE WORLD IS PROBABLY SOLVED DUE TO WHICH THE PROBLEM OF SELF-CONSCIOUSNESS GENERATION AND LOCALIZATION IS CLEARED UP

The riddle of hemispheric perception mechanism connected with hemispheric inverse perception of spatial characteristics of the environment is considered with the help of interdisciplinary research (the concept of asymmetry of human brain's hemispheres, and also the philosophical concepts of reality and physical theories of Universe's structure). It is shown that the inverse scheme of hemispheric perception corresponds to subject-subject model of human interaction with the world, which presupposes the unity of the subjective and objective, the internal and external, "I" and non-"I", man and the world. The assumption is made that self-consciousness is generated at the neutral point of interaction of "I" and non-"I", which in physical sense corresponds to the physical vacuum (as a neutral medium integrating the opposites), and also to fundamental quantum level of the Universe, revealing the unity of the internal and external, the simple and complex, cause and effect as expressions of implicative nature of the "field of consciousness" and the anthropic postulate.

Key words: cerebral hemispheres, inverse character of hemispheric perception, self-consciousness, gestalt psychology, physical vacuum, field of consciousness, anthropic postulate, mirror neurons, the principle coordination theory.

Загадка полушарного восприятия мира, возможно, решена, благодаря чему прояснена проблема генерации и локализации самосознания

На основе междисциплинарного исследования (концепции асимметрии полушарий головного мозга человека, философских концепций реальности и физических теорий строения Вселенной) рассматривается загадка механизма полушарной перцепции, связанная с инверсионным восприятием полушариями пространственных характеристик среды. Показывается, что инверсионная схема полушарной перцепции соответствует субъект-субъектной модели взаимодействия человека с миром, которая предполагает единство субъективного и объективного, внутреннего и внешнего, "Я" и не-"Я", человека и мира. Сделано предположение о том, что самосознание генерируется в нейтральной точке взаимодействия "Я" и не-"Я", которая в физическом смысле соответствует физическому вакууму (как нейтральной среде, интегрирующей противоположности), а также фундаментальному квантовому уровню Вселенной, на котором обнаруживается единство внутреннего и внешнего, простого и сложного, причины и следствия как выражения имплицативной природы "поля сознания" и антропного постулата.

Ключевые слова: полушария головного мозга, инверсионный характер полушарной перцепции, самосознание, гештальтпсихология, физический вакуум, поле сознания, антропный постулат, зеркальные нейроны, теория принципиальной координации.

The urgency of the problem. Every science has always sought to find some fundamental ground helping the crystallization of deep scientific meanings. Psychology and related scientific disciplines for such fundamental ground have the *concept of functional asymmetry of human brain hemispheres* due to the universal nature of their specializations revealing a correlation with spatio-temporal asymmetry of the Universe.

The hemispheres reflect and master the world in a unified way being opposite to each other: the functions of *the right hemisphere* reveals continuous-field aspect of the Universe, connecting with shaping an ambiguous polysemantic, artistic context of world view, with constructing sacral-religious, metaphoric reality of social world [Amunts, 2010; Bullmore, 1995; Flor-Henry, 1978; Rogers, 2000; Simonov, 1991; Sperry, 1968; Springer, Deutsch, 1997]; on the contrary, the functions of *the left hemisphere* reveals discrete-substance, plural aspect of the Universe, connecting with shaping one-semantic, unambiguous, abstract, discursive-theoretical world understanding, with building rational-technocratic reality.

The encephalographic studies shows that functional synchronization of the hemispheric information processing strategies takes place in a meditation state [Murphy, Dobovan, 1985, p. 34-40], thus enabling a man to actualize the state of illumination due to which it is possible for a man to realize intuitive perception of the world in all its wholeness and integrity.

As numerous scientific experiments show that the brain's hemispheres can be considered a psychological and physiological centre of human organism, since with their functions a lot of aspects our organism are correlated, specifically, I and non-I, the mechanisms of aim creation and searching the ways of achieving the aims [Simonov, 1991], energy and information regulation of man's behavior, strength and weakness of nervous processes, their lability and inertness, excitation and inhibition, ergotropic and trophotropic functions, sympathetic and parasympathetic branches of vegetative nervous system, such sensory processes as empathy and reflection, extroversion and introversion, automatic and spontaneous psychic activities revealing first and second signaling systems, volitional and non-volitional psychic spheres [Flor-Henry, 1978].

In a somewhat simplified way, as the hemispheres can function in supplementing way, the difference of hemispheres function can be shown in such opposite ways:

- analytical thinking, literal understanding of the words, sequential processing of information, mathematical capabilities, *right part of the body and right vision field are the domains the left hemispheric functions;*

- perception of non-verbal information, spatial orientation, understanding the metaphors, emotional processes, multitasking and parallel processing of information, *left part of the body and left vision field are the prerogative of the right hemispheric functions.*

The purpose of the article. So, the purpose of the article is to clear up the phenomenon of inverse perception of spatial characteristics of the environment by the hemispheres.

The scientific results and their discussion. It is very important to note that person's development in onto- and phylogenesis reveals the phenomenon of step by step increasing the hemispheric asymmetry into a mature age. Then this process begins to turn back when in man's elderly age the condition for functional synthesis of the hemispheres is revealed: enriched in life experience an elderly person begins to transform into a spontaneous and frank child with its plastic psyche.

The hemispheres of the human brain, taken separately, reflect the world inadequately. V.L. Deglin, studying the hemispheric peculiarities of reflecting the surrounding world and, in particular, the hemispheric capacities for spatial perception, came to the conclusion about the anisotropic character of hemispheric perception, when both hemispheres reflect the surrounding space in an erroneous way, but these errors have the opposite character, when the left hemisphere remotes the visual space, and the right – approximates the visual space to the observer. That is, as V.L. Deglin writes in his lectures on hemispheric asymmetry, the left hemisphere seeks to visually distance a person from the elements of the environment, and the right – to integrate a person into it.

This phenomenon of visual distortion of reality manifests itself at all levels of person's mental organization, since all aspects of a person are connected with the functions of the hemispheres, in particular, mental processes are dependent on the right hemisphere of the brain, include sensory asymmetries, deductive thinking processes, and the left hemispheric functions closely correlate with motor asymmetries and inductive thinking processes. It is worth mentioning that mentally retarded children lack the phenomenon of reality distortion, at least at the level of a visual analyzer: they have a concentric narrowing of both fields of vision and almost full equality of monocular fields of vision.

The functional coherence of the hemispheres (in the sphere of the "super-I", according to P. V. Simonov), the "compromise" between them leads, as V. L. Deglin writes, to the equalization of spatial deformation, that is, the adequacy the perception of volumetric space characteristics on the retina plane of the eyes is achieved, when the volumetric and plane aspects, being geometric antagonists (as demonstrated by the dichotomy of the geometries of Euclid and N.I. Lobachevsky) are harmonized and reduced to a common sensory "denominator".

In this connection, we can also mention the physical uncertainty relation of V.Heisenberg, according to which the product of the uncertainties of the coordinate of an elementary particle and its momentum can not be less than a certain constant (Planck's constant). Note, that this relationship, as shown by L.Mandel, covers space and time in general, when there is no physical system in its space and time, which at the same time have quite definite, exact values. In any physical system, when there is exact spatial characteristics, so its time characteristics are indeterminate and vice versa.

So, man's perception of space and time reveals a certain localization in the brain, when the functional asymmetry of the hemispheres expresses, as we have already written, the spatio-temporal asymmetry of the Universe.

The mastery of the future time by the hemispheres is connected with the functioning of the anterior parts of the brain, especially of the left hemisphere, and the perception of the past time – of the rear parts of the brain, especially of the right hemisphere. In this case, the frontal parts of the hemispheres are related to programming persons behavior (the "analytical forecast of the future") and the motor activity, and their lesion causes a tendency to reduce person's initiative, reaching a degree of spontaneity with no incentive for activity, as observed in case of lesion of the left frontal lobe; for reception, processing and storage of information received through the sensory channels, the back parts of the hemispheres, especially the right hemisphere (A.R. Luria, N.N. Bragina, T.A. Dobrokhotova) are most responsible.

These data allow us to build a model of functional localization of human brain, which fully corresponds to the oriental symbol of Tao.

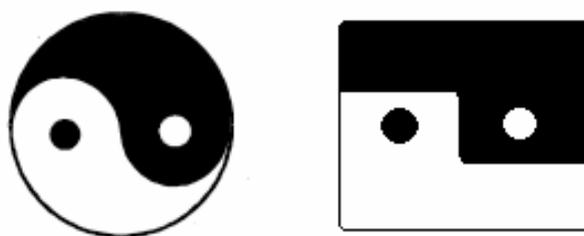


Fig. 1. The correspondence of the model of functional localization of human brain to the oriental symbol of Tao

However, even more surprising is the inverse processing of space by the hemispheres, when the right hemisphere perceives the left field of vision, whereas the left hemisphere perceives the right field of vision; this also takes place with the perception by the hemispheres of the left and right halves of human body. This asymmetry also concerns sensory systems when, for example, the left ear (and its functions) is perceived by the right hemisphere, and the right ear – by the left hemisphere.

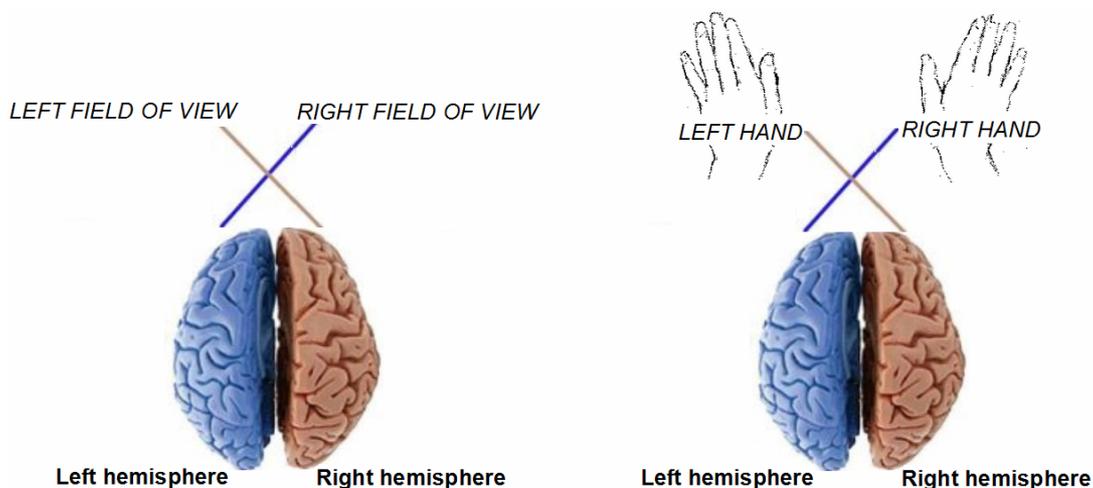


Fig. 2. Inversion perception by the hemispheres of spatial characteristics of the environment, as well as cross-links of the left arm with the right hemisphere, and right hand – with the left hemisphere

Such cross-sensory organization is incomprehensible, because according to *subject-object model of interaction of a man with his environment* (when a person perceives this environment as an external object), it would be logical to have mirror reflection of visual space by the hemispheres.

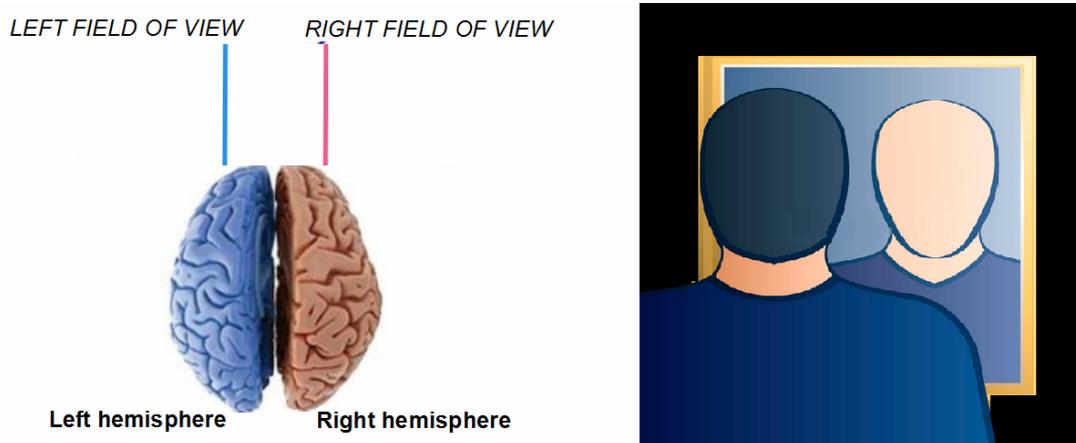


Fig. 3. Mirror subject-object perception of spatial characteristics of the environment by the hemispheres

However, the existing inverse perception of space by hemispheres indicates a *subject-subject model of perception*. This suggests that a person addresses the world and looks at it as if he were looking at himself standing on the contrary! *Here, a person who looks at the outside world actually sees himself, when the inner and outer represent oneness*, which expresses the meaning of God's definition of "I am who I am" or "I am because I am" (refer: Exodus 3:14), revealing *the personality phenomenon of self-determinism*.

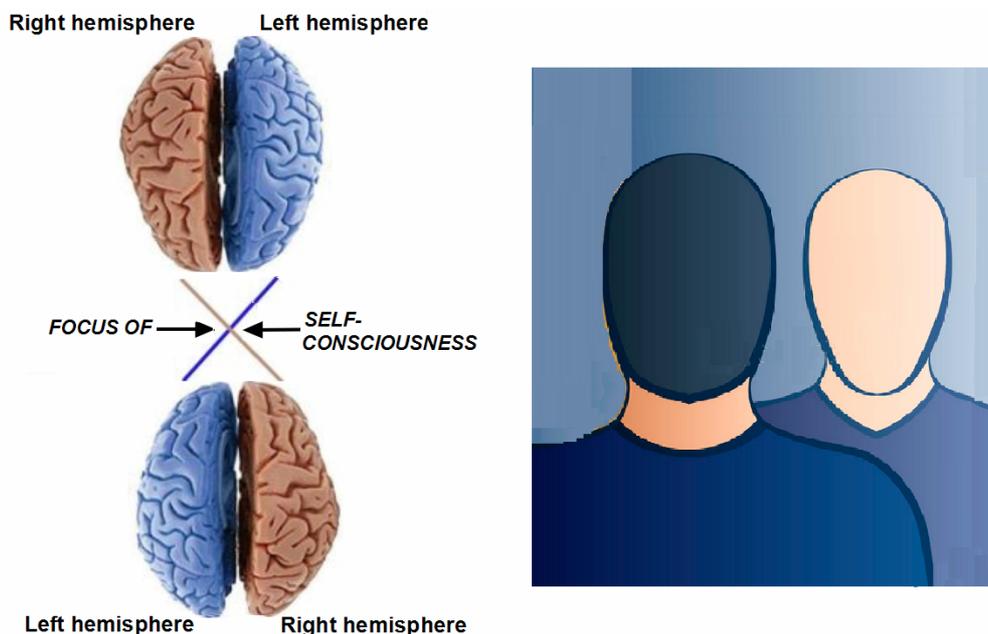


Fig. 4. Subject-subject perception by the hemispheres of spatial characteristics of the environment

This is the scenario for actualizing personality's *self-consciousness* developed by J. Gibson, who managed to show that the process of man's perception of surrounding reality occurs on the boundary between the subjective and objective personality worlds and, in essence, is reduced to the psyche's resonance with those structures of the surrounding reality that are given (opened) to the man during his vital activity. In the

process of such a resonance, the information is revealed about the possibilities that are hidden in the outer environment, and, accordingly, a reaction to these possibilities is achieved [Gibson, 1979].

Thus, the world is man and man is the world ("there is no object without subject and there is no subject without object").

The analyzed mirror effect, being embodied in Ernst Mach and Richard Avenarius "principle coordination theory" ("there is no object without a subject and there is no subject without an object") as well as in Buddhism religion ("our reality is the unity of the sacrifice, that person who offers the sacrifice, and the place where the sacrifice is offered") and Christianity ("the reality is the inseparable unity of God-Father, who commits the sacrifice, the sacrifice, being God-Son, and the place where the sacrifice is offered, being Holy Spirit) is realized at the level of the neural organization of human brain in the phenomenon of "**mirror neurons**", which were discovered by Italian neurobiologist Giacomo Rizzolatti [Rizzolatti, Arbib, 1998]. It turns out that there are unique cells in human brain that are activated in a mirror image when we watch the actions/movements of other people. That is, the actions/movements of a person, accompanied by the activation of the corresponding structure of the neurons of his brain, cause the activation of the same structure of the neurons in the brain of another person, who observes these actions/movements, which is manifested, among other things, at the level of ideomotor reactions, when a thought or mental image brings about a seemingly "reflexive" or automatic muscular reaction, often of minuscule degree, and potentially beyond the awareness of the subject. So, nerve impulses that provide physical movement appear as soon as the idea of it arises in human brain, which activates minimal in intensity (and not reflected in actual bodily movements) motor impulses arising in connection with the idea physical movements.

The associated term "ideo-dynamic response" (or "reflex") applies to a wider domain, and applied in the description of all bodily reactions (including ideo-motor and ideo-sensory responses) caused in a similar manner by certain ideas, e.g., the salivation often caused by imagining sucking a lemon, which is a secretory response.

This order of things, embodied in the principles of philosophical doctrines of subjective and objective idealism, is realized in the psychological-behavioral and therapeutic system of *the Simoron*, within the framework of which the idea of destroying the border between "I" and the non-"I" is cultivated. The Simoron puts forward the idea of different aspects of the boundaries: spatial boundaries (my personal things, my room, my house, my street, my country, my planet, my solar system, my galaxy); temporal boundaries (my working day, my month of rest, my school year, my youth, my maturity, my life). There are still internal boundaries – my plans, my ideas, my experiences, my dreams, my habits, my fears, my illnesses, my health.

The considered boundaries distinguish people from each other. And where is the man himself, his "I"? As the Simoron puts it, the man is not in the brain, in the soul, in the center of the Universe, in the physical body, within one's consciousness. Any word we use separates, restricts any object we deal with. And if we define something, then we draw a boundary between this object and that thing our object is not. The person here is considered the creator of external and internal realities, which is understood in the spirit of autopoiesis [Maturana, Valera, 1980] as a reflection of man's "I". The solution of the conflict between "I" and the non-"I", the achievement of harmony between them is realized by means of a set of psychological techniques constituting the Simoron system.

At the initial stage of mastering the Simoron system, the simplest methods of correcting the external environment as a mirror that refracts the "I" are studied. If a person corrects what is outside him, then, respectively, he corrects himself. If he encounters a disease in the external reality, this must be understood as a reflection of what nests in the person himself, because only the person himself could generate the disease by broadcasting it to the screen of external reality. Pictures on this screen represent the warning signals of what can happen to a person in the future. Observing these a person should know in advance what is awaiting him after a certain period.

The presented phenomenon in a certain sense demonstrates the work of *the mechanism of self-consciousness*, which is actualized on the basis of mutual reflection of the internal and external aspects of reality.

However, in this case there is still *the problem of localization and the essence of self-consciousness*, which appears at *the focus of interaction of the internal and external*, thus expressing the paradoxical content, which can be explained by the border paradox in Gestalt psychology, when it is impossible to say what the boundary belongs to – the figure or the background. Because of this, the border acts as *a mechanism of worlds holomity*: within the boundary the polar entities – the figure and its background, the being and non-being, light and darkness, positive and negative ... are united.

Let us note that it is the *physical vacuum* being the unity of the opposites (being deep universal boundary medium that contains everything and that binds everything, meanwhile remaining "behind the

scenes", acting as the boundary between the being and non-being) that adequately corresponds to the nature of self-consciousness.

In the field of physical vacuum as a boundary entity, a minimum portion of energy is generated thus creating a quantum-photon reality that ensures the holomorphy of the Universe: at the fundamental quantum-photon level of the matter the Universe turns out to be an integral inseparable complex where the cause and effect, the part and the whole, the past, present and future, the internal and external, the physical and mental, the actual and potential are not differentiated [Bohm, 1987].

This fundamental quantum-photon level of reality reveals logico-implicative properties and correlates with postulated by G.I. Shipov "*field of consciousness*", as well as with the universal semantic space of the Universe of V.V. Nalimov, and other similar categories, the conceptualization of which allows us to conclude, that the Universe is built on the methodological and ontological unity of the world laws for physical, biological and social micro-, macro- and megasystems (the entropic postulate).

The mentioned field of consciousness (realized in the paradoxes of quantum physics, for example in the paradox of the Observer, the Rosen-Podolsky-Einstein paradox, and also in the uncertainty relation of W. Heisenberg, as well as in the complementarity principle of N. Bohr et al.) can be understood as *a neutral entity that unites the opposites*, which can be correlated with the Wholeness (in the context of the universal model of reality, according to A.F. Losev: *the Single – the Plural – the Wholeness*): from the point of view of Plato, the world is a kind of proportional wholeness, subjected to the law of the golden section.

Conclusions. The riddle of hemispheric perception mechanism connected with hemispheric inverse perception of spatial characteristics of the environment is probably solved. The inverse scheme of hemispheric perception corresponds to subject-subject model of human interaction with the world, which presupposes the unity of the subjective and objective, the internal and external, "I" and non-"I", man and the world. Due to this we may conclude that self-consciousness is generated at the neutral focus of interaction of "I" and non-"I", which in physical sense corresponds to the physical vacuum (as a neutral medium integrating the opposites), and also to fundamental quantum level of the Universe, revealing the unity of the internal and external, the simple and complex, cause and effect as expressions of implicative nature of the "field of consciousness" and the anthropic postulate.

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