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COHERENCE AS A METHOD FOR RELEVANT VERBAL CODIFICATION IN THE NEOCORTEX

Abstract: This article deals with the problem of a binary genetically and socially determined process of launching a coherent program of verbal codification as a result of the contact of two phenomena: deep biomolecular and sociocultural information. To identify this paradoxical phenomenon on an interdisciplinary basis, questions about the mechanisms of communication are considered from the point of view of the establishment and functioning of cortical-cortical horizontal connections in the speech centers of the neocortex as neoplasms of the brain substance and deep vertical cortical-subcortical connections in the neocortex. When substantiating the question of the formation of speech-thought-linguistic abilities of a person, the role and significance of verbal information is shown, which is formed and functions outside the substance of the brain in the form of the physical matter of the language and, in the process of a speech act, penetrates into the sphere of the neocortex (mental representation) and into the subcortical nuclear structures of the brain. On the line of contact of two phenomena in the cortex, a point of critical bifurcation appears, which activates the launch program of the language as a quasi-semiotic system. sociocultural information in the generation and actualization of speech.

Key words: quasi-semiotic system, neocortex, bifurcation point, launch program, genetic cryptogram, mental representation, DNA calculus.

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Introduction

In this article, an attempt will be made to scientifically identify the problem of language triggering mechanisms, which in the framework of the natural sciences was considered from the position of biological, and in the humanities, in particular, in psycholinguistics, from the point of view of psycholinguistics, recognizing the superiority of the sociolinguistic factor. For a comprehensive scientific identification, the outlined interdisciplinary issues are investigated on the basis of a biopsychosocial approach based on a combination of the two above approaches. For this, the scientific data of neurophysiology, neurolinguistics and modern concepts of the anthropocentrist approach to the study

of the phenomenon of language in linguistics and other related disciplines are analyzed.

LITERATURE ANALYSIS AND RESEARCH METHODS.

The question of the need to study the biophysiological factors of language generation was considered within the framework of the naturalistic direction of traditional linguistics, in particular, in the concept of A. Schleicher. According to the scientist, "language is thinking expressed by sounds ... Language has as its task to create a sound image of representations, concepts and the relations existing between them." [1, 240 pp.] In the 20th century, new approaches to the study of the biophysiological foundations of language appeared, including the

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concept of Steven Arthur Pinker, consistently presented in the book *The Language Instinct*. The scientist unambiguously stated that “the language we speak is an “instinct” or a biological adaptation formed by natural selection” [2, 455 p.]. At the same time, the idea follows from the holistic concept of the scientist that both the holistic system of codification and the launching program of the language are based on instincts (from the Latin *instinctus* "impulse" from the verb *instinguere*: the basis of the Latin *stinguere* is "to prick", which gives the basic concept - "- a set of complex hereditarily determined acts of behavior characteristic of individuals of a given species under certain conditions [1-a]. Here it can be noted that in the special literature on natural science the term “language instinct” is not used, in everyday speech the expression “communicative instincts” is used. languages as a secondary signal system function in close relationship with thinking and consciousness, instincts in animals are also associated with a specific form of conscious behavior - with rational thinking (*ratsio*). To actualize speech behavior, it is necessary to connect the mechanisms of rational thinking (*intellekt*). Unlike representatives of the biological approach, supporters of the social origin of language triggering mechanisms, emphasizing the unlimited potential of social language, capable of unilaterally establishing language signatures [3, 423 p.]

During the actualization of a behavioral act in animals, the mechanisms of internalization of external information through genetically determined neurons of perception work reliably enough. During the assimilation of speech behavior in the child's cerebral cortex, a systemic transformation of the neural network occurs, incl. neurons of perception, associated with the need for adequate perception and processing of verbal information that is not specific to the genetic substance of the brain. Here we can mention that “when the installation, activation and functioning of cortical neurons as material substrates of the brain, consciousness and thinking, the conscious actions of the individual do not participate, because a person cannot consciously manage these processes.”[4, c.11] (it is impossible to control this process when the child’s thinking and consciousness have not yet been formed, moreover, even an adult with reasonable thinking and consciousness cannot coordinate the process of genetic formation of neuronal structures, since such a function belongs to the prerogative of the nuclear structures of the brain).

RESULTS OF THE RESEARCH AND DISCUSSION.

It should be noted that the above approaches to the problem of the origin of a language have sufficiently well-reasoned conceptual provisions, however, these arguments are not enough for a consistent scientific identification of the mechanisms for launching a language. Based on such

considerations, it can be assumed that this issue should be considered taking into account the undoubted achievements of the representatives of these approaches, as well as the fundamental postulates of modern scientific disciplines, including neurophysiology, neurolinguistics, linguistic semiotics, linguistic pragmatics, etc.

From our point of view, in order to radically change the methodological orientation of the study of language within the framework of the intended topic, it is necessary to focus on the anthropocentric biopsychosocial scientific interpretation of the process of generating speech, to explore the transitivity of the three-stage system of horizontal (cortical-cortical) and vertical (cortical-subcortical) connections in the generation and actualization speech act, to characterize the genetic mechanisms of biomolecular codification and the instinct of communication in the subcortical sphere, mental codification in the neocortex and sociocultural codification outside the human bodily substance (speech discourse).

Formation of a three-stage codification system that ensures the functioning of all language mechanisms in the deep subcortical sphere, in speech centers in the neocortex (Brock's, Wernicke's, optical zone and semantic analysis centers), forming a circle of mental representation, covering the work of all central and peripheral organs of the speech apparatus, the work of mechanisms real communication in the language environment is based on the cryptogram of the genetic substance of the brain.

This cryptosystem, formed as a result of centuries of human evolution, provides coherence (from the Latin *cohaerens* - "in connection") - in physics, the correlation (consistency) of several oscillatory or wave processes in time, which manifests itself when they are added. A peculiar coherent regulation in the speech act ensures the relevance of the structure and content of logically based speech constructs in the neocortex with the genetically determined biomolecular intention of the subcortical sphere.

Nuclear neuron structures located in the hypothalamus lead to the movement of the most complex system of biomolecular codification of information at the level of DNA calculus and the instinct of communication. As the nascent basis of sign formation, which has truly unique properties, the nuclear substrates of the brain transform the neural structures of the cortex, regardless of the mental structures of language and thinking, after the completion of the life cycle of the organism, they unilaterally (due to the action of the *mortido* instinct) coagulate these signatures.

The main advantage of the subcortical information codification system in comparison with the cortical codification system is the ability to process all types of information coming from the

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external environment. An immanent property of the cryptosystem of subcortical codification is that the neurons of this sphere have a three-dimensional character (material basis, structural information and energy resources). The first two properties are also characteristic of the neurons of the cortex, and the third energy supply depends entirely on the supply of energy from the deep sphere (the cortex does not have its own sources and mechanisms for controlling the processes of providing bioenergy). The limitation of the unique, self-reproducing genetic system of the Deep Realm is that its genetic cryptosystem does not provide mechanisms for launching a language. Therefore, a child who has healthy genetically determined qualities from birth (for example, children who, by the will of fate, survived among animals) cannot become a full-fledged person and instinctively master the language as a means of human communication. Under the conditions of verbal communication, a paradoxical situation arises in the child's psyche: a genetically determined perfect system of codification in the neocortex is in close contact with non-specific information entering the cortex and cannot provide relevant processing of information entering through the channels of auditory perception. Here it is important to mention the thought of the linguist and neuropathologist Erik Heinz Lenneberg (1921–1975), who was a supporter of the point of view of the concept of innate language and the biological approach to the factors of language acquisition.

Despite his beliefs about the biological origin of language, the famous scientist put forward a reasonable hypothesis that "contact with other people acts as a trigger that causes an innate mechanism." [5, 185 p.] An important postulate in the development of the issue of the launching program of the language is the hypothesis substantiated by E. Lenneberg about the presence of a critical period in the development of the language, which still remains controversial. From our point of view, the famous scientist in his book touched upon a very topical and debatable problem. This aspect of the problem of the launcher of a language can be more reasonably stated on the basis of the term critical bifurcation from systems theory. The concept of a bifurcation point is interpreted as a critical state of the system, in which the system becomes unstable with respect to fluctuations and uncertainty arises: will the state of the system become chaotic or will it move to a new, more differentiated and higher level of order. It can be assumed that the process of contact between genetic and sociocultural information inevitably leads to such a critical state, due to the fact that the cryptosystem of the deep brain, functioning at the level of absolute perfection, cannot ensure the decoding of the perceived non-specific information, as a result of which chaos occurs in the psyche. In overcoming this critical situation, the decisive role is played by the instinct of

communication, which embodies the potential for decoding any human intentions and recognizing the essence of information. This instinct, whose neurons are located in the hypothalamus, reflects the ability to self-preservation accumulated in the centuries-old process of human evolution. The communication instinct processes any external information based on dichotomous emotional motives: acceptable/unacceptable for self-preservation, positive/negative new reality, justification/unjustification of acts of behavior in a given situation, etc. (it must be borne in mind that logic and other human qualities are absolutely not manifested in the subcortical sphere).

The child's psyche instinctively determines the content of the incoming information, and at the critical bifurcation point a new fluctuation is outlined, providing a positive attitude and attraction to the perception of the language. All these implicit intentions ultimately contribute to the emergence of new impulses that ensure the installation, activation and functioning of new material substrates in the cortex - linguistic signs.

As studies in the field of neurobiology show, the system of new signs does not lead to the destruction of genetically determined neural formations of the cortex, intended for the perception of information at the level of perception (5 channels of sensation). A fertile ground for the formation of linguistic signs is created by neuroglia (from other Greek νεῦρον - fiber, nerve + γλοιός - glue), a set of auxiliary cells of the nervous tissue, which makes up about 40% of the volume of the central nervous system (the term was introduced in 1846 by Rudolf Virchow).

Glial cells constitute a specific microenvironment for neurons, providing conditions for the generation and transmission of nerve impulses, carrying out part of the metabolic processes of the neuron itself, however, these substrates are not involved in the transmission of information.

As the child learns new words, expressions and phrases in the cerebral cortex, the locations of future speech centers in the dominant hemisphere of the brain are indicated. An important stage in the development of linguistic signs is the establishment of a connection between the optical center with the center of speech perception (Wernicke's center) and the center of oral speech (Broca). Thanks to this, the child initially catches the connection between the sound complexes of words and visual images (subvocalization and nomination). As a link, a ventral pathway is formed that unites all speech zones with synapses.

In speech therapy and neurolinguistics, the following stages of launching and structuring a verbal communication system are defined:

1. Cooing.
2. Babble.
3. Subvocalization and nomination.

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4. Children's egocentric speech.
5. Incomplete predication.
6. Completed predication.
7. Social speech at the level of the I-Concept of a linguistic personality.

An important stage in the formation and development of speech abilities is the distinction between the content plan and the language expression plan. The deep sphere of the brain contributes to the establishment of speech centers and the neural network as a material substratum of a two-plane language. The system of neurons that provide the semantic analysis of speech makes up the content plan, and other centers (Brock and Wernicke) provide the language expression plan. The central and peripheral organs of the speech apparatus ensure the coordinated work of the entire system (according to the data of laboratory studies, about 14 thousand neural and neuromuscular movements occur in the speech apparatus in 1 second).

In the functioning of the speech zones of the content plan, the center of semantic analysis, located in the occipital part of the cortex, is of decisive importance. When the cerebellum is damaged, the synchronization of respiration, phonation and articulation is most often disturbed: speech slows down, is divided into syllables that can be pronounced with different strengths ("scanded speech"), and sounds become blurred and fuzzy due to muscle weakness and inactivity. With dysarthria associated with a disorder of the cerebellum, the patient's speech becomes stretched, words are sometimes pronounced as if in shocks (scanned speech).

In the coordination of neuromuscular movements in the speech act, the cerebellum (lat. cerebellum - literally "small brain") is directly involved - the part of the brain of vertebrates that is responsible for the coordination of movements, the regulation of balance and muscle tone. When the cerebellum is damaged, the synchronization of respiration, phonation and articulation is most often disturbed: speech slows down, is divided into syllables that can be pronounced with different strengths ("scanded speech"), and sounds become blurred and fuzzy due to muscle weakness and inactivity. With dysarthria associated with a disorder of the cerebellum, the patient's speech becomes stretched, words are sometimes pronounced as if in shocks (scanned speech).

The development of the child's intelligence and speech depends on the development of motor skills and vestibular function. In modern speech therapy, methods for cerebellar stimulation have been developed, which are carried out by speech therapists. In such classes, a number of pedagogical tasks are solved, including:

- automation of delivered sounds;
- strengthening the skill of fluent speech in stuttering children;

"starting speech" in non-speaking children; formation of lexical and grammatical representations in children with general underdevelopment of speech.

The process of forming mechanisms for launching a language program, the launch stages reflect the properties of a language sign: the nature of the sign, the availability of the signature, the degree of involvement of speech zones in the identification of a particular type of sign, the complexity of the signature, the nature of semantization, etc. You can distinguish the degree of gradation of signs and establish the following sequence of assimilation of each type language sign:

1. Assimilation of iconic signs by a child. This type of signs is acquired relatively easily, since the optical center of speech is involved in the formation of this type of sign formation, which is associated with the verbalization of objects available for visual perception. The child visually perceives people, other living beings, objects, the environment, the visual images of which are reflected in the optical center, and at the same time perceives the word by ear due to the functioning of the neurons of the Wernicke's center, and then the mechanisms of the Broca's center are connected. Associative memory is actively involved in this process of sign formation, which helps to remember the sound complex in the form of subvocalization. This type of sign formation contributes to the enrichment of the vocabulary through simple nominations with a direct meaning that does not require the transfer of the nomination to other objects and phenomena. At first, the child remembers words that reflect the realities of the close environment.

2. Assimilation of signs-indexes. This type of sign formation requires an understanding of the relationship between objects and phenomena, so the child learns it at a more advanced stage of language learning. Mechanisms of mastering indexes are based on establishing a connection between the centers of visual perception, Wernicke, Broca with the center of semantic analysis. For example, seeing a plate with a spoon, the child begins to understand that it is time to eat. Spatial adjacency and causal connection, "part-whole" relations are of great importance in the formation of the sign-index.

3. Assimilation of symbolic signs. This type of sign formation is directly related to the level of development of cognitive abilities, the ability to make generalizations and adequately understand the connections between the realities of life and words, to understand the properties of categorization in the language. For example, in order to understand the symbolic meaning of the word "ring" as a closed circle, it is necessary to understand that this metal-lexeme symbolizes integrity and unity. The ring has

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neither beginning nor end, therefore it is often associated with eternity and infinity. Its central hole is interpreted as a place of passage of heavenly power, divine breath. The ring symbolizes bond, union or vow. This is why the wedding ring is used to signify eternal union. The word "laurel" means triumph and victory. Being an evergreen plant, it symbolizes constancy, eternity and immortality. Laurus was credited not only with healing power, but also with the power of cleansing from spiritual defilement. Laurel leaves were ritually cleansed of spilled blood, Apollo cleansed himself with them after killing Python... The ability to correctly comprehend and use symbolic linguistic signs is associated with the formation of the self-concept, mental abilities, beliefs and value orientations of a linguistic personality.

CONCLUSION.

In the study of the problem of the launching program of the language, it is advisable to rely on the

principles of the biopsychosocial approach, which creates the prerequisites for the scientific identification of a transitive three-stage codification of information. The genetically determined cryptosystem of information processing of the subcortical sphere on the line of contact with sociocultural information is faced with the need to recognize non-specific content of information, as a result of which a critical bifurcation point is indicated. In this critical situation, the genetic quasi-semiotic system mobilizes all internal resources and coordinates the process of setting, activating non-specific speech signatures in the neocortex and ensures coherence in the systemic transformation of bio-impulses into mental language constructs. The process of formation of mechanisms for launching a language program, the launch stages reflect the properties of a language sign. The coherence of the cryptosystem ensures the relevance of linguistic signs to the deep cryptosystem and the norms of the language.

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