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TRANSITIVITÄT BEI DER KODIFIZIERUNG VON INFORMATIONEN IN DER TIEFEN UND OBERFLÄCHENGENERATIVEN BASIS DER SPRACHE

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Zusammenfassung: Dieser Artikel befasst sich mit dem Problem der generativen Grundlagen der Sprache, das erstmals im Rahmen der generativen Grammatik behandelt wird. Es versucht, dieses Problem innerhalb des biopsychosozialen Ansatzes zum Phänomen der Sprache zu identifizieren. Zur konsequenten Umsetzung der Postulate dieses Ansatzes werden alle Fragestellungen an der Schnittstelle verschiedener Wissenschaften auf Basis der allgemeinen wissenschaftlichen (philosophischen) Forschungsmethodik und der Methodik der Einzelwissenschaften betrachtet. Basierend auf dem anthropozentrischen biopsychosozialen Ansatz zur Interpretation des Spracherzeugungsprozesses charakterisiert der Autor die Transitivität von horizontalen (kortikal-kortikalen) und vertikalen (kortikal-subkortikalen) Verbindungen bei der Generierung und Aktualisierung eines Sprechakts. Eine Beschreibung efferenter Verbindungen (die den Informationsfluss, einschließlich Bioimpulse, von der subkortikalen Sphäre zur Großhirnrinde sicherstellen, und afferenter Verbindungen (der Datenfluss vom Neokortex zu den Kernstrukturen des Gehirns). Die Idee, dass die subkortikale Sphäre erstellt Signaturen und kontrolliert einen dreistufigen Prozess: Verbale Codierung der Sprache auf der Grundlage eines einzigartigen Kryptogramms einseitig ohne menschliches Bewusstsein und denkende Beteiligung.

Schlüsselwörter: psychosozialer Ansatz, biopsychosozialer Ansatz, Oberflächenstruktur, Tiefenstruktur, Transitivität, Multiplexing, quasi-semiotisches System, afferente Verbindungen, efferente Verbindungen

TRANSITIVITY IN CODIFICATION OF INFORMATION IN THE DEEP AND SURFACE GENERATIVE BASIS OF LANGUAGE

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Abstract: This article deals with the problem of the generative basis of the language, which is covered for the first time in the framework of generative grammar. It attempts to identify this problem within the biopsychosocial approach to the phenomenon of language. For the consistent implementation of the postulates of this approach, all issues are considered at the intersection of different sciences based on the general scientific (philosophical) research methodology and the methodology of particular sciences. Based on the anthropocentric biopsychosocial approach to

interpreting the speech generation process, the author characterizes the transitivity of horizontal (cortical-cortical) and vertical (cortical-subcortical) connections in the generation and actualization of a speech act. A description of efferent links (ensuring the flow of information, including bio impulses, from the subcortical sphere to the cerebral cortex, and afferent connections (the flow of data from the neocortex to the nuclear structures of the brain). The idea that the subcortical sphere establishes signatures and controls a three-stage process is substantiated. Verbal codification of the language based on a unique cryptogram unilaterally without human consciousness and thinking participation.
Keywords: psychosocial approach, biopsychosocial approach, surface structure, deep structure, transitivity, multiplexing, quasi-semiotic system, afferent connections, efferent connections

Introduction. The “Chomskian” revolution at the end of the 1960s led to a fundamental change in the methodological setting of structural linguistics with the concept of generative grammar. The main postulate of the concept of generative grammar by N. Chomsky, which implies a distinction between deep structures (deep structure) and surface structures (surface structure), was considered as a fundamental principle of scientific identification of a language [1, 126 p.]. Initially, this concept was perceived as a universal basis through which all natural languages can be defined. However, linguists and later the author of the innovative concept himself came to the firm conviction that mathematical signatures only partially indicate the fundamental principles of the content plan and the expression plan of only one language, the development of a universal program that reflects the specifics of all languages is one of the unsolvable linguistic problems. The theory considers expressions (sequences of words) corresponding to abstract "surface structures", which, in turn, correspond to even more abstract "deep structures". It is noteworthy that the concept of N. Chomsky has been recognized as a fundamental principle in the development of programming languages. [6, 342 p.] It should be noted that when developing the problem of the deep generative basis of natural and artificial language, in particular, programming languages, language is considered as a psychosocial phenomenon that arises in the neocortex and is actualized in the process of interpersonal communication outside the bodily substance of the human body (through the physical substance of air vibrations). With this approach, the process of functioning of the mechanisms of language and speech in the subcortical sphere of preparation and implementation of a speech act is actually ignored.

In this article, an attempt will be made to scientifically identify the problem on an interdisciplinary basis in line with the new concepts of natural-biological and social-humanitarian sciences. The scientific concepts of neurolinguistics used to create the UNESCO Atlas of the World's Languages in Danger [12, P.72] became a prerequisite for the definition of 9 criteria, including the provision that that the highest levels of viability are those languages in which at least 71% of the speakers of the new generation accept the language of their parents as a means of

communication. To study the mechanisms of the functioning of language as a biopsychosocial phenomenon, it is necessary to rely on the methodology of studying three forms of being - the existence of living nature (genetic laws), the existence of consciousness and thinking (laws of logic) and the existence of society (the laws of the development of civilization and culture,the law of conjugation of social and individual attributes in). It should be noted that in the study of language as a biopsychosocial phenomenon, it often becomes necessary to study factors that manifest themselves as intermediate phenomena. For example, when studying genetic patterns, one should pay attention to the nature of the change in the social life of the linguistic community. Thus, the Law of uniformity of hybrids of the first generation (Mendel's first law) is especially clearly manifested in the phylogeny of languages: such uniformity was characteristic of the historical development of Sanskrit (dr.in saṃskṛitā - "literary"), which arose as the language of the ancient Indian ethnic group, but later became the proto-language of the Indo-European family of languages.

Among the natural laws inherent in language is Zipf's law (power law of frequency), proved by the linguist A.A. Tsonis, “the magic number seven plus or minus two” (“Miller’s wallet”, “Miller’s law”) is a pattern discovered by the American psychologist George Miller, according to which short-term human memory cannot remember and repeat more than 7 ± 2 elements.

The second, psychological, mental-representative level of language is primarily subject to the laws of logic (the law of identity, the law of contradiction, the law of the excluded middle).

Language as a sociocultural phenomenon is also subject to the dialectical laws inherent in the existence of society: the law of continuity and renewal, the law of progressive circular motion, the law of conjugation of social and individual attributes.

LITERATURE ANALYSIS AND RESEARCH METHODS. Among the scientific concepts that allow us to explore the problem of the generative basis of the language within the framework of a given methodology, first of all, we can include the theory of the von Neumann architecture of computers [4,365 p.]. This theory of the description of imperative languages is a process of calculations in the form of commands that change the state of the program in the computer's RAM. The fundamental principle of the von Neumann architecture (Von Neumann model, Princeton architecture) is the actualization of the advantages of the binary system for technical implementation, which creates the convenience and simplicity of performing arithmetic and logical operations. This principle is fundamental in modern programs for processing and non-numeric types of information - textual, graphic, sound, etc. In the book of von Neumann "Theory of self-reproducing automata" (1966), the theory of cellular automata is described, which are capable of self-reproduction, similar to a living cell. An important stage in the implementation of the theoretical concept of the background of Neumann is the experiment of Leonard Edlman from the University of Southern California, who experimentally showed that DNA molecules can solve computational problems that present the greatest

difficulties for traditional computers. One of the first problems Edleman solved with the help of a biocomputer was the problem of calculating the optimal traveling salesman route algorithm. He solved it for 7 cities and 13 roads between them and highlighted the results of the experiment in Molecular Computation of Solutions To Combinatorial Problems (1994). The scientist is recognized as a co-inventor of the RSA encryption system (Rivest-Shamir-Adleman, 1977), which helps to solve so-called "trivial problems" using a computer. In 2002, L. Adlman and his research team managed to solve a "non-trivial" problem" using DNA calculations. In particular, they solved the problem with 20 SAT variables by synthesizing a mixture of DNA strands that logically represent the solution space of the problem. Processing this mixture algorithmically using biochemical methods allowed the researchers to weed out the "wrong" threads, leaving only those threads that contained information with correct solutions to the original problem. Such studies have been praised by the scientific community as pioneering achievements in the study of natural and artificial intelligence. Here it is necessary to recall that the famous German scientist A. Schleicher attributed linguistics to the natural sciences. He believed that language is the same organism as a plant or animal, and transferred Darwin's theory of the origin of species to the science of language. [13, C. 61] Recognizing the merit of scientists in developing topical problems in science and achieving a large-scale expansion of the affiliation of innovative ideas, it is necessary to note the following aspects related to the study of the problem of the deep generative basis of language as a semiotic system:

1. These studies are limited to the functioning of sign systems only in the neocortex.
2. Questions about the relationship and interdependence of the mechanisms of sign formation in the cortex and subcortical sphere remain outside the field of view of researchers.
3. The functioning of sign systems is studied only as manifestations of consciousness and intelligence in the field of computer information processing, the question of the role of natural language as a prerequisite for all mental properties of a computer is not considered.

To implement the above achievements in the field of artificial intelligence and language research and to consistently argue scientific assumptions regarding the solution of the intended task, it is necessary to proceed from the principles of the biopsychosocial approach to the study of the phenomenon of language.

RESULTS OF THE RESEARCH AND DISCUSSION. It should be noted that the scientific foundations for studying the problems of the genetic foundations of the language in the 19th century were studied within the framework of aphasiology (ancient Greek a- - not, without + phasis - speech, + logos - teaching), which in the 20th century became one of the important sections neurolinguistics (a branch of science borderline for psychology, neurology and linguistics). With the improvement of laboratory methods, in particular, the development of non-invasive methods for studying the brain in the 20th century (magnetic resonance imaging, electroencephalography, evoked potentials), work has intensified on the study of the

mechanisms of speech located in the corresponding centers of the cerebral cortex (Brock's Center (1867).), the Wernicke Center (late 19th century), the Center for Semantic Analysis of Speech and the Optical Center (early 20th century).Recently, researchers have begun to pay attention to the connection of these speech centers with the subcortical sphere.[3,p.270] “In thinking,” writes Academician P.V. Simonov, “superconsciousness gives samples of the new, fundamentally new information that does not follow from previously received impressions ... Unlike the subconscious, the activity of the superconsciousness ... is not controlled by consciousness and will under any conditions” .”[8, P.126] Continuing the thought of a well-known scientist, it can be noted that during the installation, activation and functioning of cortical neurons as material substrates of the brain, consciousness and thinking, conscious actions of the individual do not participate, because a person cannot consciously control these processes.

At the same time, a linguistic personality can consciously coordinate a speech act, enter into communication and stop speech actions. Here a reasonable question arises related to the paradox of language and thinking: does the subcortical sphere, devoid of human logic, unilaterally establish and coordinate the super-complex processes of the emergence and functioning of the material substrates of language and thinking? In order to answer this paradoxical question, it is necessary to turn to studies of the substance of the brain and the social content of culture embodied in language. In our opinion, it is necessary to proceed from the following aspects of the phenomenon of language and culture:

1. In contrast to the social component of language, in which all mental abilities and qualities of a person are concentrated, in the nuclear structures of the brain, where logical constructs do not function, there is an even more complex and effective quasi-semiotic information codification system based on basic human instincts (the instinct of self-preservation, the instinct of reproduction and the instinct of power). All these instincts are embodied in a single instinct of communication, which is crucial in mastering the language. It should be noted here that for a scientific interpretation of this problem, it is necessary to abandon the behavioral understanding of instinct as the body's ability to carry out patterned actions on a direct unconscious impulse, and take into account the presence of cognitive principles in instinctive behavior. The superiority of the instinctive principle in the nuclear structures of the brain is explained by the fact that it is based on a cryptosystem (cryptogram) formed during the evolution of the human race and serves as a single genetic prerequisite for processing and exchanging information. However, in the genetic cryptogram of instincts, the mechanisms for the formation and development of language abilities are not provided. This unique system is endowed with the ability to process verbal information only when genetic information in the cortex comes into contact with social information that enters the neocortex through the hearing organs. In other words, the mechanisms of language and thinking are formed on the line of contact between two phenomena - a genetic cryptogram and verbal codes for processing information stored in the minds of the linguistic community and individual minds. In

the absence of one of these factors, a person will be doomed to exist as a biological individual.

2. According to the data of molecular biology, a neuron of the brain in the subcortical area arises as a result of the “fusion” into one functional whole of molecular information, chemical energy and organic matter. [9, P. 869-872] The material substrates of the cortex also have a three-dimensional structure, however, unlike deep neurons, they do not have autonomous energy sources, therefore these neurons of the speech centers are in a latent, semi-active state and the activation of these cortical substrates depends on the receipt of bioimpulses from the subcortical area. A person is not able to consciously control the flow of energy into the speech centers of the neocortex, this process is fully coordinated by the hypothalamus and thalamus of the brain nucleus. By virtue of the law of energy conservation, the nuclear structures of the brain supply energy only to those areas of the cortex that should be actively involved in the speech act in a given period of time. However, in the process of performing a speech act at the level of illocution, the speaker can extract additional energy from the deep recesses of the brain to increase the degree of impact of speech on the listener. In the process of cognition, the subcortical sphere uses two types of specific connection with the cortex in a unilateral manner: efferent connections ensure the flow of information, including bioimpulses, from the subcortical sphere to the cerebral cortex, afferent connections directed from the cortex to the subcortical part serve as a feedback channel. This feature of speech is manifested in the fact that the child initially learns the skills of auditory perception, and then he develops speaking skills. Violations of neural and neuromuscular connections lead to pathologies of speech, in particular, alalia (absence or underdevelopment of speech in children with normal hearing and primary intact intelligence) and bradilalia (slowing down of speech due to the difficulty in making dissected sounds).[10,120 c.]

3. The deep subcortical basis of the brain is able to establish in the neocortex, along with the signatures of verbal communication, the sign structures of non-verbal communication, which to a certain extent can compensate for a person's lack of ability to communicate through language and speech. A striking example of such compensation is the ability to establish contacts with others in deaf and blind children who initially suffered from these ailments. Children who are deaf-mute from birth and whose sound-conducting apparatus does not function (the system of anatomical organs: the outer ear (auricle and external auditory canal) and the middle ear (tympanic cavity, Eustachian tube and mastoid process), the motor speech analyzer that provides perception and analysis does not function either information from the organs of speech, as a result of which the child is not able to learn the verbal form of communication. However, children with such speech defects can learn sign language, a type of non-verbal communication used by deaf and deaf-mute people. Sign language as an independent language, grammatically identical to verbal language, is almost completely independent of verbal language. It consists of gestures, each of which is made with the hands, combined with facial expressions, the shape or

movement of the mouth and lips. Children who are blind from infancy have no difficulty in mastering the verbal method of communication, however, children in this category have serious problems in mastering literacy. In teaching literacy to blind children, Braille is used (fr. Braille) - a relief-dotted tactile font designed for writing and reading in the complete or partial absence of the child's ability to visually perceive the text. From all that has been said, it follows that the subcortical sphere of the brain in one-sided form, without the participation of consciousness and thinking in the cortex, establishes sign signatures that are identical to the national language of the child's environment. The three-dimensional material, structural and information quasi-semiotic signature of the deep sphere is focused on the formation of a universal human ability to communicate, which, under favorable conditions for the growth of a child, takes the form of verbal communication, and in the presence of negative factors in terms of compensation, forms signatures of other forms of non-verbal communication.

4. As speech is mastered, all neural formations as material substrates of the cortex undergo a transformation process, while the neural substrates of the subcortical sphere remain unchanged, retaining the identity of the cryptogram of the genetic code of information processing. The constancy of the genetic code of the deep sphere of the brain makes it possible to preserve the ability to use language as a means of communication, which is characteristic of all people, regardless of what language they communicate in. Such an immanent property of the nuclear structures of the brain is clearly manifested in the speech of children who, due to a coincidence of life circumstances, leave their family and live among people whose language differs significantly from the language of the child's parents. As observations show, such children perfectly master the language of their environment and successfully assimilate the form of thinking of this community. When learning another foreign language, including the language of their biological parents, children's speech manifests speech defects (interference, accent, etc.) that are characteristic of the speech of the surrounding language community. These facts indicate that the genetic codes of the quasi-semiotic system for processing all types of information are stored in the deep structures of the brain through universal coding and decoding mechanisms that can ensure the relevance of processing verbal information in the neocortex.

5. A distinctive feature and an important factor in ensuring full-fledged communication through natural language is the ability of a human language to adequately express thoughts, emotions and value ideas of a linguistic personality. These mental properties of language, including logically substantiated thoughts, human emotions and value representations, manifested in the cerebral cortex, are not relevantly perceived in the genetically determined deep substance of the brain. However, in the nuclear structures of the brain, incl. in the hypothalamus, with an increase in a person’s emotional attitude to the realities of life, instinctive mechanisms for controlling biochemical and endocrine reactions are triggered, which provide the neurons of the cortex with additional energy necessary for an adequate

experience of a person. For example, when a person hears words like “beautiful”, “sublime”, “ridiculous”, the flow of additional impulses necessary to express a positive attitude of the individual to perceived realities is significantly enhanced, while perceiving the words “ugly”, “low”, “tragic” additional impulses needed to express negative feelings and urges. In some types of speech pathology, in particular, in the syndrome of the middle part of the frontal lobe, associated with the defeat of fields 9, 45, 46 and 47 according to Brodmann, the patient's speech shows false euphoria, complacency, cheerfulness, combined with a decrease in criticism. These pathologies are most often associated with a violation of the cortical-subcortical synapses involved in the energy supply of cortical neurons. [11]

6. In a language as a semiotic system, entropy constantly occurs (from ancient Greek ἐν "in" + τροπή "conversion; transformation") - the process of irreversible dissipation of energy or the uselessness of energy. Language entropy often takes the form of informational entropy, a measure of uncertainty and disorder associated with a lack of knowledge, information, or a way to verbalize a new concept. With the onset of entropy, the subcortical sphere helps to intuitively find a measure of orderliness and organization of the system of linguistic signs - negentropy, which is expressed in the strengthening of a person's linguo-creative abilities and linguistic instinct, which are reflected in language creation and speech creation.

7. The connection between the generative basis and the neocortex is carried out due to the transitivity of the language (eng. transitivity, in the theory of dynamic systems - the presence of a condensed phase in the system, in the language - the ability of the deep substance of the language to create a new orbit of sign formation in the neocortex), which reflects the immanent property of the genetic substance of the brain in the coordination of the mechanisms of the speech act. Multiplexing (eng. multiplexing, muxing) (eng. multiplexing, muxing) is a mechanism for converting bioimpulses into speech intentions in the subcortical sphere, into mental and psychological constructs in the neocortex, into the sounding matter of language - in a real speech act. The transitivity of generation, voicing and speech during speaking and writing has the character of a three-stage process: 1-stage - processing of information in the subcortical sphere in the form of DNA calculations at the level of biomolecular reactions and the instinct of communication; 2nd stage - mental-psychological codification and transformation of information into mental constructs of language in the neocortex; 3- stage - socio-cultural codification - perception, comprehension and transmission of information in accordance with linguistic (language norms) and cultural codes. With the perception of speech by ear and reading, this process occurs in the reverse order.

CONCLUSION. In studying the problem of the generative basis of 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 quasi-semiotic information processing system of the subcortical sphere at the line of contact between genetically determined and sociocultural information establishes and coordinates the process of setting, activating speech

signatures in the neocortex and ensures the functioning of multiplexing mechanisms as a systemic transformation of bioimpulses into mental constructs of language in the cerebral cortex and actualization of full-fledged verbal communication outside the bodily substance person.

References

1. Chomsky N. Language and thinking. - M .: Publishing house of Moscow University, 1972. - 126 p.
2.Jackendoff, Ray. Foundations of Language: Brain, Meaning, Grammar, Evolution. — Oxford/New York: Oxford University Press, 2002.
3 Musso, M., Moro, A., Glauche. V., Rijntjes, M., Reichenbach, J., Büchel, C., Weiller, C. Broca's area and the language instinct // Nature Neuroscience. — 2003.
4. Neumann John von 1966. Theory of Self-Reproducing Automata, Burks, A. W., ed., University of Illinois Press. ISBN 0-598-37798.
5. Herman H. Goldstine. The Computer from Pascal to von Neumann. - Princeton University Press, 1980. - 365 p.
6. Adleman, Leonard M. (November 11, 1994). "Molecular Computation of Solutions to Combinatorial Problems" (PDF). Science. 266 (5187): 1021–1024.
7.Benjamin C. Pierce. 2002. Types and Programming Languages. MIT Press, Cambridge, MA, USA.
8. Simonov P.V. Creative brain: neurobiological foundations of creativity. - M., 1993.
9. Enard W., Przeworski M., Fisher S. E. e. a. . Molecular evolution of FOXP2, a gene involved in speech and language // Nature, 2002, 418 (6900). - P. 869-872; Lakoff, George, Johnson, Mark. Philosophy in the Flesh. The Embodied Mind and its Challenge to Western Thought. New York: Basic Books, 1999.
10. Mukhiddinov A. G., Makhmudov N. I., "Russian-Uzbek dictionary of medical terms for speech aphasias." Fergana, 2022.
11. https://ru.wikipedia.org › wiki › Frontal syndrome
12. Atlas of the World's Languages / R. E. Asher, Christopher Moseley. — Routledge, 2018.
13. Schleicher A. Fragments from works. - In the book: History of linguistics of the 19th and 20th centuries in essays and extracts, part 1. M., 1964