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Evolutionary Approach to Understanding Language and Thinking

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Abstract

The paper analyses language and thinking not as elemental power, but in evolutionary aspect. Language and thinking are examined as a product of evolution and result of specific type of activity – social activity and culture, interpreted as a social code, external memory, providing the continuity of social communication. Evolutionary approach applied in this research is based on the idea of global evolutionism. Evolution is interpreted as multilevel system and co-evolution of the system and the environment. This enabled us to define the levels of cognitive evolution, levels of language evolution, and to reveal the recursive mechanism of interaction between language and thinking.

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1. Introduction

Our understanding of the nature of language varies from the obvious view that language is a system of signs to the more complex that “language is the interface between consciousness and the brain, mind and world” (Chernigovskaya, 2013). Is language the means of communication or the means of thinking? Are language and thinking closely related and considered as the fundamental givens or as formed during the evolution of human-specific functions and existence? Whether a person is born with the innate ability to think, and speech is an external manifestation of a stream of conscious representations? Or that language and thinking are products of evolution, creation of a particular kind of activity - social actions and culture, understood as social code, a kind of external

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memory, ensuring the continuity of social communication? We are trying to answer these questions by examining language and thinking not as original thinking ability but in evolutionary terms.

An evolutionary approach to language is not as traditional as in biology. Even less accepted in linguistics is the use of natural sciences methods of language description. However, since the 1970s, a new scientific paradigm called evolutionary synergetic paradigm has developed in the scientific world view. The fundamental idea of this paradigm is the idea of a global evolution. Unlike the classical evolution, global evolution doesn't contrast variability and stability. Global evolutionism is based on historicism (formation, variability) and system (integrity, interdependence). Based on the ideas of global evolution an image of the world as self-evolutionary super-system has developed, in which any object appears as a component of integrity, as an event, and as a system at the same time. Here, any object is considered as a system, and not opposed to the process. Process is getting a universal characteristic, but it is important to take into account the integrity of the Universe, in which all constituents are systems, which are a kind of block of evolution, local sustainability, and integrity.

In this study, language is observed as such integrity. Speaking of integrity, we must take into account that the environment in which the system can evolve is also changing. Environment potentially contains different types of localization processes. Environment is a common beginning, acting as a carrier of various forms of the future organization, as controversial development.

It is important to note that in biology, a recognized leader among scientific disciplines in the development of evolutionary methodology, the following stages of the evolutionary paradigm are allocated: transmutation of species; classic evolutionism (Darwinism); the synthetic theory of evolution; and global evolutionism. In the evolutionary approach based on the idea of global evolution, the essence of the understanding of evolution is expressed by the term "Co-evolution" - the joint evolution of the system and the environment.

In our case, where the language is observed as an evolving system, culture and society is its environment. In the aspect of global evolution, every transformation turns out to be the co-evolution of the system and its environment. This approach generates new insights into the nature of language and thinking. U. Maturana (2001) was the first who presented a new theory of language in his publications "The Biology of Language", "Epistemology of Reality", "Biology of Cognition", etc. In U. Maturana's Theory of Autopoiesis, thinking appears as a recursive process in which the information is not retrieved from the subject of perceiving reality but is constructed by it. Language and culture play a role of environment, and movement within it determines the result of its construction. Maturana points out that what we accepted as sensory experience is a state of relative activity between neurons that generate new descriptions in the language field in the form of thoughts and the subsequent descriptions. The process of cognition appears as a process of adaptation to the environment in which language plays the decisive role: "words are ontogenetically established coordinators of conduct" (Maturana, and Varela, 2001).

Deacon T. W. (2007) defends a similar viewpoint, noting that language is not a formal computational structure, but a spontaneously occurring emergent adaptation that couldn't be deduced from any inborn mechanisms or explicitly or implicitly obtained statements. This is the result of self-organization and selection, and a biological basis for such unprecedented adaptation cannot be localized to any neurological structure as a result of a point mutation. This is co-evolution of neuronal base and social dynamics (Deacon, 2007).

The idea of a global evolutionism is the basis of the new scientific picture of the world; it enables the integration of sciences of nature and humans through evolution. If, in the twentieth century, the idea of global evolution served as a basis of the interdisciplinary integration of natural science within the framework of the research program of self-organization, today based on the evolutionary approach, integration of natural and humanitarian sciences has turned out to be productive. So, socio-synergetic domain focuses on revealing the logic of the social process, as does self-development in the search for common algorithms for social development, in its evolutionary-structural cycles. The stage of the global evolution, as connected with human evolution, unfolds in two complementary core planes as cognitive evolution and as social evolution. Cognitive evolution is characterized by increased complexity of thought; social evolution is characterized by increased cultural diversity. The common factor in cognitive-social evolution is language. The question is: how productive is the system-evolutionary approach, based on the idea of global evolutionism, in the study of cognitive evolution and of language development?

The hypothesis that we are going to justify is formulated as: "cognitive evolution and the evolution of language are two complementary directions of social dynamics, the study of the interdisciplinary research of a single subject - language-thinking-cognition". The basis of this approach is correlation of attitudes about the world, produced by the

evolutionary-synergetic paradigm with notions about the nature of thinking and learning formed by modern cognitive science.

2. Methodology

The research methodology of cognitive evolution and of the evolution of language in the context of the global evolution is referred to system-evolutionary methodology. Argument in favor of the system-evolutionary approach based on the idea of global evolution: scientists identified common regularities characteristic of biological, cognitive and social evolution. For the first time, the link between biological evolution and the evolution of the cognitive system of organisms has been established within the framework of evolutionary epistemology. Evolutionary epistemology is defined as “a theory of cognition, which is based on the interpretation of a human as the product of biological and social evolution” (Campbell, 1974).

One of the founders of evolutionary epistemology, Lorenz K. (2000) noted that, understanding cognition as the natural historical process, we insert the cognitive experience into the evolutionary process. The subject of evolutionary epistemology is the evolution of cognitive structures, mechanisms of increase of knowledge, and cognition, understood as a function of the development function of life (Lorenz, 2000). Famous researchers, Maturana U. and Varela F. applied an evolutionary approach to the study of language and its role in human evolution and culture (Maturana, Varela, 2001). At the present stage of cognitive science, enters thinking capacity into the picture of reality generated through the system-evolutionary approach. Cognitive science does not reduce the mental to the physical and does not restrict behavioral function to cognitive process, but creates a more sophisticated model of learning through the integration of natural science and the humanities. It demonstrates the desire to understand such phenomena as language, freedom, morality, knowledge, not only through the study of culture and sociality, but also through the use of scientific argument.

3. Discussion of Results

3.1. *The idea of cognitive evolution*

In this study, cognitive evolution is viewed as part of the global evolution and as a relatively autonomous unit in the architecture of evolution; the role of language as a factor of cognitive evolution is examined. Cognitive evolution – is the evolution of cognition; we shall follow the interpretation of knowledge as creation and as process of assimilation.

In classical epistemology analysis of cognition generally started with the adoption of cognition as givens (an innate ability, a divine gift, the original evidence, etc.). In non-classical epistemology the horizon of cognitive practices is much broader and characterizes cognitive practices. Provided is not mere a model of cognition, but more like a prototype of cognition, projective-constructive model, hermeneutic practice of learning, constructivist models, model of knowledge provided by the evolutionary epistemology. The most adequate scheme of knowledge in the epistemological approach is evolutionary epistemology, in which knowledge is treated as an adaptation process of constructing knowledge.

In the evolutionary approach, cognition is reckoned not as given, but as a link and function of universal evolutionary process. Cognition is considered as two co-evolutionary processes - the process of the evolution of thinking and the evolution of language. The cognitive system is comprised of the brain, body and external environment. In cognitive evolution, at least two mutually dependent processes are involved: the evolution of cognitive system of subject's knowledge, and the evolution of total knowledge, including scientific knowledge. Cognitive evolution at the level of individual cognitive-personal evolution could be traced to the material of human intellect. Well known is the effect, called “cephalization” which is the ratio of brain weight to body weight. People have the biggest index of cephalization, and there is a slight increase of this index. Intelligence tests developed at the beginning of the 20th century allow keeping track of these dynamics. The effect, named after its founder, Flynn J., secures the stable growth of the intelligence of the population of all the countries where the study was conducted.

Cognitive evolution at the level of thinking as a sign of human evolution, in general, also has its stages. The first phase is characterized by anthropologists as a milestone of mythological thinking (C. Lévi-Strauss), “archaic thinking” (M. Eliade), “before-logical thinking” (L. Levy-Bruhl), etc. For primitive thought, associations, the lack of self-reflection and logical generalizations are typical. Comparing the thinking of a modern human with an archaic human, Levy-Bruhl has noted that we see the world with the same eyes but see it with different consciousness (Levy-Bruhl, 1937).

3.2. Thinking and language: comparative analysis

The essence of thinking lies in its correlation with categorization and manipulation of symbols. However, psychologists, linguists, and philosophers do not restrict the ability of thinking to purely logical operation of abstract symbols, but see it as a process that is inextricably linked with thinking beings, their bodies, cultures and actions. The classical theory interpreted the process of categorization as a mechanical operation of abstract symbols; hence a comparison of the mind with the computer was popular. Today, in linguistics new understanding of categorization has formed, influenced by the theory of prototypes, according to which the mind is not sufficiently understood as a mirror of nature or operation of abstract symbols. Thinking is related to the nature of thinking organisms, including the nature of their bodies, and their interaction with the external environment. In non-classical interpretation, categorization is presented as a product of human experience, imagination, perception, motor activity and culture, on one hand, and the metaphors, metonymy and mental imagery in general, on the other.

The second evolutionary system is language, its functioning – social language activity. Language occurs as a result of encoding the phenomena of reality by language elements. But, having thus arisen, language becomes a phenomenon of reality. Language elements are essential for social activity and they enter into a person's life, like tools and household items. Like making and improving tools, people create new language elements for describing reality, although some language elements were already created (Turchin, 2000). Self-organization in human systems can be correlated with self-organization in arbitrary information systems but people unlike molecules have their own intentionality. Therefore, the dissemination of information is carried out not by mechanical simulation but through communication. Therefore, the specific of managing complex social systems depends on the existence of an effective communication network.

An evolutionary approach to the analysis of language and cognition allows one to emphasize the structure of these phenomena and indicates levels of a complex organization. The evolutionary transition from one level to the next, Turchin V. describes as “meta-system transition”, and Maturana U. calls it “new structural entailing” (Turchin, 2000; Maturana, Varela, 2001). Language conveys basic information at the lowest level. This language usage is typical for many animals. On the first language level, concepts are the core of representation; they can be thought of as casts of neural models of reality. This is already a conceptual level, but typical for ordinary, everyday communication. On the second language level, notions are constructs. Here models of not real phenomena, or abstractions in socio-cultural dimension, are constructed. Therefore, the second level is the level of self-description.

The last level of complexity conditions human interaction with the world. This level is associated with sociolinguistic and self-reflective activity. Formation of human cognition and its specificity of the human capacity for self-knowledge have undergone the formation of new cognitive mechanisms and sectors. Among these are presented the logical-verbal and symbolic thinking that are implemented by language, tradition and morals. Culture as a socio-code is a new means of broadcasting information that greatly speeds the process of cognitive evolution. In the system of values and cultural universals, behavioral strategies of an individual related to mastering the culture of learning are coded. Dawkins R. (1993) proposed the theory of memes (culture-gene), as a unit of cultural information. This mechanism describes the specifics of social evolution; it can be defined as the replication mechanism using cultural memes.

3.3. Problems of language and cognition interaction

Analyzing the problem of cognition and language in global evolutionism aspect leads to two results. First, we show that the interaction between language and cognition should be understood as a process of two spontaneous co-evolutionary systems, each of which has a structure characterized by levels of difficulty and a recursive mechanism

of interaction. Secondly, we strengthen and complement the concept of global evolution, showing its methodological productivity, an opportunity to identify universal mechanisms of evolution in the self-developing systems of varying types, non-living, sentient, cognitive, and social.

The evolutionary process is not linear, unidirectional, but continuous growth of progressive changes. In biology, astronomy, and geology, that accumulated experience of evolutionary research, two complementary ways of describing evolution are observed. In biology these two ways are presented in Darwinism and non-genetic theory; in geology, substrativism and uniformism are applied. In astronomy, a classical theory explains formation of space objects (planets, stars) by condensation of diffuse matter is opposed to non-classical theory that is represented by byurakan conception to explain the evolution of the stars and planets as a result of the collapse of dense formations. The author's research has shown that substrativism and non-genetic theory, non-classical cosmogony, describe evolution as a whole and in the same way, regardless of the substrate of the evolving system: mainly as intermittent, spasmodic, irreversible natural process. Uniformism, selectionism (Darwinism), classic concept in cosmogony focus on alternative development of properties, such as continuity, frequency, multi-directional movements and fortuity (Chernikova, 1987).

It is important to note that language as self-developmental system is described by such complementary approaches. So, it is noted that Jackendoff and Pinker are supportive of the position of the slow development of the systems based on Darwinian adaptation that presided the language; whereas, Hauser, Chomsky, and Finch tend rather to a revolutionary scenario, that is, the emergence of language as a result of a certain event - mutation (Chernihiv, 2013).

Considering the results of the study, compared with other authors, you may notice the following: the evolutionary approach adopted in the study of biological systems, is not traditional in the study of language and cognition. In linguistics, the researchers described the languages as a static system with a set of rules (Saussure, Jakobson, et al.) up to N. Chomsky. Today an evolutionary approach to the study of language and cognition gets support. It is, above all, N. Chomsky's idea of universal grammar. A theme of the mental lexicon has developed. D. Dennett, using an evolutionary approach called evolutionary cognitivism, noted that the development of cognitive and reflexive means incorporated into the information processes of evolution, is part of these processes, and the result of interaction with them. Otherwise, people would not be able to navigate in the environment (Dennett, 2003; Julina, 2007).

Russian linguist Chernigovskaya T.V. (2013), after reviewing the principles of evolution of natural languages and programming languages, and physiological systems, concluded that there were many vast similarities between them. "Noticed analogies," said the author, suggest that there are some common patterns of evolution of functional systems. This idea confirms the distribution of methodology of global evolution in the evolution of language. It describes cognition as the formation of concepts and hypotheses on the nature, structure and rules of the world. According to this theory, language is understood as a tool of cognition, a specific ability of the brain that gives one the capability to build and manage sophisticated communication signals, providing a way of thinking (Chernihiv, 2013). A similar view is expressed by Deacon T.W. (2000), who has formed a position according to which the brain and language can co-evolve, but the primary adaptation work produces the language.

4. Conclusion

Discussion of the mechanism of the evolution of language and thinking has identified two oppositional approaches - inborn language ability (N. Chomsky, S. Pinker) or mastery of the language through learning (Skinner and his followers). Analysis of the problem of the relationship between language and thinking, from the perspective of modern evolution, based on the idea of global evolution, as contemplated herein, will help bring the debate to a new level of conceptualization. Both concepts are treated as co-evolutionary processes of the evolution of thinking and the evolution of language, each of which has a structure characterized by levels of difficulty and a recursive mechanism of interaction with the environment.

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