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Metaphor as an Object of the Synergy Paradigm Study

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***Abstract*---**The article investigates the ontognoseological properties of metaphor from the point of view of the synergetic paradigm. By the principles of synergetic science, metaphor is considered as a nonlinear system category that performs a system-forming, heuristic, generalizing function. With the help of the principle of subordination, complex systems are described through a limited number of order parameters, as a result of which information is compressed without loss. The metaphor has its origins in the economy: as a method of abstraction, the transition from the infinite to the finite, and the reduction of lexical means. Metaphor is a way of transmitting an idea that has a methodological significance, i.e. one theoretical system is translated into another and one system is investigated through another, simpler system. Metaphor as a dynamic formation establishes connections between objects of different orders and processes in their development in space and time, which allows you to explore metaphors using the principles of synergetics.

***Keywords*---**information compression, innovativeness, metaphor, noninearity, prosedurality, synergetics, theory of knowledge.

Introduction

Metaphor, as a complex multifaceted, and the multidimensional phenomenon is the subject of research in numerous scientific disciplines: psycholinguistics, cognitive linguistics, literary criticism, philosophy, etc. Numerous studies are devoted to the philosophical and psycholinguistic problems of metaphor, which have general methodological meanings (Bickerton, 1990; Cortazzi & Jin, 1999; Kuliev, 1987; Ortega y Gasset, 1990; Raymer & Camp, 2008; Steen, 1999).

M.Cortazzi and L.Jixian investigated the interdisciplinary nature of metaphor, as a link between teaching, learning, and language (Steen, 1999) and they considered that metaphors represent cognitive and affective refining of students' fundamental beliefs about learning, but the study of D.Steen showed that the best way to analyze conceptual metaphors in the sense of constructing

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metaphorical prepositions among linguistic, conceptual and communicative analysis is the linguistic (Steen, 1999).

The role of metaphor in the functioning of language is expressed in the fact that the thoughts are revealed with its help in the language process and "any theory of natural language not considering a metaphor is unable to explain how languages function" (Bickerton, 1990). M.Raymer and E.Kamp believe that metaphor, first of all, is a conceptual phenomenon and linguistic properties are derived from the first and the dominant field of research of metaphor belongs to the cognitive sciences (Rotenberg & Arshavsky, 1984).

Investigating the communicative role of the metaphor, Ortega concludes that thanks to the metaphor our thought becomes available to other people, we need it for ourselves for the object to become available to our thought (Ortega y Gasset, 1990). In the process of cognition, the metaphor opens access to abstract objects that elude concrete perception and it is "that instrument of thought, with the help of which we manage to reach the most distant parts of our conceptual field" (Ortega y Gasset, 1990). Perhaps, based on these properties, he evaluates each metaphor as a discovery of the law of the universe (Ortega y Gasset, 1991). An analysis of the metaphor meaning in the linguistic design of new knowledge shows that the disclosure of the essence of the mechanism of formation of a new one in science is associated with a comprehensive study of the metaphor (Kuliev, 1987).

This brief review shows that based on the principles of synergetics, the study of the metaphor mechanisms has not been given appropriate attention, which would allow a new approach to the cognitive capabilities of metaphor in the aspect of interpreting the nature and significance of new results in science. The attempts to identify the ontological and epistemological aspects of the synergistic nature of metaphor, i.e. the properties of reflection of the nonlinearity of the processes of the surrounding world, its heuristic potential, and the structural and functional sources of the information economy is taken into the article (Meynhardt et al., 2016; Wolff, 2006).

Based on the purpose of the research, the article uses the results of the study of the philosophical problems of synergetics, together with a comparative analysis that allows drawing parallels between synergistic objects and metaphors. Comparative analysis allows us to select the main attributes or parameters that determine the similarities between objects and processes, ensures the integrity of the study of the object, which is consonant with the concepts of synergetics.

Method

The age mate of poetry and the proto-language of mankind, a metaphor, initially became in demand in communication processes and in the knowledge of the surrounding world, used as a method of cognizing the properties of objects and the relationship between them, the laws governing the course of processes in the material and spiritual world. Based on this, we can conclude that metaphoricity is inherent in human thinking. According to the remark of Sh. Bally, it turns out to be the only way to cognize abstract concepts: "Metaphor is ... a comparison in

which the mind, under the influence of the tendency to bring an abstract concept and a concrete object together, combines them in one word" (Balli, 1961).

As an immanent element of thinking, the formation of a metaphor originates from mythology, for "... a metaphor was not a ready-made quantity and was not created immediately. It had its historical path and the process of formation which began in antiquity" (Freidenberg, 1998). The emergence of a metaphor is associated with an objective necessity since, without a metaphor, some mental operations become impossible, "a metaphor arises not because it is needed, but because it cannot be dispensed with, it is inherent in human thinking and language as such" (Gak, 1998).

Metaphor in philosophical research performs various functions: it is an adequate, organic way of its existence and a form of expression of philosophical ideas; plays an integrative role in ensuring the unity of ontology, logic, epistemology, and axiology in their methodological aspects, allows tracing the logic of the formation of new ideas. The ontological function of a metaphor is based primarily on the process of constructing reality, i.e. determined by its nominative, descriptive properties. Nominative knowledge of the surrounding world is formed on the life experience of a person, on the knowledge of the properties of these objects in the surrounding world (Marin et al., 2014; Subiyanto, 2016).

The notion of nomination has a direct connection with the concept of the philosophy of the name, and the philosophy of the name sees "all our cultural wealth, accumulated over the centuries in the word, and especially in the name; ... The meeting of all possible and conceivable layers of being is in the word and the name; ... In the name - the focus of all physiological, mental, phenomenological, logical, dialectical, ontological spheres" (Losev, 1990).

Metaphor creates not only new concepts and new terminology; it leads to discoveries in science, especially in border areas. A.Poincaré was the first to introduce the term "the principle of relativity," after which, through the efforts of Poincaré, Einstein, Minkowski, Lorentz, and other scientists, the principle of relativity became the greatest discovery of the XX century. The terms "limit cycle" and "bifurcation" introduced by Poincaré, became the basic categories of the synergetic paradigm (McGuire, 1983; Jackson & Decety, 2004).

The metaphor is also used as a means of displaying the reality around us, events, and processes; thanks to syncretic-synthetic properties it can present a holistic vision of the world, i.e. to recreate a complete picture of the external world. The epistemological functions of a metaphor are assessment, predication, the ability, based on known objects and processes, to catch and create similarities between very different types and classes of objects, a way to combine elements of different orders into an integral system.

In the study of the role of metaphor in post-non-classical cognition (Reshetnikova, 2010), metaphor is defined as a linguistic universal, which allows connecting the processes of imagination and thinking with the processes of linguistic creativity (model-semiotic approach). The significance of the linguistic aspects of metaphor is considered, because metaphors are needed for the competitive representation of

the results of post-non-classical science, as irreplaceable means of expression. In the proposed work, for the study of metaphor, categories such as nonlinear system, processuality, innovation, optimality are used, which allow clarifying the synergetic properties of the metaphor.

Results and Discussion

Metaphor and synergistic system

The metaphor has defined the non-linear system character of human thinking. The study of metaphor as a dynamic system by the principles of the synergetic paradigm allows us to reveal its new properties. The synergetic nature of the metaphor was noticed even in the Aristotelian definition: metaphor is the transfer of a word with a changed meaning from species to type, from type to species, from species to species, or by analogy (Aristotle, 1998). Analogy and proportionality are a kind of hint to the property of fractality, which is known as self-similarity. And this determines the ontognoseological property of the metaphor, represents a tool for cognition and display of the surrounding reality since the universe has a fractal structure.

Aristotle defined the procedural nature of the metaphor, too. "I assert that the expressions that mean things in action are visual" (Aristotle, 1998), i.e. the metaphor expresses the connections between objects and processes of different order in dynamics, in their development in space and time. This laconic definition hides the modeling potential of the metaphor, which makes it possible to find the optimal solution to the problem: "Metaphorization is the base of heuristics, i.e. the ability to find optimal solutions without sorting out sequentially the entire set of options" (Dolinin, 1987).

The idea of a metaphor as synergy determines its integrative, system-forming properties, to find or create connections between distant objects. Systemic properties are dominant, and their other properties are derived from the principle of systems. In this regard, using a systematic approach, it is possible to determine the main and derivative functions of a metaphor and draw corresponding parallels between the synergistic paradigm and metaphor.

Haken defines the synergetics as "the science of interaction" (Raymer & Camp, 2008) since development and self-development is the result of the process of interaction, which, as a philosophical category, expresses "a universal form of communication between bodies or phenomena, carried out in their mutual change ... Interaction is a process, the internal unity of which is carried out in the continuous change of its elements and sides" (Philosophical encyclopedia, 1960). In synergetic systems, the interaction takes place between the order parameters and the parameters of the state of the system, as a result of which coordinated and coherent relations are established between the elements and levels of the system, the system approaches the bifurcation point, after which a new structure is formed.

The interaction of sensual and rational, finite and infinite generates qualitatively new information that reveals previously unknown aspects of the concepts' content

included in the structure of the metaphor. In synergetics, abstract mathematical formulas have been used that express the internal connection between systems and processes of a very different nature, thereby acquiring an ontological status. The laws of gravity and Coulomb, or the laws of mass and heat transfer, have respectively identical mathematical formulas.

Synergetic and metaphorical forms of thinking have structural and functional parallels

Synergetic or non-linear thinking is multicomponent: choosing the best solution from the available alternatives, instability, and ambiguity in the situation of choice. A small change can lead to a large result, the initiation of processes of rapid, non-linear growth, an abrupt development, i.e. "learning to think synergistically means learning to think non-linearly, to think in alternatives, assuming the possibility of changing the pace of events and qualitative breakdown, phase transitions in complex systems" (Knyazeva, 2003).

Metaphorical thinking has a wide range of functions: the formation of a system from elements opposite in nature, the translation of one conceptual system into another, the transformation of the original sign or objective information into mental images, the mediated reconstruction of reality, as well as express inaccessible information through accessible information. Plus, both ways of thinking are constructive, creative, and focused on creating new, original thought (Neale & Carroll, 1997; Shinotsuka et al., 2020).

Metaphor as an approximation method allows one to study one system through another, already more familiar system, which requires a creative approach to the task. One of the approximation methods in mathematics is the finite difference method, the essence of which lies in the fact that the original continuous problem of mathematical physics is replaced by a difference scheme, its discrete analog, as a result of which a system of linear algebraic equations is obtained, by solving which the approximate values of the solution at the nodes are obtained. The finite difference method has high versatility, for example, much higher than that of analytical methods, is often characterized by the relative simplicity of constructing a decision algorithm and its software implementation. Thus, the transition from infinite to finite makes it possible not only to simplify the problem but also to ensure the universality of the method and the efficiency of the solution.

The transition from the infinite to the finite has another advantage, i.e. leads to information compression, which is characteristic of a synergistic paradigm and metaphor. Complex non-linear systems, as multilevel systems, have a structural hierarchy, each level of which is relatively independent. The internal development of each of them contributes to the development of the other on the principle of optimizing their mutual influence. In such systems, "the fundamental role is played by the order parameters that determine the behavior of the system components through the principle of subordination" (Haken, 2003), these parameters set the ontology, the principle of the existence of the system, allow simplifying a complex developmental system since the number of order parameters is much less than the state parameters. The description of the system

from the position of the principle of subordination significantly reduces the degree of freedom, provides and justifies a huge compression of information without any loss of information.

The metaphor is laconic, compiled on the principle of economy, i.e. lexical units are reduced. Similarity predicates and comparative unions are excluded from it, which ultimately leads to the absence of explicit comparison and motivation. In other words, a metaphor is an implicit comparison, and this allows omitting a sign, or a sign and a specific object, to get a significant reduction.

Metaphor as active creative search

Metaphorical thinking is characterized by the ability for associative intuitive thinking, as well as suggestiveness, i.e. the property of influencing the reader's imagination to evoke vivid emotional experiences, to reveal a new understanding of the world, or to update the old (Gentner & Clement, 1988; Gibbs Jr et al., 2004).

Associative-figurative thinking as a unity of intuitive and rational-logical thinking activity contains the necessary and sufficient conditions for the formation and solution of a creative problem. It is known that the associative component initializes the beginning of the search, “forms a sensory-semantic environment,” and the figurative constituent allows one to construct an image that is multifaceted and requires many interpretations.

Moreover, the cognitive property of metaphor is largely a function of the imagination. In the process of thinking, and imagination performs various tasks, among which Hegel singles out the associative component, “as summing up individual ideas under the general” (Hegel, 2003). E.V.Ilyenkov draws attention to the property of an integral “vision” of the imagination, “as the ability to see the whole before its parts” (Ilyenkov, 2014). Penetrating objective reality and imagination, in particular, to the essence of the subject uses only the minimum necessary features to characterize the object of research.

The images created in the imagination are united by both the reproduction of the past and the present, as well as the elements of the future, which are associated with the activities of the right hemisphere. The right hemisphere perceives the world as it is, in all its diversity. It is capable of creating ambiguous connections and identifying new ones, as well as connecting them with existing experience. The majority of researchers are in solidarity in the opinion that the originality of thinking is associated with right-brain thinking (Kuliev, 1987; Rotenberg & Arshavsky, 1984; Rotenberg, 1980).

Metaphor is an active creative search, which combining disparate fragments of the universe, generates new meanings. In the creative process, the role of the non-rational component is well-known. In the synergy of left-brain and right-brain thinking, V.S.Rotenberg notes the decisive role for the creativity of right-brain thinking and the problem of context: “... any image directly reflects reality in its entirety, and therefore is rich and multifaceted. The peculiarity of the figurative context is that all the innumerable properties, “facets” of the image

come into interconnection with the equally numerous properties of another (or even many others) image, and all these connections are established at the same time" (Rotenberg & Arshavsky, 1984). The creativity of the image, he explains, is its inexhaustibility. Not only the image is inexhaustible, but also the objects and phenomena of reality. It should be added that only the shades of color are numbered in the millions, and to give names to these shades, words are not enough, which conditions the use of metaphor.

In the creative process, G.Kuliev emphasizes the role of emotional factors: "The reflex to novelty in scientific activity begins ... with an emotional shock" (Kuliev, 1987). Emotional shock is characteristic of intuition, which like a sudden insight, expresses the ability to directly comprehending the truth without proof.

M. Bunge defines intuition as a kind of autonomous way of knowing, which is characterized by sudden, complete, and accurate comprehension (Bunge, 1967). Intuition performs the function of a mediator between the unconscious and consciousness, i.e. includes several mental operations, starting with the collection, unconscious processing of images and ending with the unexpectedness of the desired solution.

The metaphor and the synergistic paradigm are united by one more property — innovation. In synergetics, innovativeness, i.e. the formation of a new structure is associated with phase transitions, which occurs when the system crosses the line separating the two phases. Phase transitions are accompanied by jumps; during a second-order phase transition, a jump experiences the derivatives on temperature and pressure: heat capacity, coefficient of thermal expansion, etc.

Metaphor is the unity of opposites: the abstract and the concrete, the part and the whole, the unit, and the sum, in which the semantic contradiction is expressed, which, as an irrational phenomenon, contains innuendo and many secrets. Solving these mysteries often leads to new results. The innovative nature of metaphor is also determined by the fact that metaphor as a mediator, as a boundary layer, connects different systems and concepts (Dodd, 2002; Lindayani et al., 2018).

There is a common area between metaphor and synergetics — their methodology, the methodological base, which is fundamental in the theory of knowledge. Methodology in its scientific definition "is a system of principles and methods of organizing and constructing theoretical and practical activities, as well as a teaching about this system" (Philosophical Encyclopedic Dictionary, 1968). Metaphor as a universal method of thinking unites various cognitive forms — psychological, philosophical, linguistic, literary into one whole, each of which has a corresponding system of methods. Synergetics as an interdisciplinary field strives for the synthesis of natural science and the humanities, creates favorable conditions for a constructive dialogue between specialists in these fields. Synergetic principles perform methodological functions as a set of methods for studying open non-linear systems of various nature.

Conclusion

Based on the performed analysis, the following conclusions can be shown: If the development of synergetic systems leads to new structures, then the interaction of the sensible and the rational, the finite and the infinite generates qualitatively new information in metaphor.

Synergetic systems and metaphors are united by the property of optimality. First, among the alternative ways of developing synergetic systems, you can choose the optimal way. Secondly, significantly reducing the degree of freedom the principle of subordination ensures dense compression of information without any loss.

It reflects the principle of natural functioning — the principle of economy. As noted above, the metaphor is laconic, it is compiled on the principle of economy, reducing lexical units and omitting the sign of a specific subject allows us to get a significant reduction.

The process of metaphorization has universal properties: it reflects the processes of evolution in living organisms, the mechanism of the development of culture and reality cognition, is equivalent to the process of transduction, where the transfer of DNA between bacterial cells mediated by phages occurs, i.e. storage and transmission of genetic information.

The metaphor as a synergistic system has a non-linear hierarchical structure determined by the non-linearity and multistage nature of the cognition process. The process of metaphorization, producing new images of the object of research, allows one to reveal in it those properties that are not yet available to conceptual thinking.

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