

## **Synergetics of lexical innovations self-organization in the mental lexicon: interdisciplinary modeling**

**By**

**Aldash Aimankul**

Doctor of Philology, Professor.A. Baitursynov Institute of Linguistics st. Kurmangazy, 25, 050020, AP08855684, Almaty

**Aldasheva Kamar**

PhD Makhambet Utemisov West Kazakhstan University Nazarbayev Avenue, 161, 090000, Uralsk

**Seidamat Assel**

PhD doctoral student Al-Farabi Kazakh National University Al-Farabi Avenue, 71, 050040, AP08855684, Almaty

**Abuwufuer Adila**

PhD doctoral student Al-Farabi Kazakh National University Al-Farabi Avenue, 71, 050040, AP08855684, Almaty

**Nabidullin Aibolat**

PhD doctoral student Abai Kazakh National Pedagogical University Dostyk Avenue, 13, 050010, AP08855684, Almaty

### **Abstract**

Synergetics studies self-organizing objects in all spheres where they exist. At the same time, each object of study remains in the field of view of traditional sciences, but synergetics adds its own ideas, terminology and conclusions. Synergetics proceeds from the fact that any object of its attention is systemic. It is customary to call such a system a set of objects of the same or different nature that are in mutual connection, and due to this the set acquires the property of integrity, i.e. new functions and qualities that do not follow from the functions and qualities of the constituent parts aggregates. A system is, for example, any tool that combines at least two elements. Then physical, informational, functional or other connections arise between them, creating a new system quality. If the system has many elements, then the connections between them multiply exponentially and it is not possible to determine their impact on the system quality by component-by-component analysis. Other ideas are required here, which are provided by synergetics. The system object is also the language. The language system is a hierarchical organization of language competence, which consists of invariant units (phonemes, morphemes, lexemes, grammemes, sentences, textemes), structured on the basis of syntagmatic, paradigmatic and epidigmatic connections between these elements at all language levels and serves to implement nominative, communicative, cognitive, phatic, voluntative, accumulative, translational, emotive, etc. functions.

**Key words:** Synergetics, lexical, innovations, self-organization, in the mental, lexicon, interdisciplinary modeling

### **Introduction**

The systematic use of language generates various styles and genres, including the literary genre. Literary description of the evolution of the genre, the idiosyncrasy of individual

authors in their formation it is also the subject of synergetic research. firstly, the evolution of genres and literary trends occurs in the conflict of the old and the new, with the change of values of society. Secondly, the exponent of this shift is often one brilliant personality – a writer, artist or composer. His idiostyle becomes pointing, sets a new direction for art and symbolizes the point of bifurcation passed by literature, painting or music. In terms of synergetics, such phenomena lend themselves to an adequate description (samples are given in this monograph), however, they require the necessary balance. The corpus of concepts of synergetics excludes the inaccuracies and assumes a clear understanding of the conceptual metaphoricity of many terms of this science in the researcher. At the same time the model of the evolution of a genre or a particular style should not, for the sake of of mathematical accuracy of definitions, emasculate the content of these objects of research; in our opinion, this balance is observed in the synergetic-literary developments of this monograph. The system always has goals, in other words, some purposefulness of behavior. The connections between the elements of the system and the ordered set of its functions constitute the organization of the system. It is useful to compare the concepts: system, complex, conglomerate. A complex is a collection of objects with their mutual connections. Unlike a full-fledged system, the goals of the complex (if any), its connections and functions are weakly and statically expressed. Therefore, if a study declares a "complex (not systematic) study of an object", then we can expect a static description of its composition. A conglomerate is a mechanical union of elements without mutual connections. The essence of the self-organization of a system can be understood in different versions of the same meaning. The system functions on the basis of self-organization, if it is independently able to adequately respond to external changes, impacts, independently changing its parameters, structure, functions and thereby preserving itself. The response of the system is not necessarily passive (self-adaptation), it can change its position and influence the external environment. In the technical sciences, a system operating on the basis of self-organization is usually called self-governing. In the humanitarian sphere, one of the most voluminous self-governing systems is, apparently, a language system that includes linguistic personalities and a linguistic picture of the world. This system is able to organize its elements into blocks that serve to build a discussion. At the same time, at each stage of construction, self-managed systems are also formed from the participating blocks.

Modern integration of private scientific disciplines and the inevitable in this regard, the expansion of the conceptual apparatus contributed to the emergence of the so-called marginal sciences and interdisciplinary directions blurring the boundaries between individual sciences. By according to academician V. I. Vernadsky, specialization "on problems" allows, on the one hand, to delve deeply into the phenomenon under study, and on the other hand, to expand its coverage from all points of view (Vernadsky 1988: 73), which undoubtedly brings the researcher to a qualitatively a new level of scientific reflection. The science of language, slowly emerging from the methodological crisis (Parshin 1996), in which it found itself at the end of the twentieth century, also is undergoing a stage of integration and epistemological renewal. "The focus of research interest naturally shifts from the studied center to the problematic periphery and is fixed at the junction of areas scientific knowledge, <...> within which the process of interdisciplinary synthesis and symbiosis continues" (Vorkachev 2001: 64). In modern linguistics, researchers consider it possible to single out two directions of integration processes. The first direction is connected with the understanding that the science of language is not a conglomerate of disparate linguists: "there can be no different linguists (at least without prejudice to an adequate understanding essence of language as an empirical phenomenon), since all of them unites the commonality of the object" (Kravchenko 2006: 220). Therefore the need to consider the language comprehensively, in all its diversity its properties and functions. The second direction of integration processes directly due to the complex nature of the

language (physical, biological, sociocultural), which "inevitably implies interdisciplinarity in language studies, when the arena enters the whole complex of human sciences" (ibid.). Being the basis of human cognitive activity, language is not may not be the object of study of a number of individual sciences, however "It is precisely the interdisciplinary approach to the study of linguistic phenomena allows us to explain their complex and complex nature. (Furs 2012: 368), offers new forms of systematization and interpretation of the accumulated facts, contributes to a significant increase in knowledge about the object, allows representatives of various scientific disciplines not only speak the same language, but also move from analysis to synthesis and, ultimately, leads the modern researcher to develop a holistic (holistic) view of the problem under study. Linguistic synergetics, or linguosynergetics, which arose as an interdisciplinary direction in language learning using categorical apparatus and methods of synergetics, is defined by us as one of the methodological approaches to describing the dynamic language space, which is a sequential change in time of states of a changeable language megasystem. Without denying the systemic organization of the language, linguosynergetics complements the philological tradition with provisions on language as a open, non-linear, changing, self-organizing system. "There is a very symptomatic displacement of unilateral structural and cognitive vectors of description towards system-energetic, ontological landmarks" (Timirkhanov 2011: 108), appeal to systemic cognition of "coherent processes of natural language as biopsychic, semiotic, cognitive, social and cultural phenomenon" (Alefirenko 2009: 229). Our observations show that at the present stage, within the framework of general linguosynergetics, the most actively developed particular problems of text synergetics (Moskalchuk 2010; Belousov 2008; Moiseeva 2007; as well as Glazunova 2012 and others) and discourse (Alefirenko 2008 and others; Muratova 2011; Pikhtovnikova 2009 and others; Ponomarenko 2007; Slovikova 2008 and others), less developed problems synergy of translation (Kushnina 2011), idiolect (Semenets 2004, 2005), synergetics of speech deviations (Pashkovsky et al., 2013), word formation (Enikeeva 2011 et al.). At the same time, as F. S. Batsevich notes, mastering the apparatus of synergetics for learning the language has not yet been happened (Batsevich 2009: 38).

The current stage of development of ideas about synonymy requires a new approach that integrates knowledge from different fields of science. Research using synergetic methodology allows a new assessment of the results of discoveries both within the framework of natural sciences and in the sciences of man and society, since synergetics "is looking for general principles of the evolution of the world" (Knyazeva, Kurdyumov 1994: 63). "Synergetics is, first of all, the art of modeling reality, which has become a serious interdisciplinary science" (Budanov 2006: 45-61). The synergetic approach to synonymic attraction in the mental lexicon lies in a fundamentally new understanding of synonymic relations in natural language. In particular, the system of synonyms is considered as a complex, non-linear structure, self-organizing under the influence of certain order parameters. Spontaneously forming in the \* consciousness of an individual, synonymous connections reflect an individual vision of the world, features of thinking, the influence of society on the process of synonymization; The theory of self-organization < allows you to take a fresh look at synonymous relations as an evolving, self-developing^ system, complexly arranged, which functions according to certain laws. In domestic science, in line with activity1 psycholinguistics, there is an interpretation of the human lexicon as "a functional dynamic system, a means of access to a single information base of an individual, in which the products of processing perceptual, cognitive and emotional-evaluative experience (verbal and non-verbal) obtained in the processes of cognition are merged and communication according to the laws of mental activity and under the control of norms and assessments accepted in society" (Zalevskaya 2007: 275).

In our study, an attempt is made to identify the causes of synonymic attraction in the individual lexicon from the standpoint of an interdisciplinary approach in line with the synergistic paradigm, to expand the theoretical and practical base regarding the question of the proximity of the meaning of words in the mental lexicon. The study of the problem of the proximity of the meaning of words is anthropocentrically directed: The individual, as an acting, perceiving subject, is assigned the leading role in the process of identifying words, in determining the proximity of their meanings. And this process occurs “with the interaction of different types of knowledge, while the knowledge base itself is considered as a self-regulating and self-organizing system, which is characterized by mobility<sup>1</sup> and changes on the basis of new knowledge” (Lebedeva 2002a: 4). “The speech/cognitive mechanism of a person is characterized by processuality, dynamism, continuity, including the continuity of the conscious and the unconscious, as well as the ability to self-organize” (Zalevskaya 1999: 85). This gives us the right to assume that synonymous connections in the mental \* lexicon of the individual will have similar characteristics. And yet, “with the constant emphasis on the dynamism of language as a system in linguistics so far; the view on the understanding of the system as a static invariant formation dominates; which, in fact, makes it difficult to dialectically correlate determinism and randomness, the discreteness of elements and the semantic continuum represented in them ”(German, Pishchalnikova 1999: I). Insufficiency of the theoretical one: the development of the phenomenon of synonymy requires the attraction of new knowledge, the integration of various scientific disciplines in order to substantiate the optimal theoretical one. a practical basis for subsequent . research, establishing factors that regulate the process of synonymization. The relevance of the research topic is due to the intensive development of the psycholinguistic direction, which interprets language as living knowledge and as a reflection of the individual's perception of the world. One of the most pressing problems in this area is the study of synonymic variation in the human lexicon. The object of research is a synonymous attraction in the lexicon of an individual; the subject of the study are the features of the synonymous attraction, the order parameters that regulate the process of attraction.

## Discussion

In accordance with the goal set, the following tasks are formulated and solved: to consider the issues of self-organization of complex nonlinear systems in natural science and humanitarian research; evaluate the possibility of applying a synergistic approach to the process of synonymizing words in the mental lexicon; to identify existing points of view on the processes of self-organization of speech units in the mental lexicon; determine the role of the attractor in the process of self-organization of synonymic series; organize and conduct an experimental study in order to identify the order parameters that guide the process of synonymous attraction in an individual lexicon; analyze the results of the experiment and interpret the data within the synergistic approach; develop a model that reflects the process of synonymous attraction in an individual lexicon. The interdisciplinary nature of the study required an appeal to specialized literature and publications of a psycholinguistic, philosophical, linguistic, technical, psychological orientation. The theoretical basis of this dissertation research was: the concept of the internal lexicon as a dynamic self-organizing system, as a means of access to a single information base of the individual, in which the products of processing of perceptual, cognitive and emotional-evaluative experience (verbal and non-verbal) interact, as well as the theory of the word as a means of access to unified human information base A.A. Zalevskaya (Zalevskaya 1977, 1990, 1999, 2007); the theory of proximatics, which implies the possibility of synonymizing any language units in the situation “here and now” (Lebedeva 2000, 2002, 2009); synergetic theory, the key concepts of which are self-organization, open systems, nonlinearity (Knyazeva, Kurdyumov 1991, 1993; Haken,

2000, 2003, 2005; Prigozhin, Stengers 1994). In order to comprehend the possibility of integrating synergetic methodology into the field of psycholinguistics, cognitive linguistics, into the theory of the lexicon, we studied the following theories and concepts: the theory of dissipative structures (Grigozhin, Stengers 1994, Prigozhin 1991), the theory of dynamic chaos, "strange attractors" (Lorenz 1981, Ruelle 2001), consistency in synergetics (Knyazeva, Kurdyumov 1991, 1993, 1997; Malinetsky 2002, 2003), linguosynergetics (Herman, Pishchalnikova 1999, Herman 2000), dynamic information theory (Haken 2005, 2000, 2003), concepts of synthesis of natural and human sciences (Jantsch 1980, Keller 1997), synergetic text theory (Moskalchuk 2003), the theory of the core of the mental lexicon as a "strange attractor" (Zolotova 2005, 2008). Works on synonymy are also analyzed (Apresyan 1994, 1995; Arutyunova 1990; Zalevskaya 1999, 2005; Lebedeva 2002, 2003, Rivelis 2007, 2008, Myrphy 2003, etc.).

## Methods

The following methods were used as the main methods in the course of the study: the method of semantic and formal analysis; corpus data analysis method; method of associative experiment. The obtained results were subjected to statistical processing using the computer program Microsoft Excel. The scientific novelty of the proposed research is determined by a new perspective of studying the object from the standpoint of a synergistic approach. Identification of the order parameters allows revealing the specifics of the synonymic attraction in the individual lexicon.

## Results

The material of the study was the data of a directed associative experiment in the amount of 2110 vocabulary units received from 148 recipients, as well as an analysis of collocations in the amount of 182148 combinations. The theoretical significance of the work is determined by the fact that the study allows us to look at synonymy as a complex self-organizing structure brought into a state of order with the help of attractors. The practical significance of this work lies in the possibility of applying its results in educational special courses, courses in general linguistics, language theory, psycholinguistics, cognitive linguistics, sociolinguistics. The following provisions are put forward:

1. To study vocabulary perceived by an individual as semantically close, it is advisable to use a synergetic theory that is relevant to the modern scientific paradigm. The introduction of such concepts as attraction, attractor, fractality into the linguistic field will allow using the formal-logical direction for the analysis of linguistic phenomena.
2. The specificity of the synonymic attraction in the mental lexicon is manifested in the spontaneous alignment of a specific lexical system, striving for conceptual compression, regulated and directed by order parameters relative to the attractor.
3. A synonymic attractor is a fractal entity, consisting of a set of characteristics, compared objects and phenomena, and having the properties of self-similarity and brokenness. The synonymic attractor is the basis of the conceptual framework of the synonymized objects and contributes to finer detailing of the verbalized information.
4. The experience of the closeness of the meaning of words is due to society and culture, various systems of knowledge of the individual, the interaction of internal and external contexts.
5. The order parameters that regulate the process of synonymic attraction function within the personal sphere and the sphere of the external context. The manifestation of the

latter is determined by the presence of the main factors: age, emotional perception, sensory perception (visual, sound, olfactory), reliance on individual and collective knowledge, reliance on society and culture in the "here-and-now" situation.

## **Conclusions**

As a result of a comprehensive study of the specifics of synonymous attraction, we come to the following conclusions:

1. On the basis of experiments, it was found that the phenomena that are relevant to the individual at a given moment in time attract a large number of various synonyms.
2. Analysis of the data of the National Corpus of the Language and the free associative experiment regarding the proposed stimulus words revealed the possibility of interpenetration of concepts. For the study, words were chosen that are not synonyms in the language, however, in the mind of the individual, some of them I actualize one another.
3. The resulting synonyms for stimulus words made it possible to identify some thematic groups, on the basis of which schemes were built that reflect the cognitive perception of these words.
4. It was found that the attractor (stimulus word) structures the space around itself in a special way. As a result of the appearance of order parameters that bring the system to a relatively stable state, the individual creates his own system of synonyms according to the attractor. We believe that the process of attraction occurs each time according to an individual scheme, and one or, possibly, a combination of parameters can become the determining factor.
5. The order parameters can be: emotional, sensory perception, individual, collective knowledge, external context, visual sensations, age, experience, knowledge, socio-political situation, cultural environment of communication, profession, education, olfactory, auditory, tactile sensations .
6. The presented model of the attractor of a dynamic system of synonyms reflects the order parameters structuring the entire system. Having a fractal essence, the attractor has the ability to change, be completed, its components can be replaced by new parameters. Development occurs non-linearly, resulting in spontaneous formation of new synonyms for a given word-attractor.
7. The synergetic model of the process of synonymization of words in the mental lexicon of an individual reflects the main stages of synonymic attraction from the perception of a stimulus word, its processing to the reproduction of a synonymic series.

In the proposed work, the features of synonymous attraction in the mental lexicon were studied in line with the synergetic approach. The study provides an overview of a number of theoretical provisions in the field of the theory of synergetics and synonymy, the purpose of which is to show the complexity and diversity of the phenomenon under study. The research presents different points of view on the nature of synonymization, in particular, the problem of identifying the essence of synonymization in the mental lexicon is considered, it is shown how this problem can be solved from the standpoint of synergetics. Of particular interest are studies carried out in line with cognitive linguistics and psycholinguistics and interpreting synonymous relations as a means of structuring and explaining various phenomena of reality. Existing theories try to unite and systematize the facts of the connection of lexemes, to identify the main parameters of identity and similarity in the system of language and speech, to create common criteria for describing and classifying various manifestations of this phenomenon. The psycholinguistic

approach to the problem of the similarity of the meaning of words is based on the principle of anthropocentrism - taking into account the complex processes that take place in the mind of the individual, taking into account social, cultural, gender and many other factors. The research concludes that the most promising is an interdisciplinary approach that accumulates knowledge of various scientific disciplines. Within the framework of the synergetic paradigm, which is recognized as general scientific, a theory is being developed on the self-organization of nonlinear dissipative structures. As already noted, the individual's lexicon is a dynamic self-organizing system in which the results of the individual's perceptual, cognitive, and emotional-evaluative experience interact. Synonymous attraction in the mental lexicon is considered from the standpoint of the psycholinguistic theory of the word and individual knowledge, according to which behind the word in the speech organization of the individual lies a complex of mental processes occurring at different levels of awareness during the interaction of the products of processing of cognitive, perceptual and affective experience in the situation "here-and- now". The conducted research proves the possibility of studying the lexical system of the language from the standpoint of a synergistic approach. Our study was based on the assumption that the process of synonymization in the mind of an individual is determined by certain order parameters that reflect the individual's perception of the world, age, experience, knowledge, psycho-emotional state. As part of the dissertation research, we conducted an experiment involving native speakers representing different age and professional groups. In the course of an experimental study involving the methods of directed associative experiment and the National Corpus of the Russian Language, extensive material was obtained for analysis. It was assumed that the attractor word in a special way organizes not only the system of synonyms in the mind of the individual, but also the text space around itself. In the process of experiencing similarity, a person tries to reconstruct the image that was put at the basis of synonymization.

It was revealed that the process of synonymous attraction in the mind of an individual is determined by the sensory, intellectual and external context. When experiencing similarity, an individual is guided by the "here and now" situation, which reflects the most relevant order parameter at a given moment in time. Systems of synonyms are built spontaneously in the mind of the individual, regulated and directed by the attractor. It should be clarified that we are not talking about a single In understanding the situation, the experimental material shows that even when pointing to one dominant feature that serves as the basis for attraction, the subjects can accentuate different features of the features and evaluate the same situation in different ways. In the proposed dissertation, models of possible knowledge systems of an individual were developed, within which synonymous convergences occur. We have developed a model of a synonymous attractor, which reflects its fractal essence (self-similarity, brokenness). The conducted research allowed us to conclude that the system of synonyms will be characterized by gradualness, i.e. as you move away from the attractor, the number of characteristics in common with it will decrease. The point of attraction can be a variety of phenomena, such as the social situation in the country, the scope of the individual, education, age, gender, which will affect the set of synonymous words. The dissertation presents a diagram of the stages of synonymous attraction in the mind of an individual. It reflects both psycholinguistic and synergistic principles of the functioning of the word in the lexicon of the individual.

The results obtained can form the basis for further research, since they open up prospects for studying synonymic attraction in line with the synergetic paradigm. It is interesting to study the influence of individual order parameters on the process of attraction: We also consider it promising to study synonymic attraction on the example of interlingual comparison and to identify cross-cultural differences and similarities in the formation of synonym systems.

The research has been conducted under the project AP08855684 Scientific project Synergetics of self-organization of Kazakhized lexical innovations in the mental lexicon: a methodological platform for interdisciplinary modeling.

## References

- Arnold, V.I. (2004) Theory of catastrophes (in Russian), 4th ed. Moscow, Editorial-URSS.
- Budanov, V.G. (2007) Methodology of synergetics in the post-non-classical science and education, Institute of Philosophy. M.: LCI Publishing house, 240 p.
- Chernavskii, D.S. (2004) Synergetics and Information. Dynamical Theory of Information. URSS.
- Haken, H. (2004) Synergetics: Introduction and Advanced Topics (Springer, Berlin, Heidelberg)
- Haken, H. (1993) Advanced Synergetics: Instability Hierarchies of Self-Organizing Systems and Devices. New York: Springer-Verlag, 424 p.
- Haken, H. (2003) Secretes of Nature. Synergetics: the Learning about the Interaction, 320 p. Limited (2006) Chichester, 1983. Regular and Chaotic Dynamics, 136 p.
- Wiener N. (2003) The Creator and the Future, 732 p.
- Nusratullin V.K. (2006) Nonequilibrium economy. 2nd prod. additional M: Satellite company, 482 p.
- Prigogine, I. Stengers, I. (1986) Order out of Chaos. Man's new dialogue with nature, 432 p.
- Stepin, V.S. (2003) Self-developing systems and postnonclassical rationality. Moscow.
- Thom, R. (1975) Structural Stability and Morphogenesis: An Outline of a General Theory of Models. London.
- Thom, R. (1996) Logos et Théorie des Catastrophes: à partir de l'oeuvre de René Thom, ed. Jean Petitot. Colloque de Cerisy-la-Salle 1982 (Patiño, Geneva 1996).
- Zang, Wei Bin (1999) Synergetic Economics. Time and Locusts in the Nonlinear Economic Theory / V. Zang, M. Ostrovsky (translated from English) – Moscow: Mir, 366 p