ADILBEK AMRENOV, GULSUM ABZULDINOVA,
ASSIYA ALBEKOVA, MARZHAN AKOSHEVA,
NURLAN OMAROV, GAISHA IMAMBAYEVA

ZOOMORPHIC MODEL OF METAPHORIZATION OF ZOOLOGICAL TERMS

1. INTRODUCTION

The terminology of any science is a verbalized result of special scientific knowledge. It is formed in close and direct interaction with the „profane", ordinary consciousness of native speakers. The scientific cognition of the surrounding reality as a later stage of human cognition largely uses the knowledge already available to man, which s/he acquired in the process of pre-scientific knowledge of the world. Scientific categorization, characterized by logic, abstractness, rationality, relies in many cases on the constants of ordinary consciousness.

Especially indicative in this respect are the metaphorical terms of this or that branch of science. According to V. Croft, D. A. Kruse (2004, p. 204), metaphors are everyday colloquial forms of conceptualization, which are closely related to human experience, to the surrounding world and its bodily sensations. When a person faces the need to comprehend and interpret new scientific data, with the problem of embedding new scientific information in the existing conceptual model of the world, in the existing scientific picture, he or she relies on cognitive mechanisms based on the principle of similarity, analogy, i.e., on the mechanism of metaphorization. This cognitive mechanism is very effective and widespread in the scientific discourse of various industries. A. Wilden wrote (1980, p. 38): „Any scientific theory is a network of metaphors and, moreover, – any knowledge, including scientific, is inevitably metaphorical". The genetic scientist A. E. Sedov (2000, p. 526) notes:

> „Usually one and the same complex natural system – a structure or process – not entirely invented and created by man, but only partially explored and understood by him, can be represented in the minds and works of different researchers in the form of different systems consisting of verbal and visual images, temporal and logical connections – the so-called cognitive models. They are studied by cognitive psychology, and in the future, perhaps, they will become objects of neurobiology and computer science".

In our work we rely on the cognitive interpretation of the process of metaphorization, which was first described in the works of G. Lakoff, M. Johnson (2003), J. Fauconnier, M. Turner (1998). In particular, the cognitive understanding of metaphor suggests that metaphorization is based on procedures for processing knowledge structures – frames and scenarios, and the knowledge represented in them manifests a generalized experience of human interaction with the surrounding world – both with the world of objects and society (Lakoff, Johnson 2003). Thus, verbal metaphors are the result of the cognitive mechanism of analogy in the

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human mind. The action of this mechanism can be described with the help of a metaphorical model constructed on the basis of a person's analogy of knowledge about one object with information about another object. The approach proposed by Lakoff and Johnson objectifies a metaphor in language as one of the elements of the system of verbal representations of the conceptual analogue metaphorical model existing in the minds of native speakers, and not as an accident or an isolated case. This system of verbal representations in the scientific discourse, as we assume, is of a stable, regular nature, based on the strength and stability of the conceptual structure in the mental world of man. Hence the universal character of the set of metaphorical terminological units in scientific discourses differing in the structure and genesis of languages, as will be shown later in our work. Metaphors that are peculiar only to individual languages are generated by specific conceptual structures as a whole or by specific elements in them with general simila.

The problem of metaphorization in scientific discourse was studied quite seriously, the works of S. Grinev-Grinevich (2008), M. Rossi (2014), S. Fernandez-Silvia (2013), R. Sommer (2006), R. Sommer, B. A. Sommer (2008), A. E. Buzheninov (2015), E. V. Bekisheva, A. A. Grosheva (2017), A. E. Sedov (2000), etc. Nevertheless, the metaphor in the zoological discourse of Russian, Kazakh, English languages has not yet become the object of attention of linguists in comparative aspect. This determines the novelty of our work. The goal of our work is to compare zoological terms – metaphors as a result of the cognitive mechanism of analogy in genetically and structurally different languages – Russian, Kazakh and English, to identify similarities and differences in the process of their metaphorization.In addition to theoretical importance, our research is important for solving practical problems, such as improving the practice of creating new zoological terms for the described basic models, including new information in their lexicographic description in terminological dictionaries for scientific and educational purposes, including bilingual zoological dictionaries: Russian–Kazakh, Kazakh–Russian, Russian–English, Kazakh–English, etc.

2. METHODOLOGY

The genetic scientist Sedov in his work *Metaphors in Genetics* states that until now the study of scientific metaphors was limited to the framework of the humanitarian discourse, whereas for their effective study, the efforts of scientists-cognitivists, linguists, philosophers, methodologists and specialists in those fields of science, metaphors of which are subjected to research:

> „Comparing the most significant publications about the structures and functions of various genetic systems for more than 20 years, I found that it is a metaphor that underlie the new formulations. It was with the help of unexpected and accurate images-word combinations that outstanding geneticists «designed» unusual images and concepts. The texts

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created by them become an interesting field of research for linguists, philologists, cognitive scientists, psychologists, methodologists and philosophers" (Sedov 2000, p. 526).

As a methodological basis for the study, the theory of the conceptual metaphor of Lakoff, Johnson was chosen. On the basis of this theory, we determined the technique for describing the action of the cognitive mechanism of analogy in the compared languages. It relies on the notion of a „metaphorical model" (Baranov 2004), which is defined as a generalized verbalized representation in the form of a formula consisting of two elements: the nomination of the source sphere of knowledge and the nomination of the target sphere involved in the metaphorization of the zoological term.

In accordance with the hypothesis of the invariance of Lakoff (1990) on the partial preservation of the structure of the source sphere in the target sphere under the metaphorical projection, we introduce the concept „metaphorical submodel" into the methodology for describing zoological terms of metaphorical origin. It will allow us to detail the source sphere by its individual elements and more clearly visualize the effect of the cognitive mechanism of analogy in the process of metaphorizing terms.

According to the research, the basic conceptual areas-sources of the terms of many sciences are a man, fauna, flora, war, nature (landscape, climate), artifacts (clothing, cloth, tools, food, architecture, etc.). In previous works, we analyzed in detail the anthropomorphic metaphorical model of the formation of Russian and Kazakh zoological terms (Temirgazina *et al.* 2016), artifacts as a source area for the formation of zoological terms (Temirgazina *et al.* 2017). The subject of our further research is a zoomorphic metaphorical model with source area of „fauna". We extracted the terms from zoological terminological dictionaries of Russian, Kazakh, English, as well as bilingual: Kazakh–Russian, Russian–Kazakh, Russian–English dictionaries (Damblton 2000; Kussainova 2000; Syzdykova, Husain 2002; Allaby 2014; http://www.etymonline.com/word/turtle).

The metaphorical models, the sources of which are the concepts and subject areas of natural origin, refer to the earliest scientific metaphors along with the anthropomorphic model. This is because they are based on the oldest cognitive mechanisms, rooted in the pagan and mythological thinking of a man. A scientific metaphor with a source of the concepts and subject areas of natural origin helps the abstract theoretical concepts the body and subject-matter character, facilitating the process of scientific knowledge. Such models are widespread in virtually all branches of science; they have regular reproducibility and repeatability. That is why we can refer them to the metaphorical archetypes of scientific discourse.

Fauna as a source area of metaphorical conceptualization is involved in gnoseological modeling in different scientific fields (for example, in economy *эффект стадности* lit. *effekt stadnosti* (the herd effect) – the behavior of consumers who are building their consumption so as to keep up with others; *колл спрэд «медведей»* lit. *koll sprehd «medvedej»* (call spread „bears") – a combination of the purchase of a buy option with a lower „intrinsic value" and the sale of a

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buy option with a higher value; in botany *волчки* lit. *volchki* – fast-growing water or fat shoots, formed from sleeping buds on the trunks of fruit and other trees. It should be noted that they are not universal for the whole discourse like the sphere of „man". The zoomorphic model of cognition, like the anthropomorphic one, can be attributed to the archetypes of scientific cognition because of its mythological and „folklore" origin, although it differs from the anthropomorphic model by its smaller prevalence in various scientific discourses.

3. RESULTS

Metaphorical model [animals] → [other animals]

In the model under consideration, knowledge about certain animals is used as a source of knowledge of other animals by means of the mechanism of metaphorization. If argue within the framework of discursive interaction and intersection, we can say that this metaphorical model belongs to the field of intradiscussive interaction.

Within the zoomorphic model, several submodels with the source spheres „mammals", „birds", „mythical creatures" are identified.

Metaphorical submodel [mammals] → [other animals]

Let us cite as an example the terms of Latin origin, functioning in the Russian language zodiac course, built on this submodel: *педипальпы* lit. *pedipal'py* (the second pair of articulate limbs of the cephalothorax) from the Latin. *pedis* 'leg', *palpus* 'tentacles', etc.; as well as the terms of proper Russian origin: *морские собачки* lit. *morskie sobachki* (the family of fishes of the order of perciform, during the ebb and flow by land with jumps with the help of fins), *морские слоны* lit. *morskie slony* (the genus of mammals of the family of real seals up to 6.5 m long and weighing up to 3.5 tons, the head of the males has a swelling similar to a short trunk), *морские львы* lit. *morskie l'vy* (pinnipeds of the family of eared seals up to 3.6 meters in length and weighing up to 400 kg), *морские лисицы* lit. *morskie lisicy* (a family of fish of a shark ordering up to 6 meters in length), *морские свиньи* lit. *morskie svin'i* (the genus of dolphins up to 2 meters long the fin is about half of the body), *морские зайцы* lit. *morskie zajcy* (the genus of the mollusks of the sub-ovary subclass up to 40 cm in length, the posterior pair of tentacles in shape resemble hare ears), *морские ежи* lit. *morskie ezhi* (a class of invertebrate animals such as echinoderms), *молочко пчел* lit. *molochko pchel* (a protein substance produced in one of special pairs of salivary glands in worker bees, to which they feed the larvae).

In the Kazakh language: *теңіз иттері* lit. *teńiz ıtteri* (sea dogs), *теңіз шошқалары* lit. *teńiz shoshqalary* (sea pigs), *теңіз пілі* lit. *teńiz pili* (sea elephant), *теңіз арыстаны* lit. *teńiz arystany* (sea lion), *теңіз түлкісі* lit. *teńiz túlkisi* (sea fox), *теңіз қояны* lit. *teńiz qoıany* (sea hare), *теңіз кірпісі* lit. *teńiz kirpisi* (marine hedgehog), *ара сүті* lit. *ara súti* (milk of bees).

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In English: *a catfish* (a large fish with long stiff hairs, like a cat's whiskers, around its mouth) (https://biologydictionary.net/category/zoology/#gti_C), *a brown-headed cowbird, a sea bear* (a fur seal), *a sea calf* (obsolete, the common seal) (*idem*), *a sea fox* (a large shark), *a sea hare*, *a sea horse* (a small sea fish that swims upright and has a head that looks like the head of a horse) (*idem*), *a sea lion* (a large seal, a sea animal with thick fur that eats fish and lives around the coast) that lives by the Pacific Ocean (*idem*), *a sea otter* (a rare marine otter (Enhydra lutris) of the northern Pacific coasts that may attain a length of six feet (two meters), is chiefly brown but with lighter coloration on the back of the head and neck, and feeds largely on shellfish) (https://www.collinsdictionary.com/dictionary/english), *a sea pig* (porpoise), *a sea urchin* (a small sea creature with a round prickly shell (a hedgehog)) (Syzdykovoy, Husaina 2002), *an elephant seal* – either of the very large seals (genus Mirounga of the family Phocidae) characterized by a long inflatable proboscis (https://biologydictionary.net/category/zoology/#gti_C).

The associative connection between the concepts of the source sphere and the target sphere is lost in time and is not always realized by native speakers. But it can always be established by examining the etymology of the term. Thus, for example, the origin of the term *catfish* (cat-fish), given to different species of fish, is explained in the etymological dictionary as follows:

> „The 1610s probably due to the similarity to the name of the wolverine wolf-fish, for its ferocity; from cat (cat) + fish (fish). North American freshwater fish were so named in the 1690s, probably because of its «whiskers», or because of the purring noise that it is said to produce when it is taken out of the water" (https://www.merriam-webster.com/dictionary).

Metaphorical submodel [birds] → [other animals]

The terms of Greco-Latin origin are created by this model: *корацидий* lit. *koracidij* (free-floating larva of some tapeworms, covered with a layer of ciliated cells) from the Greek *kotax*, genus, the case korakos is a crow, and also something bent by a hook, like the beak of a crow; *хелицеры* lit. *helicery* (the first pair of cephalic limbs in *chelicerae*, which are used as jaws to grasp and tear the prey) from the Greek *chele* 'claw', *keras* 'horn'; *бипиннария* lit. *bipinnariya* (free-swimming larva of sea stars) from lat. *bi* 'double', *pinna* 'feather'; terms of proper Russian origin: *sea cocks* (the family of fishes of the order of percussion), *мягкоперые* lit. *myagkoperye* (one of the suborders of clawed fish), *павлиний глаз* lit. *pavlinij glaz* (nocturnal butterfly).

The terms of the Kazakh zoodiscourse: *қауырсыны жұмсақ қанаттылар* lit. *qaýyrsyny jumsaq qanattylar* (soft pinion, winged).

The terms of English zoological discourse: *a hawk moth* (Latin *Sphingidae*, an insect of the *Lepidoptera* group, a brazier), *a peacock butterfly* (butterfly).

Let us analyze the differences in the choice of the basis of analogy for nomination by representatives of different cultures. The speakers of the Russian lan-

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guage, using the idea of a 'peacock' for the nomination of a peacock butterfly, detail it, stopping at the similarity of the drawings on the butterfly wings and the peacock's feathers with the eye. Speakers of the English language when forming the term *peacock butterfly* rely on a general idea of the appearance of a peacock and a butterfly.

Metaphorical submodel [mythical animals] → [real animals]

Conditionally, this model is joined by metaphors engendered by religious mythological discourse, or more precisely, by concepts denoting mythical beings.

See, for example, in the Russian language: *морские черти* lit. *morskie cherti* (the family of predatory marine fish, up to 1.5 m in length and weighing up to 20 kg), *морские ангелы* lit. *morskie angely* (the genus of pterodal mollusks up to 5 cm in length); in the Kazakh language: *теңіз шайтаны* lit. *teńiz shaıtany* (sea devils), *теңіз періштесі* lit. *teńiz perishtesi* (sea angels); in English: *a sea dragon, a dragonfly*. As we see, for the linguistic consciousness of English speakers, the typical mythological creature is a dragon.

4. DISCUSSION

In all three submodels under consideration, a group of terminological combinations of Russian, Kazakh and English languages is formed. It is constructed according to the same structural and semantic model [adjective *морской* lit. *morskoj / теңіз* lit. '*teńiz*' / '*sea*'] + [noun-name of the animal]: *морская свинья* lit. *morskaya svin'ya - теңіз шошқа* lit. *teńiz shoshqa – a sea pig*. The first component of the structural-semantic model name the body's habitat, and the second component is the animal, the bird, or the mythological being from the source sphere. Kazakh terms are formed by loan translation of the Russian zoo terms, a complete word-coinage (*теңіз арыстаны* lit. *teńiz arystany – морской лев,* lit. *morskoj lev*, *теңіз түлкі* lit. *teńiz túlki – морская лисица* lit. *morskaya lisica*, *теңіз қояны* lit. *teńiz qoıany – морской заяц* lit. *morskoj zayac*) and incomplete word-coinage: *теңіз ит* lit. *teńiz ıt – морская собачка* lit. *morskaya sobachka.* In the latter example, incomplete word-coinage is limited to the morphemic and derivational abilities of the Kazakh language – a small number of diminutive affixes, so the noun is transmitted to the Kazakh noun *ит* lit. *it* (a dog), in which the suffix *-к-* with a diminishing meaning is missing.

It should be noted that a pair of terms *a sea horse – морской конек* lit. *morskoj konek* reveals incomplete semantic equivalence, since the English term *a sea horse* does not contain a component with the meaning „small", which is available in the Russian term. This component arises due to participation in the formation of the term the suffix *-ок (-ok)*, which has a diminishing meaning.

Concepts from the source areas of „birds", „mammals" are transferred to the categorization of concepts in the areas of „marine organisms", „fish", and „insects". This allows us to state with certainty the following trend in the cognitive mecha-

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nism of the zoomorphic metaphor: knowledge of higher organisms allows us to understand and nominate concepts about lower-level organisms metaphorically.

In the course of the study, we came to the following conclusions, which do not contradict our hypothesis and the confirmed analysis of linguistic material. First, a part of the terminological metaphors in the zoo discourse of the Russian, Kazakh, and English languages is based on a universal archetypal zoomorphic model. This model is also actively used today for the nomination of new concepts in the scientific discourse.

Secondly, metaphors generated in the framework of universals are similar in the languages we are studying: Russian, Kazakh, and English. Many of them go back to the Greek-Latin designation of zoological concepts, because they also rely on these metaphorical universals.

Thirdly, in scientific communication, the metaphorical expression functions as a ready-made term containing only purely scientific information. The speakers of the language do not realize the metaphorical nature, since in a long-functioning zoo metaphor, the connection with the source sphere is lost. But this connection is not lost, it goes to the deep, ontological level of human consciousness. From there, the metaphorical model can return at any time to the general knowledge base of a man, enriched with new associations and nuances of meaning.

Fourthly, a comparative analysis of the metaphorical terms in the Kazakh and Russian zoological discourse suggests that a small part of the terms differ due to the different structural capabilities of the languages (the absence of diminutive affixes in the Kazakh language and, on the contrary, the wide possibilities of the Russian language in this regard).

Fifthly, the comparison of terms shows that even if they are formed according to a similar structural model, they are not always completely semantically equivalent. See, for example: *a sea horse – морской конек* lit. *morskoj konek.*

5. CONCLUSION

The analysis of scientific zoological terminology confirms the metaphorical nature of the language of science, generated by the cognitive mechanism of analogy. The mechanism of analogy is universal and operates both in the field of common mindset and in the field of scientific knowledge.

The scientific metaphor is formed on the basis of already formed conceptual structures in each ethnic culture which have been consolidated in the language. Between scientific thinking and „profane" consciousness there are no rigid boundaries, so scientific knowledge uses the person's general knowledge of the world in the process of representing knowledge in any scientific field. The zoomorphic metaphorical model refers to the archetypes of human cognition, although its implementation in various languages shows some features caused by the structural properties of languages.

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MODEL ZOOMORFIC DE METAFORIZARE A TERMENILOR ZOOLOGICI
(*Rezumat*)

Articolul abordează un aspect neexplorat al mecanismului cognitiv al analogiei în cazul termenilor zoologici metaforici din rusă, kazahă și engleză. Problema este determinată de nevoia de a identifica fundamentele cognitive ale originii terminologiei științifice in diferite limbi. Din punct de vedere metodologic, a fost selectată teoria metaforei conceptuale iar conceptele de „model metaforic" și „submodel metaforic" sunt folosite ca bază pentru metoda analizei termenilor-metaforă zoologici. Zona-sursă a metaforelor este fauna, analizându-se modelul metaforic zoomorfic.

În analiza detaliată a termenilor zoologici din rusă, kazahă și engleză, submodelele metaforice sunt incluse în structura modelului metaforic zoomorfic. Sursa termenilor-metaforă zoologici este reprezentată de „mamifere", „păsări" și „creaturi mitice". Modelul zoomorfic metaforic se referă la universaliile arhetipale ale limbajului științific datorită naturii sale mitologice. Natura sa arhetipală este evidențiată de faptul că mulți termeni zoologici care funcționează în limbajul științific din rusă, kazahă și engleză, împrumutați din latină și greacă sunt construiți pe modelul zoomorfic. Un anumit număr de termeni din kazahă sunt tributari terminologiei rusești. În același timp, se arată că termeni din rusă, kazahă și engleză, formați după un anumit model structural, pot fi non-echivalenți semantic și pot avea componente de sens diferite. Analiza terminologiei zoologice științifice din trei limbi confirmă natura metaforică a limbajului științific generat de mecanismul cognitiv al analogiei.

Cuvinte-cheie: *mecanism cognitiv al metaforizării, termeni zoologici, model metaforic, model zoomorfic*.

Keywords: *cognitive mechanism of metaphorization, zoological terms, metaphorical model, zoomorphic model*.

State Pedagogical University
Pavlodar
Kazakhstan
adilbek.61@mail.ru
guleke160265@mail.ru
omardos@mail.ru

Saken Seifullin Kazakh Agrotehnical University
Astana
Kazakhstan
a.albekova12@mail.ru
akmar2809@mail.ru

Innovative Eurasian University
Pavlodar
Kazakhstan
lady.gaysha@mail.ru

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