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Lingvocognitive Specificity of Metaphorical Modeling in Russian Oil and Gas Terminology

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Abstract

The article represents the results of the research of the metaphorical fragment of oil and gas terminology in the Russian language from the perspective of conceptual modeling. The conducted research allows one to assert that the models involved in the process of the metaphorical conceptualization in the framework of the national worldview are universal. The comparative analysis of the metaphorical fragments of the Russian and English terminological systems showed the asymmetry of both the qualitative and quantitative types.

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Keywords: Oil and gas terminological system; source-domain; target-domain; conceptual metaphor; naive worldview; scientific worldview; lingvocognitive specificity; metaphorical modeling.

1. Introduction

Modern works in the field of cognitive terminology and metaphorical terms (Golovanova, 2008; Nikitina, 2010; Ovsyannikova, 2010; Sofronova & Fel'de, 2010; Fel'de, 2011; Fel'de, 2012; Deeva, 2013; Glinskaya, 2013) prove that terminological systems of various scientific branches contain significant metaphorical fragments. The works in metaphorical modeling prove that the national specificity of a linguistic worldview is strikingly reflected in the metaphorical fragment of a national worldview (Prokhorova, 1996; Grishaeva & Popova, 2003; Rezanova et al. 2005; Nikitina, 2010; Mishankina, 2010, 2012; Tripol'skaya, 2013). This fact allows one to suggest that there is

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lingvocognitive specificity in epistemological processes, which is reflected in the metaphorical fragments of various terminological systems, including the oil and gas terminological system. It's a known fact that the formation and development of oil and gas terminology depends on the development of the industry (Dumitru 2009; Shepelev, 2009). The oil industry in Russia and the USA started to develop simultaneously, but due to some historical conditions this branch in the States started to develop intensively. This fact affected the process of formation and development of the terminological system: initially, the terminological systems in the two countries develop independently, however, the Russian terminological system started to align with the better-developed English system. At the same time, it's crucial to note, that the Russian oil and gas terminological system has a number of specific characteristics. For example, the functional lexicon and jargon weren't found in the framework of the Russian oil and gas terminology unlike the English terminological system. Due to some extralinguistic factors which have defined its development, this statement is not correct for the Russian oil and gas terminological system, because one can find a great deal of loan words from various terminological systems and different languages (Dumitru, 2009). In general oil and gas terminology both in the Russian and English languages has been investigated and a number of analyses have been conducted: structural and semantic analysis (Dumitru, 2009), contrastive-comparative analysis of the development of the "oil and oil products terminological system" (Pankratova, 2005), the specificity of the terminological field "oil and gas" (Smagulova, 2010), the terminological system of oil and gas and the functioning of the system in professional discourse (Suleymanova, 2006), the semantic diffusion in the Russian and English technical terms (based on oil and gas terminology) (Yunusova, 2010). In these investigations the presence of metaphorical terms was studied in the aspect of its genesis. However, despite its "adopted" nature, the Russian oil and gas terminological system has a significant metaphorical fragment (Deeva, 2013). Therefore, one can come to the conclusion that the problem of the conceptual modeling of metaphorical terms within the framework of the Russian oil and gas terminological system regarding the aspect of its lingvocognitive specificity has not been studied yet.

2. Methods

The main goal of the article is to reveal and describe the lingvocognitive specificity of the metaphorical modeling in the Russian oil and gas terminological system. We base the problem on the assumption of the hypothesis that the common language naive worldview influences the formation of terminological systems (including technical terminological systems) relating to the aspect of their lingvocognitive specificity. The hypothesis is verified on the metaphorical fragment of the Russian oil and gas terminology versus other common language metaphorical models and the metaphorical models, functioning in the analogous fragment in the English oil and gas terminological system. This type of comparison makes it possible to reveal those features which are typical for the process of metaphorical conceptualization of the Russian oil and gas terminological system, and brings to light the distinctive features of the investigated terminological system and, therefore, reveals its specificity.

We apply a methodology suggested by cognitive linguistics, in particular, the theory of the conceptual metaphor, because the process of metaphorical conceptualization in the course of creating oil and gas terms is considered a complex mental operation, involving metaphorical models, important for the epistemological tradition of the Russian language. The cognitive approach to the study of the term semantics pays close attention to the ways of representing knowledge and, therefore, favors the semantic analysis of a metaphorical term while understanding a metaphor as a general mental operation, the specificity of which lies in the analogous nature of a metaphorical projection and has a "national background". This approach was proposed in works of G. Lakoff and M. Johnson. Following G. Lakoff and M. Johnson we consider a metaphor to be a stable correspondence between a source-domain and a target-domain, fixed in linguistic and cultural traditions of a particular society (Lakoff & Johnson, 2004). The basis for metaphorical conceptualization is a procedure for the processing of knowledge structures, corresponding to the principle of analogy (Lakoff & Johnson, 2004). The heuristicity of a metaphor lies essentially in its epistemological nature because a metaphor is the basis for thinking. This point of view is widely approved by modern philosophers (Petrov, 1985; Kuliev, 1987; Ortega y Gasset, 1990; Gusev, 1994). A metaphorical term optimizes an "epistemic access" (the term was coined by R. Boyd) and therefore favors cognizing a new notion, and making the understanding, remembering and use of a complex metaphorical term conceivable.

It was the complexity of the stated goal that defined the system of analysis which was applied during different phases of the investigation. In the first phase we defined conceptual domains and metaphorical models, functioning in the metaphorical fragment of the oil and gas terminological system of the Russian language, and then we defined the specificity of the metaphorical modeling of the terms with regard to metaphorical modeling in the framework of the common Russian language. The analysis was performed according to the scheme, presented in the scientific works (Chudinov, 2001; Rezanova, 2003; Lakoff & Johnson, 2004; Rezanova et al., 2005; Ovsyannikova, 2010; Mishankina, 2010, 2012).

Since the terminological meaning can have no common components with the plain meaning, the component analysis is supported by other sources of information, for example, images of the equipment details, which allow one to conclude that there is a unified frame structure, which forms the basis for the metaphorical conceptualization. The identified metaphorical models functioning in the system of the oil and gas terms correspond to the common language metaphorical models, identified on the basis of the analysis of the contexts taken from the National Corpus of the Russian Language. The detailed comparison allows one to assert that there is a genetic proximity of the metaphorical models in the terminological system to the models in the national language, which proves the universal nature of the models in the Russian language.

During the second phase we defined the level of the lingvocognitive specificity of the metaphorical models in the Russian oil and gas terminological system in contrast to the analogous metaphorical fragment in the English terminological system. The ground for the contrastive analysis is the structure of the metaphorical fragment of the Russian terminological system. The English terms which are equivalent to the Russian terms were selected. If the term is of a metaphorical nature, the analogous analysis of the English term was performed during the third phase. After that, we compared the identified Russian and English metaphorical models. The results of the conducted analysis allow one to identify the original nature of the lingvocognitive specificity of the Russian, as well as the English, metaphorical fragments of the described terminological systems.

The empirical base for the study is the metaphorical terminology of the Russian and English terminological systems. In order to prove the universal nature of the metaphorical models in the Russian worldview we used data from the National Corpus of the Russian Language (Russian National Corpus, electronic version). The analysis has shown that for the designation of *oil and gas equipment, oil, gas, well, geological horizon, drilling process, oil and gas extraction and drilling muds*, knowledge, based on a person's life experience is involved. All of the analyzed terms referred either to basic or peripheral metaphorical models. The division is based on semantic and quantitative types of analysis. The basic metaphorical models form the basis of the metaphorical fragment of the oil and gas terminological system. According to the quantitative analysis, a) basic models are: *artifactual* – 40.10%; *anthropomorphic* – 20.86%; *animalistic* – 13.90%; b) peripheral models are: *zoomorphic* – 9.63%; *substantial* – 8.02%; *phytomorphic* – 4.28%; *landscape* – 3.21%.

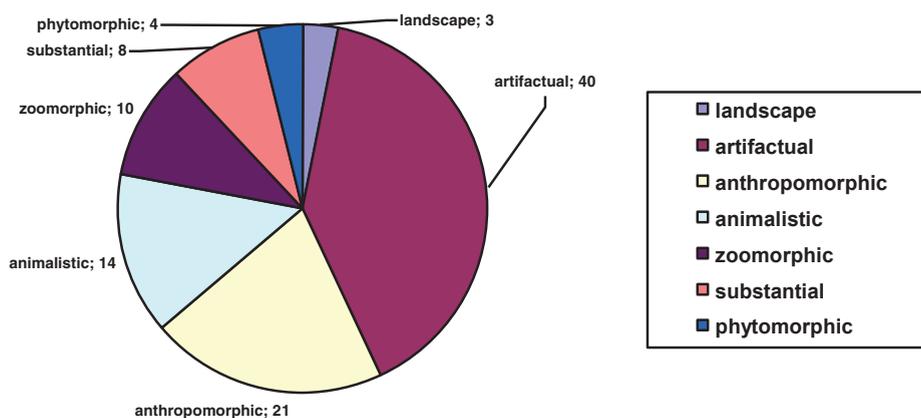


Figure 1.

The majority of artifactual metaphorical terms are used for equipment nomination – 88%. The basic conceptual domain which serves a linguistic source-domain is everyday surroundings and items. The analysis of some frame structures allows one to conclude that in the Russian oil and gas terminological system, the basis for the metaphorical conceptualization is the background knowledge of architectural and interior design items (*балкон вышки, лифтовая колонна, жаровая печь, амбар, магазин, стол бурового ротора, жалюзи с пескоуловителем*), household items (*стакан, чашка сваба, тарелка, штопор, пробка, бурильный замок, бурильная свеча*), tools (*ловушка, дудка, сеть, хомут, плуг, перо*), clothing and accessories (*юбка, кожан, воротник, муфта, рукав, серьга вертлюга, подвеска, кольцо*). All of the revealed frame structures are well-known for native speakers. This fact improves the epistemic access to the semantics of the metaphorically derived terms.

A “human” in the terminological system has a two-way representation: *physiological* and *social* perspectives. The frame structures involved in the process of term formation show that a human is interpreted as a subject possessing some particular qualities and states (*пассивный, эксцентричный, возмущенный, свободный*), and undertaking activities (*кондуктор*). “Physiological human” is represented by nominations-somatisms (*щеки, кулачок, палец, нога*). The third basic model, functioning in the oil and gas terminological system is an animalistic metaphorical model. This type of metaphor combines those metaphorical terms that are based on features inherent for both a human and an animal. In the framework of this model one can find terms, based on the understanding of biological characteristics of a living being: “the body” (*ушко, шейка, челюсть, зубья, ребро*), physical state (*подвижный, мертвый, слепой, усталый, истощенный, тощий, жирный*), “physiological process” (*дыхание, биение, пульсация, питание*).

Peripheral models (zoomorphic, phytomorphic, substantial and landscape) are represented by an insignificant number of terms. However, these very terms favour lingvocognitive specificity revelation. In the course of metaphorical conceptualization the knowledge of the body of an animal and its habitation is involved (*бабочка, гусак, лебедка, рыбий хвост, ери, гнездо* etc.). The specificity of a substantial metaphor in the framework of this terminological system lies in actualizing all target-domains (*well, oil, gas*) except for *equipment* (*сладкий, кислый, сырой, тяжелый, легкий*). Phytomorphic metaphor involves the knowledge of the structure of a plant (*ёлка, куст скважин*), and its parts (*ствол, ветвь, груша*) in the process of metaphorical conceptualization. The most common image borrowed from the phytomorphic domain is the image of a *bush*. Besides, in the framework of landscape metaphor, the knowledge about some landscape objects, their structure and notion of some climatic events are included. The most common basis for the metaphorical conceptualization is a complex of different features and qualities: the visual appearance of an object, the functioning of the object and the functional purpose of the object.

3. Results and discussion

According to the results of the contrastive analysis of the metaphorical terms and metaphorical items in the Russian language it is evident that between metaphorical models, functioning in the oil and gas terminological system, and models, functioning in the Russian language in general, one can trace a consistent succession. This proves that the models are of a universal nature. This fact, on one hand, favors the idea, stated by a number of scientists (Gusev, 1994; Petrov, 1985), according to whom the models are of a common language nature. On the other hand, this fact indicates close interaction between the scientific and naive understanding of the world. Further evidence in the favor of this point is the fact that in the process of coining terms the concept of objects which are very typical for a particular culture or, even of archaic nature, are involved (*хомут, ника, щит*). This confirms the thesis that the process of metaphorical conceptualization is a complex mental operation. In the course of metaphorization a person’s experience from the previous generations, and experience from various areas of knowledge and activities are involved. Moreover, the process of metaphorical conceptualization is a complex process of the subject analysis, in the course of which, the main features are conceptualized, transferred and assigned to a new object. The metaphorical fragment of the technical terminological system is under the influence of the naive worldview.

As has already been noted, in order to identify the lingvocognitive specificity of the investigated terminological system, we used the analogous metaphorical fragment of the English terminological system. As a result, we have

identified the asymmetry of the metaphorical terms in the two terminological systems. This fact proves that there is a significant difference in the process of the human's experience structuring, and in cultural distancing. The difference in the fragments in the two terminological systems becomes evident during the first phase of the terms comparison. This demonstrates the *quantitative asymmetry* in that the metaphorical terms in the English terminological system 325 are predominant, whereas in the Russian terminological system we have identified only 187 metaphorical terms. This situation is due to the framework of the English terminological system, which includes functional lexicon and jargon: *stud duck*– production and exploration vice-president; *jet piercing*– drivage method by means of high-temperature liquid fire; *jack pot well* – high-flow-rate well; *doctor test* – sour sulphur oil test with “doctor’s” solution – sodium plumbite solution; *roughneck*– a drill man.

The data submitted in the table shows the quantitative difference between two metaphorical fragments presented on the basis of metaphorical models:

Table 1.

Model	Russian Language	English Language
Artifactual model	75 = 40,10%	89 = 27,38%
Anthropomorphic model	39 = 20,86%	131= 40,31%
Animalistic model	26 = 13,90%	27 = 8,31%
Zoomorphic model	18 = 9,63%	28 = 8,62%
Substantial model	15 = 8,02%	21 = 6,46%
Phytomorphic model	8 = 4,28%	13 = 4%
Landscape model	6 = 3,21%	16 = 4,92%
Total number	187	325

The qualitative asymmetry becomes evident while studying the models, types of relations between the terms involved in the process of metaphorical conceptualization of the frame structures, which are referred to the same or different conceptual domains. This asymmetry is realized in two types of the metaphorical type correlation: 1) “metaphor – direct nomination”; 2) “metaphor – metaphor”.

The qualitative asymmetry of the first type occurs when a metaphorical term in one terminological system corresponds to a non-metaphorical term in another terminological system: *rabbit* – *скребок для чистки трубопровода*; *deadwood* – *якорь для крепления оттяжки*; *go-devil* – *сбрасываемое в скважину устройство*; *dog house* – *бытовка*; *crow's nest* – *верхняя площадка на вышке*; «*рама*» – *skids*; *смятая труба* – *jammed pipe*; *вскрытие продуктивного пласта* – *drilling in*; *сетка скважин* – *well spacing*; *шаг зубьев (в венце шарошки)* – *spacing*; *обвязка трубопровода* - *ripping manifold*; *ловильный ёрш* – *wire line grab* etc.

The conducted analysis has revealed that 36 out of 187 Russian terms have non-metaphorical English equivalents.

The second type of the qualitative asymmetry occurs when a metaphorical term corresponds to a metaphorical term from another system. In this case, if the equivalent term is formed according to the same conceptual scheme, it is considered symmetric and can be treated as an example of qualitative symmetry: *рыбалка* – *fishing*, *приток* – *inflow*; *башимак* – *shoe*; *тарелка ректификационной колонны* – *dish*; *плечо* – *shoulder*; *палец* – *finger*; *вертлюг* – *swivel*; *полвышки* – *derrick floor*; *роторный стол* – *rotary table*; *жалюзи с пескоуловителем* – *sand trap louvres*; *ремень* – *belt*; *кольцо* – *O-ring*. The analysis has revealed 46 cases (out of 187) of symmetric metaphoricality.

The qualitative metaphorical asymmetry occurs in cases when the metaphorical term from one terminological system corresponds to the metaphorical term from another one, but this term was created by means of another conceptual scheme. The analysis has revealed 105 cases of this type of asymmetric metaphorization. In the figure one can see the allocation of the types the asymmetry, which were revealed in the course of the analysis of the Russian and English terminological systems.

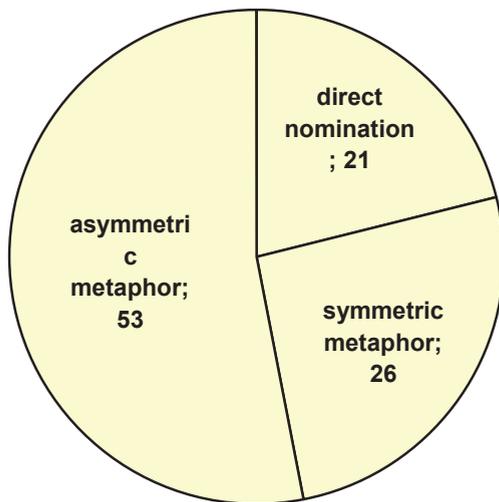


Figure 2.

The qualitative asymmetry of the second type is presented by two subtypes:

- 1) both Russian and English terms are created on the basis of the frame structures, belonging to the same conceptual domain;
- 2) Russian and English terms are created on the basis of the frame structures, belonging to different conceptual domains.

Figure 3 presents the allocation of the subtypes revealed in the course of the detailed comparison of the Russian and English metaphorical fragments of the oil and gas terminology.

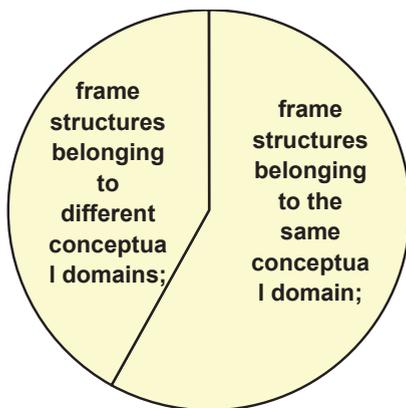


Figure 3.

The equivalent metaphorical terms, referring to the first subtype, turn out to be the most common among artefactual metaphor. In its framework one can note distinguishing frame structures (*буровая вышка – derrick*), as well as quite similar ones, corresponding with each other by metonymical principal, they tend to be almost symmetric (*факел - flare*). Relationships of the second type are rare; however, they show the wide spectrum of the involved conceptual domains and frame structures: *коленце – dogleg; шайба – washer; амбар – swamp; фонтанная арматура – Christmas tree; хомут – dog; струна – line; мостки – catwalks; чашка сваба – capsule; свеча – pipe*

string; *дудка*– *bell pit*; *умнопо*– *rope spear*; *горловина вертлюга*– *goose neck* etc.

The conducted analysis made it possible to identify the specific features of the English oil and gas terminological system which are not exposed or not very prominent in the Russian one:

- 1) the significant difference in the number of the metaphorical terms is probably due to the openness of the system to functional lexicon and jargon;
- 2) the dominant part is assigned to the anthropomorphic model;
- 3) the types of the lexical items, involved in the process of metaphorical conceptualization are anthroponyms: *Kelly drive* – вкладыш для вращения квадратной штанги, *Kelly* – ведущая буровая труба, *Jack latch* – ловильный инструмент, *Paddy bit* – буровой наконечник с выдвигающимися под давлением резаками и др.; gender and age markers – *male tap* – ловильный метчик, *female fishing tap* – ловильный колокол; *high boy* – прицеп с высокой платформой.

4. Conclusion

The analyzed material presented in the research shows that there is a significant asymmetry between the metaphorical fragments of the Russian and English terminological systems, and this fact proves the hypothesis of the influence of national background on scientific worldview, even in the framework of technical disciplines. It is evident that behind the asymmetric terminological systems of the two languages there is a national scientific worldview, the structure and the components of which are defined by the national language. The scientific worldview is created by means of the resources of the national language; it bears the impression of the specificity of a particular world perception, figurativeness of the thinking process, the mentality and character. All these facts are embodied in the terminology and, moreover, in the metaphorical terminology.

Therefore, the conducted research has demonstrated that in general the metaphorical fragment of the oil and gas terminological system is nationally and culturally specified. The analysis of the Russian metaphorical terminological system has shown that the metaphorical projection has a “national background” because it is based on the common language models of the metaphorical conceptualization. All the models revealed in the course of analysis of the oil and gas terminology are also found in different contexts in the National Corpus of the Russian Language. This fact allows one to assert that the models involved in the process of the metaphorical conceptualization are universal. The comparative analysis of the metaphorical fragments of the Russian and English terminological systems showed the asymmetry of both the qualitative and quantitative types. The qualitative asymmetry is revealed in all types of term correlation. The conducted research has shown the significant asymmetry of the metaphorical fragments in the Russian and English terminological systems. This fact allowed one to confirm the provisional hypothesis of the research, according to which the common linguistic naive worldview affects the formation of terminological systems (including technical terminological systems).

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