

Classification of metaphors according to the degree of difficulty of their perception and their decoding from the standpoint of invariant semantics

By

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Annotation

The article attempts to determine the nature of meanings in the semantic space of the lexicon by revealing the content of metaphors. A three-level classification of metaphors is presented within the scope of the article. Its main criterion is the degree of difficulties in their comprehension. The metaphors are arranged according to the principles of fluent and crystalized intelligence. A semantic structure of a word is viewed as a multi-level configuration of meanings. It is fixed by a dominant invariant meaning. The analysis of the English substantive “a leg” is presented. We have developed a new approach to the phenomena under consideration called

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the invariant-component method. As a result, the obtained semantic metaphorical clusters have lead to the lexical invariant definition. The latter is viewed as a set of basic dominant components that form the semantic core of a polysemous word. The results of the study led to the conclusion that lexical invariants make it possible to successfully decode metaphors of the first basic level according to our classification.

Keywords: classification of metaphors, a polysemous word, a semantic structure of the word, semantics, a meaning.

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1. Introduction

A human conceptual system functions as a semantic network with many inputs and outputs. Its complex multi-level system of paradigmatic, syntagmatic, associative and other connections, allows to effectively navigate in the environment, adapt to it and finally manage it. Using the language of neurolinguistics, one can rephrase what was said in the vein that the operation of neurointerfaces is carried out against the background of changes in neuroplasticity through the continuous formation of new neural circuits while deactivating existing ones. In the language of neuro-linguistics, the operation of neurointerfaces is carried out against the background of changes in neuroplasticity by continuously forming new neural circuits with parallel deactivation of existing ones

In the process of mental and speech-thinking activity, individual consciousness is equally prone to both generalizations and personal interpretation of incoming information that refracts the objective perception of the surrounding world. A person is driven by the desire to streamline the received symbolic connections and relations between them under the influence of historical, socio-economic, cultural and other factors, which give rise to the need for new nominations.

Technical and general progress continuously leads to the development of languages whose vocabulary can be changed dynamically, reaching up to 30% per century. The use of the means available in the language is of great importance, since it makes it possible to use them to designate something for which there has not yet been a special nomination.

Languages in which word formation is poorly developed fill gaps by adding new meanings to already existing polysemous words. At the same time, there is a process of renewal within the structures of polysemous words: the meanings perceived as the main ones cease to be direct meanings over time, moving into the category of figurative ones (for example, English *a coach* - first *a carriage*, then *a bus*).

The most frequent figurative meanings in the composition of polysemous words are metaphors and phraseological units. In modern cognitive linguistics, a metaphor is interpreted not only as a means of giving the text a special emotional and evaluative expressiveness, but also as a mechanism for generating new cognitive scenarios. Among the reasons for word structures expanding there are extra linguistic factors (for example, the new metaphors appearance in Russian of 1980s: *стенка* – *a wall* (as modular sectional furniture), *двойка* – *deuce* (TV and a video recorder), *приставка* – *console* (a tape recorder), etc.

A metaphor is an applicable tool for nominating new artifacts in any area of human life.

It is also almost the only way to meaningfully define objects of a high degree of abstraction. The change of paradigms towards the virtual construction of entities is characterized by a change in the vector of metaphorization towards the objectification of the world. For example, only a user with a deep understanding of the computer system can be called a root, as if being a part of a plant deeply buried in the ground.

2. Hypothesis

In order to operate with metaphors, it is important to decode them correctly. Today, a situation is emerging when culturally-coded literary speech, including complex expanded associative non-trivial and multi-stage metaphors, is decoded with difficulties.

Within the framework of this article, a classification of metaphorical meanings of different types and levels of perception is proposed. The presented classification is based on the degree of difficulty of metaphors comprehension and decoding. The typology is also based on the principle of using the type of intelligence: flexible (mobile) and crystallized [Cattell, 1971]. The classification includes simple basic intuitive metaphors, expanded associative non-trivial metaphors and nested multi-stage metaphors.

Thus, complex expanded associative non-trivial and nested multi-stage metaphors, are sometimes decoded with difficulties. Their understanding presupposes the use of flexible intellect and a play of the imagination. The inability to decode complex metaphors, in our opinion, is directly related to the lack of interest in systematic literature reading.

At the same time, our research proved that effective decoding of metaphors, at least of the first level of complexity, can be carried out not traditionally through the main meaning but through the proposed dominant nuclear components – a lexical invariant. The latter already exists and functions in the lexicon as a result of multiple use of metaphorical meanings.

That is, instead of two cognitive operations (first appealing to the semantic components of the first meaning and only through them to the metaphor itself), we propose one cognitive operation. We believe that this is how the brain works - efficiently and economically.

The awareness of these basic frequent components can help the user in metaphorical meanings decoding. The invariant semantic components unite the contextual realizations of all the figurative meanings of the polysemous word.

3. Methods

The conscious use of lexical invariants allows us to see not only the “raw material” from which a certain figurative meaning is formed, but also to understand the logic of the formation of the entire structure of the word. The lexical invariant has a dynamic nature and is formed as a result of frequent use of the metaphor in question. Lexical invariants unite metaphors into a single structure

As an illustration of the lexical invariant functioning, we propose an empirical invariant-component analysis of the word “*a leg*”. With the help of introspection, linguistic observation, empirical invariant-cluster method, description and comparison, the dominant elements of this polysemous word will be defined. Thus, the algorithms of the secondary meanings decoding will be revealed. We also apply semantic reduction as a basic analysis. It presupposes the gradual removing of the trivial semantic components of each figurative meaning.

In our analysis, we adhered to the following methodology for determining the lexical invariant of a polysemous word:

1. On the basis of the most frequent components of several explanatory dictionary definitions, the first nominative-non-derivative meaning is formulated.
2. The invariant-component analysis of each figurative meaning by comparing it with the obtained averaged nominative-non-derivative meaning. As the analysis proceeds, there is a consistent disposal of components of a trivial nature.
3. Further reduction of the word meaning. We single out the most relevant dominant nuclear semantic components in the obtained interpretations of each metaphorical meaning. At the same time, we carry out a consistent reduction of each interpretation to the minimum necessary bundle of nuclear features, necessary and sufficient for recognizing the specific meaning of the word.
4. Based on the identity of the core dominant semantic components included in the semantics of each metaphor, we group the latter into clusters. These clusters greatly simplify the decoding of metaphors that are perceived in them as a whole.
5. On the basis of the dominant semantic components identified in each metaphorical cluster, a lexical invariant is formulated. It includes core basic semantic components, which in any of the configurations underlie all the metaphorical meanings of this polysemous word.

4. Classification of metaphors

Below we present a classification of metaphorical meanings, the main criterion of which is the degree of difficulty of their decoding and general perception. Accordingly, metaphors are arranged according to the principle from simple to complex:

1) The first class of metaphors includes basic intuitive metaphors, which are usually perceived instinctively and automatically. They are used without much cognitive effort and are so common that they seem to be natural and self-evident descriptions of everyday life. Here is an example of English basic intuitive metaphors: *coat/ knee/ sleeve of a pipe, nose of a ship, head of a mountain/ river/ bay, branch of a company, chain of events/ circumstances*, etc.

Compared to English, metaphorization is not that extensive in Russian: thus, for the Russian word *голова* – *a head* there are many lacunas: *coat of a pipe* and *head of a mountain / river / bay*, etc. Thus, about 103 metaphorical meanings are found in the structure of the English polysemous word “a head”. The Russian analogue, even including the derivatives of “a head”, contains only 15-20 metaphors. Even in Russian, where word-formation models and direct nomination prevail, there are quite a lot of intuitive metaphorical transfers.

From the typology proposed by G.Lakoff and M. Johnson [Lakoff & Johnson 1980], the orientational metaphors, such as *to feel up/down*, were included to our classification of metaphors as the simplest and most obvious. By the way, orientational metaphors can be supplemented with the following mechanism: “being important is always good, being unimportant is bad”. For example, all metaphors with a component *head* can illustrate this mechanism. Thus, if we refer to a part of an object as *head*, be it the top or the beginning, it will always be the important part of it. For example, in metaphor *the head of a table* “head” is any place at the table that the owner considers the most important: it can be either the end of the table or its center.

The first group of basic intuitive metaphors also includes synesthetic metaphors, such

as a green old age (happy age), yellow silence, green envy, humid green, pale sound, bitter tone, low sound, bright sound, sweet sounds, cold / warm light, light creaking, heavy hum, etc. Synesthetic metaphors based on the level of tactility are quite common. It is obvious that hugs or any physical closeness can create a feeling of warmth or cold: a warm / cold friendship or handshake. These metaphors, although of linguo-cultural nature, are usually perceived without much effort and cognitive dissonance.

The first group of basic intuitive metaphors also includes synesthetic metaphors, such as a green old age (happy), yellow silence, green envy, humid green, pale sound, bitter tone, low sound, bright sound, sweet sounds, cold / warm light, light creaking, heavy hum, etc. These metaphors, although they are of a linguo-cultural nature, are usually perceived without much difficulty and cognitive dissonance for individuals with imagination.

From around the age of four, children display an ability to transfer metaphorical meanings from one modality to another [Marks & Stevance, 1966]. In this respect, metaphor is classed as the earliest cognitive function that directly affects language acquisition. As for synesthesia, color synesthetic metaphors also come from childhood.

The first class of metaphors also includes numerous anthropomorphic metaphors. They are usually not difficult for comprehension either. Anthropomorphism serves as an umbrella term for such phenomena as animism (personification), animatism (personification with endowing inanimate objects or animals with human emotions and abilities): a devouring prairie; Notre'Dame squats in the dusk; Mother Nature blushes before disrobing, etc.

As is demonstrated in our studies [Pesina, et al 2021], the vector of anthropomorphism is bidirectional. We distinguish centrifugal-nominative and centripetal-nominative anthropomorphism. The first is focused on likening the surrounding objects and phenomena to the structure and functioning of one's own body. The second one is focused on the reverse process: the nomination of personal properties like character, appearance, etc., on the analogy of the appearance and qualitative characteristics of the surrounding objects and phenomena.

We use basic intuitive metaphors so often that we don't even notice that they are figurative meanings that imply overthinking. Their decoding involves a crystallized type of intelligence that involves reasoning (usually verbal) based on the prior knowledge and the ability to infer secondary relational abstractions by applying previously comprehended primary abstractions.

In contrast to the crystallized type of intelligence, flexible intelligence (also mobile or fluid) includes reasoning (often non-verbal) about new problems. Flexible intelligence is able to "produce" knowledge different from the existing one, solve new problems. It is associated with the acquired critical skills as understanding, interpretation and learning [Cattel, 1971].

In the understanding of the next type of metaphorical rethinking, which we called "leveled expanded associative non-trivial metaphors", both these forms of intelligence are involved.

So the second class of metaphorical meanings includes extended associative non-trivial metaphors, which, unlike intuitive ones, require the activation of voluntary attention. They assume a significant distance between the source and target domains. These are expanded non-trivial metaphors. They are fresh and often perceived as a shock of recognition, since they contain a paradox, a search for similarities in dissimilar objects. To decipher extended

associative non-trivial metaphors, an individual needs several interconnected cognitive processes. It is necessary due to the high density of embedded information.

When creating such levelled metaphors, several or at least two initially poorly correlated domains can be used. From them a single domain is subsequently constructed. If the cognitive dissonance arising from the perception of associative non-trivial metaphors or the delay in decoding information is critical, then understanding does not occur.

This class of metaphors includes structural, ontological and polymodal (multimodal) metaphors, for the understanding of which at least two semiotic channels of information perception are used, for example, verbal and visual. Mixed verbal-graphic metaphors form one idea from two or more domains. This is, for instance, embodied in metaphorical memes, various kinds of promotional products containing figurative rethinking on condition that metaphors should not be trivial.

The polymodal metaphors are often analyzed with the help of the theory of conceptual integration developed by J. Fauconnier and M. Turner. Instead of the two-term scheme of Lakoff and Johnson, they rely on a system of four basic components, in which two concepts project their components onto each other, and do not replace one concept with another, as in the theory of conceptual metaphor. Moreover, the complete replacement of one domain by another rarely occurs as through one meaning, as a rule, “shines through” another (the effect of oscillation or palimpsest).

Internet communication is often metaphorical and polycodal. For example, at least two cognitive processes occur if you see a picture of a tiger preparing to jump and read the inscription: “This is how your wife is waiting for you when you say that you will come in 10 minutes, but come in 2 hours ...”. We are witnessing an anthropomorphic, or rather animate rethinking, when the qualities of an animal are transferred to a person and, therefore, it must be attributed to the first type of a simple intuitive metaphor. However, at least two cognitive processes are involved here: the perception and combination of graphic and linguistic information. Based on this criterion, such example of recategorization is more difficult to perceive and can be attributed to the second class of metaphors.

Nevertheless, we recognize that there is a field for discussion here, as graphic perception may serve as means of linguistic content understanding. In addition, metaphors are so diverse and rooted in our lives that it is extremely difficult to draw a clear demarcation line of classification between them.

Finally, *the third class* of metaphors includes folded multi-stage metaphors with multiple degrees of understanding. In such transfers, the semantic arrow in turn points to the semantic movement as a multi-level (double, triple, etc.) rethought of information, occurring in someone's imagination.

This type of metaphors can cover the entire literary work - a poem or prose (cf. F. Wheelwright's diaphora, meaning the combination of the most diverse details into a single new perspective). At the same time, semantic information can be packed into a number of metaphorical images that interact with each other in the most unusual way. We are talking about the formation of new complexes by successive fusion of some impressions that are difficult to commensurate.

Critical thinking, a high level of culture, a good working combination of flexible and crystallized intelligence are needed to understand nested metaphors. The individual must see a

generalizing idea and be able to produce ideas.

5. Illustration of nested multi-stage metaphors with multiple degrees of understanding.

Let's give a brief illustration of nested metaphors. A generalizing nested metaphor is created through the feelings and thoughts of the character in Franz Kafka's novel "The Process". Through the dialogues, descriptions and internally represented speech a generalized nested metaphor is created. This is an image of a monster state, into the clutches of which any most ordinary harmless inhabitant can fall. The monster methodically devours people, drawing them into all thoughts of humiliation, exterminating all human. Thus a reader can visualize a monster or other horror incarnate.

Within the framework of a parallel allegorical understanding of the same novel, another metaphor may arise: the monster can be a formidable accusatory machine of justice, mercilessly grinding the soul of a person. A multi-stage metaphor with multiple degrees of understanding can be an incessant nightmare from which awakening is impossible. Thus, the only deliverance is death.

The nested metaphor is constantly enriched with colors of doom and hopelessness, similar to a narrow rut from which one cannot get out. This is the road along which many are doomed, but always go in the same direction.

The next association is connected with descending into orbit and rotating on it until the person approaches the sizzling center. Approaching the center is also inevitable. The center appears as a black hole, where a person who has passed the point of no return. On reaching the point the person would inevitably be stretched, torn apart and swallowed up forever. So metaphorically and allegorically Kafka brilliantly predicted the emergence of fascism. Thus the system into which a person gets by chance sets itself the boundary conditions for him.

Possible trajectories of reaching the programmed end differ for the main characters of F. Kafka's works only by the degree of the nightmare and its nuances. So, in the novel "America" the fatal friends of the protagonist pursue him, as in a nightmare, and overtake him everywhere and always. At the same time, the system itself, as it were, destroys other possible scenarios for the development of events, i.e. other stories, leaving only one inevitable.

Interestingly, in relation to the development of the universe within the framework of astrophysics, the phenomenon of multiple histories was discovered in the 1960s. It was discovered by the famous physicist, one of the founders of quantum electrodynamics, Nobel laureate R. Feynman. Later, this hypothesis was refined in the sense that the boundary conditions may not be specified at all.

Thus, it may not be the system, but the person himself sets fatal boundary conditions for himself and moves within the framework of the trajectory set by himself. In this regard, the genius of F. Kafka lies in the formulation of the right questions, which humanity has yet to answer.

Within the framework of these works, nested multi-stage metaphors of personified horror are constantly present in the background of linguistic consciousness. They impose a multi-stage perception, including figurative, dictate the multiplicity of cognitive transitions. Such metaphors construct a mode of perception, as if toning everything that happens. The individual

must be intellectually, morally, ethically and culturally ready to construct such associative links.

Nested multi-stage metaphors are a serious intellectual burden on general perception, attention and memory. This is perhaps the only way to catch and meaningfully define objects of a high degree of complexity, i.e. multi-level abstractions. With their insensitivity, a situation arises when whole layers of culturally coded and ethically marked thinking, embodied in the figurative Aesopian language, cannot be understood.

We are talking not only about the carriers of the so-called naive picture of the world or average native speakers, but also about those who have received higher education. Clip communication, testing aimed at choosing the right answer, and not at creative problem solving, the lack of systematic literary reading skills can have far-reaching negative consequences for the state of linguistic consciousness. It is connected with the corresponding bundle and fine-tuning of the crystallized and flexible types of intellect.

Our experimental data show that even people with the higher humanitarian education do not always structure their thoughts, do not realize them, cannot interpret the meanings. Very often they cannot link the existing metaphorical figurative meanings in one polysemous word structure [Pesina et al. 2019]. Meanwhile, in order to operate with metaphors of the second and third classes from those presented above, it is not enough to somehow feel and decode them. It is necessary to understand their functions and feel their advantage over non-metaphorical nomination.

There are studies on how the level of development of crystallized and flexible intelligence affects the processing of metaphors. For example, L. Trick and A. Katz [Trick & Katz 1986] found a positive correlation between people's scores on a test of reasoning by analogy and scores on the comprehensibility of metaphors. As their studies have shown, neither the measurement of the level of vocabulary (crystallized intelligence), nor the ability of verbal-analogous reasoning contributed to the prediction in terms of understanding metaphors.

In contrast, D. Chiappe & P. Chiappe's research [Chiappe & Chiappe 2007] suggests that both fluid and crystallized intelligence affect metaphor processing. In their study, recipients who scored high on a test of working memory on measures of vocabulary and familiarity with printed text (crystallized intelligence) generated better interpretations of metaphors faster.

A good working memory, as well as a good level of inhibitory control, predetermine the correct processing and interpretation of metaphors [Ackerman, Beier & Boyle 2005]. These executive functions are associated with neuroplasticity and reflect the ability of excitatory and inhibitory neurons to create the necessary signal circuits. This skill is closely related to the work of flexible intellect.

In general, as we believe, at present there is not enough junction of cognitive linguistics, linguistic pragmatics, neurolinguistics, psycholinguistics, philosophy of language and methods of teaching language to set and solve the ambitious task of cardinal refocusing and boosting the speech-thinking processes of people of all ages. We need the proven reliable methods that can constantly develop imagery and the power of thinking. At the neuro-linguistic level, we are talking about the development of neuroplasticity and the formation of appropriate stable neural circuits.

6. Decoding basic intuitive metaphors based on the lexical network of dominant semantic features

In connection with the foregoing, it is important to find the key to decoding at least basic intuitive metaphors, to learn to see the commonality that unites the contextual realizations of the figurative meanings of the same word.

We have proposed a hypothesis for the effective decoding of basic intuitive metaphors in order to rely on the common thing that unites the contextual realizations of the figurative meanings of the same word. To do this, we use the concept of “lexical invariant”, which we understand as an abstract linguistic entity, a cluster of semantic components. This cluster underlies all or a number of meanings of the polysemous word in one of its configurations in accordance with the intuition of the average native speaker.

In the process of a metaphor decoding as part of a speech context, the lexical invariant can make it easier and faster to understand the metaphor. The context metaphor implements one of the dominant semantic components of the lexical invariant. Or, in other words, the latter is embodied in one of its combinatorial variants [Solonchak, Pesina 2015].

Let us illustrate what has been said by presenting below the results of the analysis of the English polysemous substantive a leg. The following are the invariant components that hold together the semantics of the English word a leg which we call a lexical invariant: a long straight, often lower and branching off part of an object which acts as a support or a distinct portion or a stage between two stops or positions (long straight, often lower and a branching part of an object that acts as a support or separate part or step between two stops or positions).

This lexical invariant includes the most significant integral and differential semantic components and is formed at the level of the language system through numerous contextual realizations of meanings (in particular, metaphorical ones). It is opposed to the term “variant”, which functions at the speech level as a contextual realization of the invariant. This opposition is built into the language-speech dichotomy [Kostina, Zerkina & Pesina 2015; Pesina et al. 2021].

As an illustration of the functioning of the lexical invariant, let us present an empirical invariant-component analysis of the polysemous English word leg. All metaphorical meanings can be divided into five clusters. In each of the clusters, the configuration of the semantic components is somewhat different. As a result of the analysis of 16 meanings of the polysemous word a leg, the following groups of metaphors can be identified:

- *part of an object, long, straight, acts as a support* (leg of a triangle; leg of a divider/compass – side of a triangle other than base or hypotenuse);
- *part of an object, long, straight, branching off from the main object* (leg of a road (a way radiating from an intersection); leg of antenna (a branch or lateral circuit connecting a communication instrument with the main line); leg of a cricket field (the part of the field to the left of and behind a right-handed batsman and vice versa);
- *part of an object, long, straight, lower, acts as a support* (leg of a plant – the part of a plant stem between the base and the point from which branches arrive; leg of a table/chair/bed (the part of furniture that rests on the floor and helps to support its

weight);

- *a distinct portion or a stage between two stops or positions, long, straight* (leg of a long journey/flight – one of the distinct portions or stages of any course or journey; that part of an air flight pattern that is between two successive stops or positions, or changes in direction);
- *part of an object, long, straight leg* of a football game/a dart match/races etc – a part of a game, a part of a race, or a game of a pair or series of games.

The content of the following value is as abstract as possible: something resembling or suggesting a leg in use, position or appearance [ACD]; something resembling a support branch of a forked or joined object [NDWEL]. This metaphorical meaning implies a wide range of referents, suitable for the concept of a support or a long branch from something. This value indicates that over time, as metaphors are used, a certain generalizing construct is formed in the individual, which increases the efficiency of his thinking.

The equivalent of this word in Russian is not rich in metaphors and has less anthropomorphic power than the English one. It is actually only a metaphor, such as “a leg of a chair”. The Russian polysemous word is rich in phraseological units, like its English equivalent, in which the components of the main meaning are realized: *вверх ногами* (upside down), *на широкую ногу* (to live richly, not embarrassed in means), *на короткой (дружеской) ноге* (in close, friendly relations), *ни в зуб ногой* (not to understand anything), etc.

The marker of the lexical invariant functioning is the appearance of the meanings beginning with the following words: “something resembling or suggesting ...” For the word *a leg* we can present the following meanings of broad semantics: “something resembling a hood in shape or use” [LDCE] (for the polysemantic a hood), “something resembling or suggesting a leg in use, position or appearance” (for the polysemantic a leg), “that part of anything which is considered as forming the top or upper end; the foremost part or projecting end of anything” [NWDEL] (for the a head polysemantic), any projection resembling or suggesting a tooth [NWDEL] (for the a tooth polysemantic).

Let us consider some other examples of such meanings: “something that resembles a blanket, anything that covers”, “a series of closely linked or connected things, a number of connected things, events etc.” [Oxford St.] (for word *a chain*), “a small piece of something” (for word *a knob*), “something resembling a bridge in form or function” [LDCE] (for word *a bridge*), “a division into usually two parts or one of the parts” [CIDE] (for word *a fork*). The more frequent the word, the more reason to expect it to develop an extended polysemy with a developed metaphor and a subsequent tendency towards broad meaning.

These metaphors suggest the likening of objects nominated by metaphorical transfers to a wide range of referents. They are a generalization of all metaphorical meanings and are formed on the basis of actualizations of all figurative meanings in the semantic structure of the statement, opening up “carte blanche” for the nomination of any object or phenomenon that has any resemblance to a nominative non-derivative meaning. The paradox is that this similarity is expressed not by signs of the main meaning, but by the components of the lexical invariant. That is, the latter is closer to metaphors than the main meaning.

The use of a lexical invariant makes it possible to avoid the phase of comparison and directly decode the metaphor through the dominant core features of the invariant. Since the language has the property of economy, the functioning of such a meaningful core,

covering, together with the main meaning, the entire semantics of the word, is effectively and justified.

That is, the bundle of nuclear features we have presented is capable of directly decoding metaphorical transfers, bypassing the first nominative-non-derivative meaning. Based on this generalizing meaning and the analysis carried out (the results of the invariant-cluster analysis are presented above), we specified the dominant features included in the lexical invariant.

The metaphors that make up this polysemous word are anthropomorphic, i.e. the objects they nominate are designed to function in the image and likeness of how the human body functions and how it is arranged. Therefore, the above metaphors belong to the first class of basic intuitive metaphors. A native speaker perceives them instinctively and automatically, because he knows how his body is arranged and “works”.

The lexical invariant is derived from the internal “intuitive contemplation” using the corresponding innate and human-specific brain algorithms, conveying the essence and delineating the boundaries of the semantic structure of the word. At the linguistic level, we are dealing with a bundle or cluster of semantic components, and at the psycholinguistic level, we have a model of the functioning of words in the lexicon. Moreover, such an invariant model presumably has an innate character, since it illustrates the basic ability of a person to generalize (along with the ability to associate, categorize and conceptualize).

7. Conclusion

A metaphor serves as the leading link and the most frequent transfer mechanism, being the richness of the polysemous structure and ensuring the integrity of its semantic context. Metaphor, as a powerful tool for personifying the surrounding world, minimizes the difference between subject and object. Without metaphor, there would be no vocabulary that characterizes abstract concepts. In metaphor, we see the refraction of the everyday world, revealing and grasping the very essence of an object or phenomenon.

The presented classifications of metaphors testify to the levels of understanding by a person of the world of conventions that he himself creates. It reflects the nuances of the interpretation of refracted reality and the ontological connection between the features of the subjective perception of the surrounding world and the world itself.

The refracted world can be endowed with the same physiological and spiritual properties as the person himself due to the need to create his own comfortable psychological space and explain the laws and mechanisms of functioning of the often hostile environment. A person, in accordance with the anthropic worldview, adapts his habitat to himself, apparently using innate mechanisms of metaphorical categorization of reality.

This refracted world is reflected and embodied in the nuclear information formed behind the structure of the word about the semantics of this word, in what we call the lexical invariant. It functions at the background level, providing an effective quick access to the semantics of a metaphor, fastens the structure of the polysemous word, preventing it from disintegrating into homonyms. The lexical invariant involves referring directly to the dominant nuclear features of the word, which underlie the metaphors, are learned intuitively and are absolutely necessary for the successful decoding of hidden meanings.

Conflict of interests

The authors confirm that the presented data do not contain a conflict of interest.

СЫЛКИ

Ackerman, P. L., Beier, M. E., & Boyle, M. O. (2005). Working memory and intelligence: The same or different constructs? *Psychological Bulletin*, 131, 30–60. <https://doi.org/10.1037/0033-2909.131.1.30>

brightness. Unpublished manuscript.
brightness. Unpublished manuscript.
brightness. Unpublished manuscript.
brightness. Unpublished manuscript.
brightness. Unpublished manuscript.
brightness. Unpublished manuscript.

Cattell R. B. *Abilities: Their Structure, Growth, and Action*. Boston, MA: Houghton Mifflin, 1971.

Chiappe, D. L., & Chiappe, P. (2007). The role of working memory in metaphor production and comprehension. *Journal of Memory and Language*, 56, 172–188. <https://doi.org/10.1016/j.jml.2006.11.006>

Kostina N., Zerkina N., Pesina S. Polysemous Words Functioning and Process of Concept Formation // *Procedia - Social and Behavioral Sciences*, Vol. 192, 24 (2015), P. 690-694.

Lakoff G., & Johnson M. (1980). *Metaphors we live by*. Chicago: University of Chicago Press.

Marks L.E. Stevenage J. C. (1966). Individual brightness functions // *Perception and Psychophysics*. 1. P. 17-24.

Marks, L. E. (1987). On cross-modal similarity: Pitch, loudness, and

Marks, L. E. (1987). On cross-modal similarity: Pitch, loudness, and

Marks, L. E. (1987). On cross-modal similarity: Pitch, loudness, and

Marks, L. E. (1987). On cross-modal similarity: Pitch, loudness, and

Marks, L. E. (1987). On cross-modal similarity: Pitch, loudness, and

Marks, L. E. (1987). On cross-modal similarity: Pitch, loudness, and

Pesina S. A., Zimareva O. L., Baklykova T. Y. Experimental Study of Semantic Structure of the Word in Terms of Anthropocentric Approach // *Humanities and Pedagogy Studies*. 2019. V. 3. Issue 4. P. 34-38. [in Russian]

Pesina S.A., Vinogradova S.A., Kiseleva S.V., Trofimova N.A., Pastushkova M.A., Ovcharenko N.V. Functional aspects of indeterminacy category and invariant study of polysemous words // *REVISTA ENTRELINGUAS*», V. 7, № 8. 2021. P.1-10.

Pesina S.A., Yusupova L.G., Kozhushkova N.V., Baklykova T.Yu., Golubeva I.A., Velikanova S.S., Representation of polysemous words in lexicon // *Applied Linguistics Research Journal*. 2021. V. 5. № 2. P. 131-136. DOI: 10.14744/alrj.2021.93276

Pesina S.A., Yusupova L.G., Vinogradova S.A., Kiseleva S.V., Trofimova N.F., Rudakova S.V., Baklykova T.Yu. Functioning of metaphor through the prism of invariant theory in polysemy // *Applied Linguistics Research Journal*. 2021. V. 4. № 5. P. 247-252.

Solonchak T., Pesina S. Cognitive Properties of Images and Metaphors // *Procedia - Social and Behavioral Sciences*, Vol. 192, 24 (2015), P. 650 – 655.

Solonchak T., Pesina S. Language Ability and Word Functioning // *Procedia - Social and*

- Behavioral Sciences, Vol. 192, 24 (2015), P. 447 – 452.
- Solonchak T., Pesina S. Lexicon Core and Its Functioning Metaphors // Procedia - Social and Behavioral Sciences, Vol. 192, 24 (2015), P. 481 – 485.
- Trick, L., & Katz, A. (1986). The domain interaction approach to metaphor processing: Relating individual differences and metaphor characteristics. *Metaphor and Symbolic Activity, 1*, 185–213. https://doi.org/10.1207/s15327868ms0103_3.
- [ACD] – American College Dictionary. – New York. Random house, 1951.
- [CIDE] – Cambridge International Dictionary of English Language. – Cambridge University Press, 1995.
- [LDCE] – Longman Dictionary of Contemporary English. – Harlow, Longman group Ltd, 1995.
- [NWDEL] – New Webster's Dictionary of English Language. College ed. - 4th repr. Dehli: Surgeet Publications, 1989.
- [Oxford St.] - Oxford Student's Dictionary of Current English. – Oxford University Press, 1981.