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REVERSIBLE METAPHORICAL MODELS 'MECHANISM IS A MAN' AND 'MAN IS A MECHANISM': PRODUCTIVITY OF THE MODEL AS AN ASPECT OF FUNCTIONAL ASYMMETRY

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Abstract. This article, by means of statistical data processing, reveals the productivity of a metaphorical model 'MAN IS A MECHANISM' in comparison with a metaphorical model 'MECHANISM IS A MAN', being reversibly compatible. This research is based upon the methodology of cognitive linguistics and on materials of the National Russian Corpus using statistical methods of material analysis.

Keywords: cognitive linguistics; metaphorical model; reversible metaphorical models; conceptual sphere; productivity.

Introduction

Within the cognitive approach the metaphor is considered as a prism, which reflects the most significant features and qualities for a human being, usually assigned to the object of comprehension [1-5].

Lakoff and Johnson, when working on the study of the common conceptual system of the humankind, singled out its metaphoricalness: "Metaphor penetrates into our everyday life, moreover, it goes into our language as well as into the process of cognition and activities" [1]. The theory of the conceptual metaphor interprets the cognitive mechanism of unification of the two conceptual spheres as correlated terms called "a target-sphere" and "a source-sphere". As a rule, the source-sphere is some more concrete knowledge received by a human being in the process of actual experience of cooperation with the outside world; and the target-sphere is something less concrete, less clear, that is why it is being interpreted on the basis of the former [Ibid].

The theory of the conceptual metaphor presented by Lakoff and Johnson, focused on cognitive metaphorical models, being realized in the system of metaphorical categories, was later continued by a number of foreign and national linguists: José Ortega y Gasset, Tchenki, Baranova, Borodulina, Kubryakova, Mishankina, Rakhilina, and Rezanova.

Cienki describes an important feature of metaphorical models, arguing that any areas, connected with the metaphor, are asymmetrical and unequal. For example: a metaphor 'LOVE IS JOURNEY' - is widely spread in a num-

ber of cultures, but a metaphor 'JOURNEY IS LOVE' is not so efficient, as physical events are not apprehended through the abstract ones [6: 352].

Studies of the metaphor from the aforementioned point of view made researchers realize the semantic reversibility of metaphorical models. Reversible metaphorical models are considered as functional types of conceptual metaphors, characterized by the inverse ratio of source and target spheres: a cognitive source-sphere of a certain metaphorical model within a reversible model is a target-sphere, and on the contrary, a target-sphere of the first model constitutes a source-sphere of another model [7: 10]. A problem of semantic correlation of metaphorical models, characterized by the inverse ratio of source and target spheres of the metaphorical modeling, was initially set up by Z.I. Rezanova [7, 8]. Certain reversible conceptual models were studied by E.A. Poturaeva [9] and Day Inly [10].

Our previous papers describe such reversible metaphorical models as 'COMPUTER IS A MAN' and 'MAN IS A COMPUTER' [11]; 'MECHANISM IS A MAN' 'MAN IS A MECHANISM' from the point of view of their content-related and axiological correlation. The metaphorical model 'MECHANISM IS A MAN' has also been considered in terms of productivity of metaphorical modeling [12].

Research design and methodology

Purposes and objectives of the study: The purpose of the study is to analyze productivity of the metaphorical model 'MAN IS A MECHANISM' in comparison with the metaphorical model 'MECHANISM IS A MAN', which are reversibly related.

Objectives: a) analysis of frequency of the studied lexical categories, representing a conceptual model 'MAN IS A MECHANISM', revealing the productivity of metaphorical modeling of the analyzed lexical units; b) comparison of the degree of metaphorical productivity of the analyzed lexical units and frequency of their use in non-metaphorical contexts; c) comparison of the productivity of metaphorization of the reversible metaphorical models 'MECHANISM IS A MAN' and 'MAN IS A MECHANISM'.

Hypothesis: A metaphorical model 'MECHANISM IS A MAN' is a particular variation of a more general and a more efficient in the Russian linguistic world image model - the anthropomorphous one. The reversible model 'MAN IS A MECHANISM' is a later one. On this basis, we suppose that the model 'MAN IS A MECHANISM' is less active in the process of figurative cognition of the outside world and is less productive in comparison with the metaphorical model 'MECHANISM IS A HUMAN'.

By analyzing the productivity of metaphorization in formation of a conceptual sphere 'mechanisms are means of transportation' such term as 'a degree of metaphoricalness of linguistic representation of a conceptual sphere'

was introduced. This index is determined by the quantitative ratio of direct nominative and metaphorical meanings, representing events of a corresponding conceptual sphere and by their actualization in contexts. Degree of metaphoricalness is an aggregate of textual relevance of all metaphorical models of this conceptual sphere, along with that metaphorical model may be of different degree of productivity [12: 60-73].

In this article we, by means of studying a degree of metaphoricalness of the reversible metaphorical model 'MAN IS A MECHANISM', figure out some relative frequency of metaphor realization as well as their textual productivity. Our primary source is data from the Russian National Corpus (NRLC) [13].

Units of our analysis consist of predicative and non-predicative word-groups, which include certain parts of a mechanism, description of its distinctive features and actions.

The statistical analysis is conducted with respect to the total number of contexts, which include both metaphorical and non-metaphorical word-groups. E.g.:

1) *podshipniki stupic (hub bearing)* - is a non-metaphorical word-group, which includes two lexical items of direct meaning: 'A bearing part of revolving and pivoting mechanisms'; 'A central part of a wheel with spoke sockets and a hole for an axe' (The Great Academic Dictionary of the Russian Language); *podshipnikov v zapyast'e (bearings in the wrist)* - a metaphor (*Nemnogo popisali - azh dym iz podshipnikov v zapyast'e pravoy ruki poshel / We wrote for a little while - so that even bearings in the right wrist started to smoke*): in this word-group a lexical item 'zapyast'e' ('wrist') has a direct meaning, but the lexical unit 'bearings' is used metaphorically;

2) *zapustit' zarzhavevshij motor (to start a rusty engine)* - is a non-metaphorical saying, components of which have a direct meaning ('scaly with rust (maroon coating on iron)'; 'an engine (combustion or electrical)' (The Great Academic Dictionary of the Russian Language); a metaphor *skripya zarzhavevshimi sustavami (wheezing rusty joints)* (*Ya sovershenno prodrog u pogasshego kostra i podnimayus' s brevna, skripya zarzhavevshimi sustavami / I am totally frozen sitting by the dead fire and I am standing up from the log wheezing my rusty joints*): the first component 'zarzhavevshie' ('rusty') is used metaphorically, and the second one 'sustavy' ('joints') has a direct meaning. The holistic meaning of this word-group is to describe a human being through an image of a mechanism.

For the purposes of the study we have composed a list consisting of 26 lexical items of the Russian language, naming different parts of a mechanism, of its distinctive features, and actions - *detal' (a part, detail)*, *vintik (a small screw)*, *porshen' (a piston)*, *zarzhavet' (to rust out)*, *tarahtet' (to rattle)*, *glohnut' (to pack up, die)*, etc. By means of continuous sampling we have selected 52 205 contexts, representing the said lexical items, including

379 contexts of metaphorical interpretation. We have conducted a contextual analysis taking into account data from explanatory dictionaries of the Russian language (The Great Academic Dictionary of the Russian Language), The Great Explanatory Dictionary of Russian Verbs). Analysis of frequency ratio of lexical categories was conducted based on 'The Frequency Dictionary of the Contemporary Russian Language' [14]. The frequency of metaphorical contexts was identified by means of direct quantitative calculations and by comparing them with the general frequency of their use.

The term 'general frequency' of a lexical item is used to identify a number of use cases in direct meaning per one million of words of the Corpus, or ipm (instances per million words). This unit of frequency measurement is used worldwide and it makes the process of word frequency comparison in different dictionaries and in different corpora much easier. The point is that text selections, on the basis of which frequency is being calculated, may vary significantly in their size [Ibid].

Results

We identified 4 groups of analyzed lexical items by degree of their frequency. High frequency lexical units (ipm over 100) have not been identified among the analyzed lexical items. The second group of the most frequently used words includes items with ipm between 50 and 100, e.g. *detal'* (a part, detail) - 75.7 ipm.

Mid-frequency lexical items, such as: *provod* (a wire), *rychag* (a lever), *zavodit'* (to start a motor) share a common frequency of use with ipm between 15 to 50 per million words of the Corpus. Such lexical items as: *tormoz* (a break), *rzhavyj* (rusty), *klapan* (a valve), *pruzhina* (a spring), *tormozit'* (to slow down), *vint* (a screw), *pedal'* (a pedal), *generator* (a generator), *gajka* (a screw nut), *bolt* (a bolt), *podshipnik* (a bearing), *zaglohnut'* (to pack up, die), *rzhavchina* (rust), *vintik* (a small screw), *porshen'* (a piston) are characterized by low frequency (ipm between 3.4 and 14.7). Such words as: *neispravnyj* (defected), *tarahtet'* (to rattle), *zarzhavet'* (to rust out), *sharnir* (a joint, pivot), *shesternya* (a gear), *zapravit'sya* (to fuel), *zaryadit'sya* (to charge, energize) are of some very low use frequency: between 0.4 to 2.7 million words of the Corpus (yet still better 0-1, 1-10...).

Analysis of metaphorical and non-metaphorical lexical contexts, representing the conceptual sphere "a human" through an image of a mechanism, identified that degree of productivity of metaphorical groups can be correlated with the general frequency of a lexical item, but cannot be entirely determined by it. To compare the degree of metaphoricalness and frequency of a lexical item, characterizing a human through such conceptual sphere as 'a mechanism', we took two key figures: general frequency of use of a lexical unit (ipm) and average frequency of use in metaphorical contexts per million words of the Corpus (ipm in metaphorical contexts).

Table 1 presents results of the metaphorical contexts analysis, assimilating the conceptual field "a human" to the conceptual sphere 'a mechanism'. The material is located to show successive decrease of the productivity degree of metaphorical modeling of these items.

The most frequent is the metaphorical interpretation of the lexical item 'zaryadit'sya (to charge, energize)' with the average usage percent of the conceptual metaphor above 10 (16.7% of metaphorical groups per total number of contexts of the National Russian Corpus): vy "zaryadites' psihicheskoy `energiej" (you 'will be **charged** with psychological energy'); on yavno sil'no **zaryadilsya** kokainom (he was obviously **charged** with cocaine); **zaryadilsya** ot svoej dissertacii (he was **charged** from his dissertation); prilichno **zaryadivshijsya** goryuchim (he was completely **charged** with booze); **zaryadit'sya** pischej na sutki (to be **charged** with food for a day), etc.

Lexical items with a high degree of metaphoricalness (average percent above 1) are: tarahtet' (to rattle), zapravit'sya (to fuel), neispravnyj (defected), zarzhavet' (to rust out), vintik (a small screw), sharnir (a joint, pivot), klapana (a valve), gajka (a screw nut), zavodit' / sya (to start a motor), zaglohnut' (to pack up, die), rzhavchina (rust): stala **tarahtet'** po-francuzski (she started to **rattle** in French); Ne dajte sustavam "zarzhavet'" (do not let your joints 'to rust out'); vashe zrenie **neispravno** (your vision is **defected**); v mozge odnogo takogo **vintika** ne hvataet (the brain lacks one **small screw** like that); Esli u vas nachali stuchat' **klapana**, buzit' aorta (If your **valves** started to make noises, your aorta became grumpy...); ruki i nogi horosho vraschalis' na **sharnirah** (the hands and legs were turning just fine in the **pivots**), etc.

A mid-frequency of metaphoricalness (between 0.5 and 1%) applies to the following lexical items: shesternya (a gear), rzhavyj (rusty), generator (a generator), pruzhina (a spring), rychag (a lever): **shesterni** kruzhilis', tam, pod cherepom (some **gears** were spinning under the skull); toj vlozhennoj v serdce kazhdogo cheloveka **pruzhiny** (by that **spring**, placed in each human's heart); Vy nastoyaschij **generator** pervoklassnyh idej (You are a true **generator** of first-class ideas!); Liza nachinala shevelit' **rzhavymi** mozgami (Liza began to use her **rusty** brains); montazhnye shemy muskulov i razlichnyh kostnyh **rychagov** (mounting layouts of muscles and of different bone levers), etc.

Nonproductive lexical items from the point of metaphorical interpretation (average percent is less than 0.5) are: tormoz (a break), vint (a screw), tormozit' (to slow down), podshipnik (a bearing), porshen' (a piston), bolt (a bolt), pedal' (a pedal), provod (a wire), detal' (a part, detail): sil'nee davilo v grudi, chto-to tam kolotilos' obezumevshim porshnem (the chest was under pressure, something inside was pounding there like a crazy cylinder); **podshipniki** moi snosilis' (my **bearings** worn out); mnogie "**detali**" nashego organizma (many '**parts**' of our body); otpustit' vnutrennie **tormoza** (to release

the internal *breaks*); *zhit' s obnazhennym provodom vnutri* (to live with a naked *wire inside*), etc.

Average productivity of the lexical and semantic group is 0.73%.

Table 1

Productivity of Metaphorical Modeling

	Lexical item	Total number of contexts	Number of metaphorical contexts	Productivity of metaphorization, %
1	zaryadit'sya (to charge)	72	12	16.667
2	tarahet' (to rattle)	316	22	6.962
3	zapravil'sya (to fuel)	136	13	9.559
4	neispravnyj (defected)	654	61	9.327
5	zarzhavet' (to rust out)	320	29	9.063
6	vintik (a small screw)	637	33	5.181
7	sharnir (a joint, pivot)	302	7	2.318
8	klapan (a valve)	2 123	41	1.931
9	gajka (a screw nut)	1 195	14	1.172
10	zavodit' / sya (to start a motor)	3 923	55	1.402
11	zaglohnut' (to pack up, die)	885	10	1.130
12	rzhavchina (rust)	890	9	1.011
13	shesternya (a gear)	420	4	0.952
14	rzhavyj (rusty)	2 639	21	0.796
15	pruzhina (a spring)	2 998	21	0.700
16	generator (a generator)	1 646	11	0.668
17	rychag (a lever)	3 082	16	0.519
18	tormoz (a break)	2 197	9	0.410
19	vint (a screw)	2 931	9	0.307
20	tormozit' (to slow down)	1 742	5	0.287
21	podshipnik (a bearing)	803	2	0.249
22	porshen' (a piston)	876	2	0.228
23	bolt (a bolt)	1 131	1	0.088
24	pedal' (a pedal)	1 189	1	0.084
25	provod (a wire)	6 160	5	0.081
26	detal' (a part, detail)	12 938	9	0.070
		52 205	379	0.726

The histogram (fig. 1) shows the ratio of a lexical item frequency in the aggregate of their meanings (lines on the left) and frequency of its realization in anthropomorphic metaphorical contexts (lines on the right), the numbers of the horizontal line correspond to the numbers of lexical items in table 1.

Table 2 presents results of an analysis related to the degree of metaphorical productivity and frequency of use of analyzed lexical items in non-metaphorical contexts. The material is located to show successive decrease of the productivity degree of use of the lexical items in metaphorical and non-metaphorical contexts.

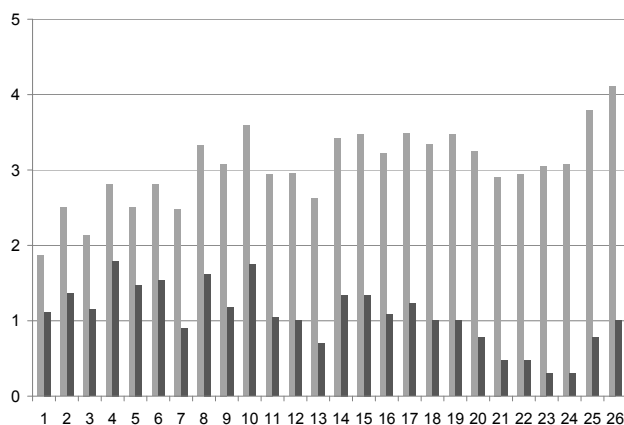


Fig. 1. Ratio of the general productivity of a lexical item and anthropomorphic contexts of their actualization

Table 2

Comparison of degree of metaphorical productivity and frequency of use of analyzed lexical items in non-metaphorical contexts

Frequency, ipm		Functional productivity of metaphorical modeling, ipm	
High frequency			
detal' (a part, detail)	75.7	rzhavyj (rusty)	0.282
provod (a wire)	26.5	neispravnyj (defected)	0.252
rychag (a lever)	18.9	vintik (a small screw)	0.192
zavodit' / sya (to start a motor)	17.1	zarzhavet' (to rust out)	0.154
Mid-frequency			
tormoz (a break)	14.7	tarahet' (to rattle)	0.118
rzhavyj (rusty)	14.6	tormoz (a break)	0.117
klapan (a valve)	12.0	rychag (a lever)	0.098
pruzhina (a spring)	11.7	generator (a generator)	0.090
tormozit' (to slow down)	11.2	zapravitsya (to fuel)	0.086
vint (a screw)	9.4	klapan (a valve)	0.084
pedal' (a pedal)	8.6	bolt (a bolt)	0.072
generator (a generator)	7.7	zavodit' / sya (to start a motor)	0.070
Low frequency			
gajka (a screw nut)	5.2	zaryadit'sya (to charge)	0.067
bolt (a bolt)	5.1	pedal' (a pedal)	0.057
podshipnik (a bearing)	4.3	detal' (a part, detail)	0.053
zaglohnut' (to pack up, die)	4.2	zaglohnut' (to pack up, die)	0.047
rzhavchina (rust)	4.2	rzhavchina (rust)	0.042
vintik (a small screw)	3.7	pruzhina (a spring)	0.036
porshen' (a piston)	3.4	sharnir (a joint, pivot)	0.035
neispravnyj (defected)	2.7	tormozit' (to slow down)	0.034
tarahet' (to rattle)	1.7	provod (a wire)	0.021
zarzhavet' (to rust out)	1.7	podshipnik (a bearing)	0.011
sharnir (a joint, pivot)	1.5	shesternya (a gear)	0.011
shesternya (a gear)	1.2	porshen' (a piston)	0.008
zapravitsya (to fuel)	0.9	vint (a screw)	0.008
zaryadit'sya (to charge)	0.4	gajka (a screw nut)	0.006

The analysis has shown that the majority of lexical items are characterized by a proportional ratio of frequency degree in all kinds of meanings and in metaphorical contexts. For example: such low-frequency lexical items as *gajka* (a screw nut), *podshipnik* (a bearing), *porshen'* (a piston), *shesternya* (a gear), *zaglohnut'* (to pack up, die), *sharnir* (a joint, pivot) also have a low index of functional productivity of metaphorical modeling. Such mid-frequency lexical item as *generator* (a generator), *tormoz* (a break), *klapan* (a valve) are also moderately productive from the point of view of metaphorical interpretation.

However, individual lexical items are characterized by different indexes of frequency and functional productivity of metaphorical modeling.

For example, such high frequency lexical items as *detal'* (a part, detail), *provod* (a wire) are characterized by significantly low degree of metaphoricalness, while such low frequency lexical items as *vintik* (a small screw), *zarzhavet'* (to rust out), *neispravnyj* (defected).

The majority of the analyzed lexical items are characterized by a low frequency of use in non-metaphorical word-groups as well as in metaphorical ones.

A comparison of degree of metaphoricalness and frequency of use of lexical items naming parts and distinctive features of a mechanism revealed proportional criteria of relation of these terms to the major part of analyzed contexts. However, certain lexical items are characterized by completely opposite indexes of frequency degree and degree of metaphorical productivity.

Table 3 presents the results of an analysis of functional productivity of metaphorical modeling of lexical units, representing reversible metaphorical models: 'MECHANISM IS A MAN' and 'MAN IS A MECHANISM'. Data for functional productivity of the metaphorical model 'MECHANISM IS A MAN' were taken from the earlier published article: 'Anthropomorphic Metaphorical Interpretation of Conceptual Sphere 'Transportation Means' (Degree of metaphoricalness of conceptual sphere and productivity of a metaphorical model)' [12].

Table 3

Comparison of functional productivity of metaphorical modeling of reversible metaphorical models 'MECHANISM IS A MAN' and 'MAN IS A MECHANISM'

Functional productivity of metaphorical modeling, ipm, 'MECHANISM IS A MAN'		Functional productivity of metaphorical modeling, ipm, 'MAN IS A MECHANISM'		
1	mashina (a machine)	1.638	rzhavyy (rusty)	0.282
2	avtomobil' (a car)	0.631	neispravnyj (defected)	0.252
3	tramvaj (a tram)	0.448	gajka (a screw nut)	0.192
4	gruzovik (a truck)	0.445	zarzhavet' (to rust out)	0.154

Functional productivity of metaphorical modeling, ipm, 'MECHANISM IS A MAN'			Functional productivity of metaphorical modeling, ipm, 'MAN IS A MECHANISM'	
5	vertolet (a helicopter)	0.336	tarahet' (to rattle)	0.118
6	parohod (a steamship)	0.333	tormoz (a break)	0.117
7	parovoz (a loco)	0.33	rychag (a lever)	0.098
8	poezd (a train)	0.261	generator (a generator)	0.09
9	samolet (a plane)	0.258	zapravit'sya (to fuel)	0.086
10	elektrichka (a commuter train)	0.253	klapan (a valve)	0.084
11	trolleybus (a trolleybus)	0.247	bolt (a bolt)	0.072
12	avtobus (a bus)	0.233	zavodit' / sya (to start a motor)	0.07
13	traktor (a tractor)	0.203	zaryadit'sya (to charge)	0.067
14	raketa (a rocket)	0.16	pedal' (a pedal)	0.057
15	kran (a crane)	0.153	detal' (a part, detail)	0.053
16	lift (an elevator)	0.126	zaglohnut' (to pack up, die)	0.047
17	kater (a motor boat)	0.101	rzhavchina (rust)	0.042
18	teplohod (a motor ship)	0.094	pruzhina (a spring)	0.036
19	motocikl (a motorcycle)	0.083	sharnir (a joint, pivot)	0.035
20	barzha (a barge)	0.051	tormozit' (to slow down)	0.034
21	teplovoz(a diesel loco)	0.046	provod (a wire)	0.021
22	eskalator (an escalator)	0.033	podshipnik (a bearing)	0.011
23	krejser (a cruiser)	0.025	shesternya (a gear)	0.011
24			porshen' (a piston)	0.008
25			vint (a screw)	0.008
26			gajka (a screw nut)	0.006
	Average mean	0.282	Average mean	0.0789

Based on the described data, our analysis of productivity of metaphorical modeling confirmed a tendency towards asymmetry of reversible metaphorical models 'MECHANISM IS MAN' and 'MAN IS A MECHANISM', which correlates to a tendency identified earlier and based on certain other material [7, 15].

A metaphorical model 'MECHANISM IS A MAN' is characterized by high metaphorical productivity as it is a certain variation of a more general and the most productive model in the linguistic worldview of the Russian language - the anthropomorphic one. A reversible model 'MAN IS A MECHANISM' is less active in the process of metaphorical modeling as it came to be later. However, it is necessary to mention that its productivity, based on the data from the National Russian Corpus, is increasing nowadays.

Conclusion

This study aimed to confirm or disclaim the thesis that the reversible metaphorical models 'MECHANISM IS A MAN' and 'MAN IS A MECHANISM' are productively asymmetrical.

The research findings confirmed not only the presented hypothesis, but also the existing opinion that anthropomorphism has a leading role in the cognitive process of learning the world [16: 35; 17: 7-8].

At the same time the acquired findings may become a part of more global research aimed at studying the interpretational potential of a conceptual sphere 'artifact', which unites mechanisms along with architectural and household artifacts.

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