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**STRUCTURE AND SEMANTICS OF PSYCHOLOGICAL PHRASEMES IN ENGLISH
(QUANTITATIVE DESCRIPTION)**

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Abstract

The relevance of the problem investigated can be explained by the growing interest in accurate quantitative description of terminology in general and phraseme terms in particular. The article aims (1) to develop quantitative description of the distribution of phraseme terms according to their structural models and semantic classes, namely: fusions, unities, and combinations; (2) to compare quantitatively obtained characteristics with those in another terminology (namely: automobiles) to get a more general perspective on the description of different terminological systems in English. The quantitative method was used as the main one to explore the problem (the author used a formula estimating the comparison coefficient of two systems for several parameters), which enabled to accurately compare both structural and semantic characteristics of phraseme terms in the field of psychology. The result of the study was the first ever estimation of the shares of semantic classes (using the new definitions the author had formulated earlier) which was done for psychological terminology. This made it possible to quantitatively compare them with automobile terms and the literary norm. The author found a quantitative correlation between the structural models of phraseme terms of psychology and carried out their quantitative comparison with the share of models in English automobile terminology.

Keywords

Phraseme – Terminology – Structural model – Semantic classes

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Introduction

The study of terminology as a special branch of linguistics began in the early and mid 20th century¹. Before that it was believed that terms were special (performing a special function) noun words that had only one meaning and did not have synonyms. Later it turned out that these were only "desirable" properties, but in fact terms (like all other units) are subject to general laws of the language at all linguistic levels: phonetic, lexical, word-formative, grammatical, phraseological, and semantic².

There are several different definitions of the concept 'the term'³. Since we explore dictionaries (i.e. "language" in modern theory⁴), we use the following definition: "Language terms are lexemes, morphemes or phrasemes that have at least one meaning known to a limited circle of speakers – specialists in any theoretical or practical area"⁵.

Terms that consist of many words are widely used in various terminologies, especially in new areas, for example, electronics, solar energy, or nuclear energy. Since they are fixed non-predicative phrases, they fall into the category of phraseme terms.

¹ I. M. Vulfius, "On the classification of idioms", Russian language in the Soviet school, num 6 (1929); A. V. Kunin, The course of phraseology of modern English: Textbook for institutes and departments of foreign languages. 2nd ed., revised. (Moscow: Vysshaya Shkola. Dubna: Publishing Center "Phoenix", KuninA, 2005) A Course on modern English phraseology (Dubna: Fenirs + Press 1996); V. M. Leichik, Terminology studies. Scope, methods, structure (Moscow: "LIBROKOM" Book House, 2009); A. A. Reformatsky, "What is the term and terminology?" Issues of Terminology (Moscow: Publishing House of the USSR Academy of Sciences, 1961); V. N. Telia, Phraseological unit. In Linguistics. The Big Encyclopaedic Dictionary. Ed. V.N. Yartseva. 2nd ed. (Moscow: Bolshaya rossiyskaya entsiklopediya, 2000); N. M. Shansky, Phraseology of the modern Russian language (Moscow: Vysshaya Shkola, 1963) y Ch. Bally, *Precis de stylistique* (Geneve, 1905).

² O. S. Akhmanova, Dictionary of linguistic terms (Moscow: KomKniga, 2005); A. V. Kunin, The course of phraseology of modern English: Textbook for institutes and departments of foreign languages. 2nd ed., revised. (Moscow: Vysshaya Shkola. Dubna: Publishing Center "Phoenix", KuninA, 2005) A Course on modern English phraseology (Dubna: Fenirs + Press 1996) y V. M. Leichik, Terminology studies. Scope, methods, structure (Moscow: "LIBROKOM" Book House, 2009).

³ N. N. Amosova, Fundamentals of English phraseology (Leningrad: Publishing House of Leningrad State University, 1963); O. S. Akhmanova, Dictionary of linguistic terms (Moscow: KomKniga, 2005) V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947); B. N. Golovin & R. Yu. Kobrin, The linguistic fundamentals of the doctrine of terms (Moscow: Vysshaya Shkola, 1987); A. V. Kunin, The course of phraseology of modern English: Textbook for institutes and departments of foreign languages. 2nd ed., revised. (Moscow: Vysshaya Shkola. Dubna: Publishing Center "Phoenix", KuninA, 2005) A Course on modern English phraseology (Dubna: Fenirs + Press 1996); V. M. Leichik, Terminology studies. Scope, methods, structure (Moscow: "LIBROKOM" Book House, 2009); A. A. Reformatsky, "What is the term and terminology?" Issues of Terminology (Moscow: Publishing House of the USSR Academy of Sciences, 1961) y V. N. Telia, Phraseological unit. In Linguistics. The Big Encyclopaedic Dictionary. Ed. V.N. Yartseva. 2nd ed. (Moscow: Bolshaya rossiyskaya entsiklopediya, 2000).

⁴ N. N. Amosova, Fundamentals of English phraseology (Leningrad: Publishing House of Leningrad State University, 1963); V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947) y V. N. Telia, Phraseological unit. In Linguistics. The Big Encyclopaedic Dictionary. Ed. V.N. Yartseva. 2nd ed. (Moscow: Bolshaya rossiyskaya entsiklopediya, 2000).

⁵ B. I. Bartkov, Essays on quantitative glottology and glottography (Kazan: BUK Publishing House, 2017).

The study of common literary phrasemes began in the period from the early to mid 19th century⁶. However, in works on this topic one can find up to twenty different definitions of phrasemes which are called phraseological units, idioms, phraseological expressions, phraseological schemes, proverbs, sayings, etc⁷. From our perspective, there is a clear difference between phrasemes (fixed non-predicative phrases, i.e. sayings) and paremiemes (fixed predicative phrases, i.e. proverbs)⁸.

V. Vinogradov⁹ once noted that phrasemes may act as terms (e.g. 'breast pang'). Currently, not only lexemes are widely used in various terminologies, but also phrasemes – fixed non-predicative phrases. However, all linguists focus on the study of general literary phrases¹⁰.

Several years ago, we began working on the quantitative description of phrasemes not only belonging to the literary norm, but also phraseme terms¹¹ and this included both structural models themselves and their distribution within semantic classes¹².

⁶ V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947); I. M. Vulpius, "On the classification of idioms", Russian language in the Soviet school, num 6 (1929); A. V. Kunin, The course of phraseology of modern English: Textbook for institutes and departments of foreign languages. 2nd ed., revised. (Moscow: Vysshaya Shkola. Dubna: Publishing Center "Phoenix", KuninA, 2005) A Course on modern English phraseology (Dubna: Fenirs + Press 1996) y N. M. Shansky, Phraseology of the modern Russian language (Moscow: Vysshaya Shkola, 1963).

⁷ O. S. Akhmanova, Dictionary of linguistic terms (Moscow: KomKniga, 2005); A. V. Kunin, The course of phraseology of modern English: Textbook for institutes and departments of foreign languages. 2nd ed., revised. (Moscow: Vysshaya Shkola. Dubna: Publishing Center "Phoenix", KuninA, 2005) A Course on modern English phraseology (Dubna: Fenirs + Press 1996) y V. N. Telia, Phraseological unit. In Linguistics. The Big Encyclopaedic Dictionary. Ed. V.N. Yartseva. 2nd ed. (Moscow: Bolshaya rossiyskaya entsiklopediya, 2000).

⁸ B. I. Bartkov, On singling out of semantic classes in English, German and Russian paroemias: fusion, unity and combinations in diachrony (Proceedings of FESTU, 2005) y B. I. Bartkov, Essays on quantitative glottology and glottography (Kazan: BUK Publishing House, 2017).

⁹ V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947).

¹⁰ N. N. Amosova, Fundamentals of English phraseology (Leningrad: Publishing House of Leningrad State University, 1963); V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947); V. M. Leichik, Terminology studies. Scope, methods, structure (Moscow: "LIBROKOM" Book House, 2009) V. N. Telia, Phraseological unit. In Linguistics. The Big Encyclopaedic Dictionary. Ed. V.N. Yartseva. 2nd ed. (Moscow: Bolshaya rossiyskaya entsiklopediya, 2000) y N. M. Shansky, Phraseology of the modern Russian language (Moscow: Vysshaya Shkola, 1963).

¹¹ B. I. Bartkov, On singling out of semantic classes in English, German and Russian paroemias: fusion, unity and combinations in diachrony (Proceedings of FESTU, 2005); B. I. Bartkov, Essays on quantitative glottology and glottography (Kazan: BUK Publishing House, 2017) y B. I. Bartkov, The so-called "phraseological units" of V.V. Vinogradov from scientific perspective. In Quantitative derivatography, derivatology, phraseology and paremiology of German, Slavic and Roman languages (Materials of the Jubilee International Conference on the 30th anniversary of the Vladivostok Linguistic Club (September 7-9, 2009) (Vladivostok: PIPKRO, 2010).

¹² B. I. Bartkov, On singling out of semantic classes in English, German and Russian paroemias: fusion, unity and combinations in diachrony (Proceedings of FESTU, 2005) y B. I. Bartkov, Essays on quantitative glottology and glottography (Kazan: BUK Publishing House, 2017); B. I. Bartkov; L. I. Minina; T. B. Bartkova; L. V. Pereshivkina & O. N. Shchukina, "A quantitative semantic-structural description of the terms-phrasemes of automobilism in English language", Academic Science,

Materials and Methods

The semantic-structural analysis of phraseme terms was made on the material of the Glossary – an appendix to the monograph on psychology (in English)¹³.

To obtain a broader perspective, we used the description of automobile phrasemes we had published earlier¹⁴.

The definitions of the semantic classes that had been previously proposed by V. Vinogradov¹⁵ are vague and linguistically incorrect (as a result, during the last 70 years none of linguists could use them for practical analysis of large arrays of phrasemes – dictionaries)¹⁶. Therefore, we proposed "new" correct definitions of semantic classes, preserving (without knowing why!) their "old" names¹⁷:

(a) Phrasemic fusion is a fixed non-predicative word combination that has a literal (denotative) meaning (the sum of the meanings of the word-components) which is unknown to speakers due to the fact they do not know the meanings of certain words (proper names, toponyms, mythonyms, religionyms, borrowings from foreign languages, figures) and figurative (connotative) meaning which is well-known and common (for example: Broca's aphasia, P300 wave, gestalt therapy, the phi phenomenon, etc.).

(b) Phrasemic unity is a fixed non-predicative word combination that has a literal (denotative) meaning known to speakers, but used only regarding background information, and a figurative (connotative) meaning that is well-known and frequent (e.g.: cognitive balance theory, fraternal twins, primary color, etc.).

(c) Phrasemic combination is a fixed non-predicative word combination that currently has only a literal (denotative) meaning that is known to speakers and is frequently used (for example: antisocial personality, empirical approach, inferiority complex, school psychology, etc.).

Our task included the following: 1) to quantitatively describe the distribution of phraseme terms according to structural models and semantic classes: fusions, unities and combinations; 2) to quantitatively compare the obtained characteristics with those in other

Problems and Achievements, num 4(2) (2015): 151-156 y I. M. Vulpius, "On the classification of idioms", Russian language in the Soviet school, num 6 (1929).

¹³ G. H. Bower; R. R. Bootzin & R. B. Zajonc, Glossary. Principles of Psychology Today (New Yorks: Random House, 1986).

¹⁴ B. I. Bartkov; L. I. Minina; T. B. Bartkova; L. V. Pereshivkina & O. N. Shchukina, "A quantitative semantic-structural description of the terms-phrasemes of automobilism in English language", Academic Science, Problems and Achievements, num 4(2) (2015): 151-156 y A. D. Sadovnikov & M. A. Sadovnikova, English-Russian motorist dictionary (Moscow: "GRAMMA" Publishing House, 1994)

¹⁵ V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947).

¹⁶ V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947).

V. N. Telia, Phraseological unit. In Linguistics. The Big Encyclopaedic Dictionary. Ed. V.N. Yartseva. 2nd ed. (Moscow: Bolshaya rossiyskaya entsiklopediya, 2000).

¹⁷ B. I. Bartkov, On singling out of semantic classes in English, German and Russian paroemias: fusion, unity and combinations in diachrony (Proceedings of FESTU, 2005); B. I. Bartkov, Essays on quantitative glottology and glottography (Kazan: BUK Publishing House, 2017) y B. I. Bartkov; E. Boyko & N. S. Grechko, Semantics of English phrasemes and paroemias. In Issues of Modern Philology and Methods of Teaching Languages in University and School. Collection of Articles the 8th All-Russian Scientific and Practical Conference (Penza: RIO FSAG, 2006).

terminology (automobile) to get a more general perspective. For this purpose, we used a mathematical formula to assess the similarity of two sets for several parameters (Renkonen's formula)¹⁸:

$K=1 - 0,005 \text{ Sum } |P_i - Q_i|$, ($0 < K < 1$), where P_i and Q_i are the shares of the corresponding units in two compared terminologies, $\text{Sum } |P_i - Q_i|$ is the sum of the differences in the shares in absolute value. If $K = 0$, then there is no similarity, if $K = 1$, then the similarity is absolute.

Results

A quantitative analysis of the distribution of phraseme terms by "new" semantic classes showed the following (Table 1).

Phrasemes	Fusion		Unity		Combination		Total	
	qty	%	qty	%	qty	%	qty	%
Psychological terms	23	5.1	210	47.1	213	47.8	446	100.0
Automobile terms ¹⁹	20	0.3	64	0.9	7077	98.8	7161	100.0
Literary norm ²⁰	70	3.2	2123	95.0	41	1.8	2234	100.0

Table 1

Semantic classes of English phrasemes in systems of terms and literary norm

To explain this result, let us give some examples of the distribution of phrasemes by "new" semantic classes.

1) Fusions: Alzheimer's disease, ad hoc categories, Oedipal conflict, Parkinson disease, phi phenomenon, PQ4R method, P300 wave, Stanford-Binet test, etc.

2) Unities: active phase, basic level, cognitive balance theory, double-blind procedure, fraternal twins, primary colors, semi-circular canals, tardive dyskinesia, transference neurosis, variable ratio schedule, etc.

3) Combinations: analytic psychology, empirical approach, cerebral hemisphere, free associations, identical twins, placebo effect, positive correlation, reciprocal altruism, school psychology, standard deviation, taste buds, etc.

In this regard, we would like to note the following: very few cases of fusion were found among psychological phrasemes – 5,1%. Most phrasemes are distributed almost evenly between the classes of unities (47.1%) and combinations (47.8%).

It is interesting that in automobile terminology, phrasemes are distributed differently: there are few fusions– 0.3%, as well as there are few unities – 0.9%. The largest share of phrasemes fall into the class of combinations– 98.8%.

¹⁸ O. Renkonen, "Statistisch-oekologische Untersuchung ueber die terrestrische Kaeferweef der finnischen Bruchmoore (Fin. suum.)", Ann. Zool. Soc. Zool.-Bot., num 6(1) (1938): 1-231.

¹⁹ I. M. Vulfius, "On the classification of idioms", Russian language in the Soviet school, num 6 (1929).

²⁰ V. M. Leichik, Terminology studies. Scope, methods, structure (Moscow:"LIBROKOM" Book House, 2009).

If we compare these results with the literary norm, we can see that most phrasemes belong to the class of unities – 95.0%, while fusions account for only 3.2%, and combinations – 1.8%²¹.

Let us estimate the values of the similarity coefficient between these sets of phrasemes for the purposes of objective evaluation.

It was estimated that $K(\text{psy}/\text{auto})=1-0.005 \times 102.0=1-0.51=0.49$. This points out to average similarity.

The similarity of the semantic classes of psychological terms and the literary norm is described by the following value: $K(\text{psy}/\text{lit}) = 0.73$. This is three-quarters of the maximum possible above the average.

At the same time, the similarity of phrasemes of automobile terminology and the literary norm²² estimates the following value: $K(\text{auto}/\text{lit}) = 0.03$; that is, the similarity is virtually negligible.

Thus, terminologies differ from each other not only in the set of phrasemes (which is obvious), but also in the shares of their distribution within semantic classes – fusions, unities and combinations (which was proven for the first time ever!).

Analysis of the structure of psychological phrasemes (and for comparison – automobile) showed the following (Table 2). In total, we identified 21 structural models within psychological terminology. The largest were structural models AN (52.7%) and NN (30.7%), which in total gives 83.4% of all phrasemes in psychology.

Interestingly, in automobile terminology²³, the NN model (64.2%) is the largest of the seven identified models. The AN model counted almost twice as few phrasemes– 32.5%. Other models were insignificant: NprepN (1.0%), VADV (1.0%), prepN (0.6%), and VN (0.6%).

Phraseme models	Psy	%	Auto ²⁴	%	Examples (from psychology)
AN	235	52.7	2329	32.5	Artificial intelligence, lucid dreams, Psychological zero, identical twins
NN	137	30.7	4595	64.2	Broca's aphasia, gestalt therapy, inferiority complex, placebo effect
ANN	24	5.4	-	-	Additive color mixing, standard score system

²¹ B. I. Bartkov; E. Boyko & N. S. Grechko, Semantics of English phrasemes and paroemias. In Issues of Modern Philology and Methods of Teaching Languages in University and School. Collection of Articles the 8th All-Russian Scientific and Practical Conference (Penza: RIO FSAG, 2006).

²² B. I. Bartkov; E. Boyko & N. S. Grechko, Semantics of English phrasemes and paroemias. In Issues of Modern Philology and Methods of Teaching Languages in University and School. Collection of Articles the 8th All-Russian Scientific and Practical Conference (Penza: RIO FSAG, 2006).

²³ B. I. Bartkov; L. I. Minina; T. B. Bartkova; L. V. Pereshivkina & O. N. Shchukina, "A quantitative semantic-structural description of the terms-phrasemes of automobilism in English language", Academic Science, Problems and Achievements, num 4(2) (2015): 151-156.

²⁴ I. M. Vulpius, "On the classification of idioms", Russian language in the Soviet school, num 6 (1929).

AAN	14	3.1	-	-	Autonomic nervous system, nuclear magnetic resonance
N prep N	11	2.5	73	1.0	Expression of emotion, locus of control, condition of worth
NNN	5	1.1	-	-	Expression management theory, Rohrschach inkpot test
N of AN	5	1.1	-	-	Curve of normal distribution, measure of central tendency
AN of N	3	0.7	-	-	Illusory aftereffects of motion, latent content of dreams
NN of N	3	0.7	-	-	James-Lange theory of emotion, two-factor theory of emotion
N of ANN	1	0.2	-	-	Doctrine of specific nerve energies
NNN for N	1	0.2	-	-	Wechsler intelligence scale for children
NANN	1	0.2	-	-	Wechsler adult intelligence scale
AdvA	1	0.2	2	0.1*	Fully functioning
AdvAN	1	0.2	-	-	Just noticeable difference
Aadv	1	0.2	-	-	Working backward
Vadv	-	-	76	1.0	-
prepN	-	-	44	0.6	-
VN	-	-	42	0.6	-
AdvV	1	0.2	-	-	Randomly assign (v)
NANN	1	0.2	-	-	Minnesota multiphasic personality inventory
NN and AN of N	1	0.2	-	-	Wechsler preschool and primary scale of intelligence
Total	446	100.0	7161	100.0	
Average	24.8	-	1023	-	

Table 2

Shares of structural models of psychological and automotive phrasemes

Let us calculate the similarity coefficient of shares (%) of structural models in psychological and automotive terminologies:

$K(\text{psy}/\text{auto})=1-0.005 \times 76.6=1-0.383=0.62$. That is, the similarity is slightly more than half of the maximum.

Discussion

The abovementioned results were obtained, firstly, by using linguistically correct new definitions of phrasemes²⁵ (in contrast to inaccurate and erroneous definitions²⁶ which

²⁵ B. I. Bartkov, On singling out of semantic classes in English, German and Russian paroemias: fusion, unity and combinations in diachrony (Proceedings of FESTU, 2005) y B. I. Bartkov, The so-called "phraseological units" of V.V. Vinogradov from scientific perspective. In Quantitative derivatography, derivatology, phraseology and paremiology of German, Slavic and Roman languages (Materials of the Jubilee International Conference on the 30th anniversary of the VladivostokLinguistic Club (September 7-9, 2009) (Vladivostok: PIPPKRO, 2010).

²⁶ V. V. Vinogradov, The main types of phraseological units in the Russian language. In Russian language. Grammatical doctrine of the word (Moscow: Uchpedgiz, 1947) y V. N. Telia, Phraseological

prevent accurate division of phraseme sets (dictionaries!) into classes, and therefore, obtaining reliable information on the relation of semantic classes to phrasemes, which is of interest to linguists, and secondly, considering phraseme terms as phrasemes (that is, fixed non-predicative word combinations) allowed us to include terms that are not lexemes in semantic research (these terms are mainly studied by terminologists²⁷). Thirdly, the research was facilitated due to using mathematical methods, in particular, Renkonen's similarity index²⁸, which made it possible to compare quantitatively two different terminology systems, as well as to compare each of them with the literary norm.

Conclusion

A quantitative description of the structure and semantics of phraseme terms in psychology in the English language allowed us to identify 21 structural models, in which the largest share of phrasemes was comprised by the AN (52.7%) and NN (30.7%) classes, in total accounting for 83.4% of all phrasemes in psychology.

The new classification of semantic classes enabled us to establish their share in psychological terminology: fusions (5%), unities (45%), and combinations (48%).

It was established that these terminologies differ not only in sets of phrasemes (which is obvious), but also in distribution of phrasemes according to structural models (which is by no means self-evident!).

Carrying out quantitative comparison of psychological and automotive phraseme terms, we demonstrated that the degree of similarity of semantic classes estimates the following value: $K(\text{psy/auto}) = 0.49$; whereas for structural models the figure is $K(\text{psy/auto}) = 0.62$.

The research findings can be used for university courses such as "Phraseology of the English Language", "Terminology of the English Language" and "Mathematical Linguistics".

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- ²⁷ B. N. Golovin & R. Yu. Kobrin, *The linguistic fundamentals of the doctrine of terms* (Moscow: Vysshaya Shkola, 1987) y V. M. Leichik, *Terminology studies. Scope, methods, structure* (Moscow: "LIBROKOM" Book House, 2009) y A. A. Reformatsky, "What is the term and terminology?" *Issues of Terminology* (Moscow: Publishing House of the USSR Academy of Sciences, 1961).
- ²⁸ O. Renkonen, "Statistisch-oekologische Untersuchung ueber die terrestrische Kaeferweef der finnischen Bruchmoore (Fin. suum.)", *Ann. Zool. Soc. Zool.-Bot.*, num 6(1) (1938): 1-231.

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