

# Ontological Description of Russian Prepositions\*

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## Abstract

The paper deals with a part of a research project which focuses on the development of a corpus-driven semantic-grammatical description of Russian prepositional constructions. In this paper, we investigate the structure of synonymous and quasi-synonymous semantic relations of primary and secondary prepositions in the Russian language. The metalanguage for the identification of a prepositional meaning is described. The methodology for processing corpus data and calculating frequency characteristics of prepositional constructions in modern Russian texts is presented. We demonstrate results of our methodology for the semantics of the locative rubric.

**Keywords:** *Russian prepositional constructions, grammatical ontology, corpus statistics, locative prepositional constructions, semantic rubrics, syntaxemes, prepositional governors, prepositional governees*

## 1 Introduction

The paper deals with a part of a research project focusing on the development of a corpus-driven semantic-grammatical description of Russian prepositional constructions. In order to achieve this goal, we take four interdependent tasks: 1) the integral description of Russian prepositional system as an interconnected structure in terms of the sense metalanguage specified according to prepositional meanings; 2) the collection of corpus statistics for “preposition – its meaning” pairs in this structure; 3) the sense representation of prepositional constructions as a function expressed by prepositions in this structure over the unity of their governors and governees; 4) the exposition of prepositional semantics as a part of syntactic links between classes of content words, i.e. a kind of a prepositional ontology.

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These tasks are challenging due to the prepositional ambiguity, which is manifested in selectional preferences of particular prepositions expressing synonymic relations between similar content words. We couldn't rely on abstract scholastic presentation of prepositional meanings. Therefore, all elements of our description are based on corpus data: the enumeration of prepositional constructions, variance of their grammatical features, synonymic and near synonymic prepositional constructions, etc. This corpus-based semantic and grammatical description of Russian prepositional constructions uses empiric data from various contemporary Russian corpora in order to identify and then formalize the basic ontologic semantic patterns of a "prepositional grammar". We foresee the results of our research to be a useful part of NLP resources because prepositions have not been getting much attention by specialists in this sphere.

The semantics of Russian prepositions was a matter of a large amount of works which are mentioned in [Solonitsky, 2003] and [Filipenko, 2000] though they mainly follow more traditional methodology and investigate several specific aspects of prepositional constructions. Anyway, the linguistic prerequisites for analyses of prepositional construction are a fundamental part of our method.

The main problem of quantitative prepositional ontology is its inner controversy because the ontological structure presupposes logical analysis of lexical meanings though prepositional constructions themselves are usually interpreted as non-lexical or not fully lexical language elements. It is obvious that grammatical constructions have grammatical meanings which are partially similar to lexical ones but in some way they are quite different. From our point of view, their differences were articulated by M.I. Steblin-Kamensky [Stebelin-Kamenskiy, 1974]. The first point of the distinction is the extent of specificity: the lexical meanings may include a complex list of visual and functional features of objects, people, locations, as, for example, the form of a maple tree and alike. For this purpose, in the lexicon of a particular language comprehensive lexico-semantic groups were developed describing all the necessary characteristics of people, objects, and other notions used in the nomination of a specific national-specific lexical system of the language. As far as the grammar is concerned, there is an incomplete awareness of the motivation for grammatical meanings, which is expressed, for example, in the attribution of animateness to obviously inanimate nominations such as покойник, мертвец ('dead person') or кукла ('a doll') and the like. There are grammatical meanings which weakly correlate with any meaningful characteristic, for example, the meaning of Russian cases. Such grammatical categories are usually called formal. However, even in such cases it is possible to formulate some oppositions which were demonstrated by R. Jakobson [Jakobson, 1985] in his analysis of grammatical oppositions within the structure of Russian case forms or verbal categories. His main point was that in the binary grammatical opposition there is a specified member, so called characteristic category, expressing a grammatical meaning "A", and its counterpart which is not a simple opposite of "non A" but some sort of a merger between "non A" and "A". For our approach, this is a fairly clear principle of distinguishing grammatical oppositions on the basis of corpus statistics. We will use this idea of the characteristic category as a guideline for distinguishing grammatical oppositions since purely logical comparisons of prepositional meanings lead to the so-called "inconsistency" in the use of prepositional-case constructions due to their grammatical nature.

## 2 Core Group of Primary Prepositions

Prepositions constitute a part of speech whose frequency in Russian is extraordinarily high. In the Russian National Corpus (RNC), they represent more than 10% tokens. There are 3 prepositions “в” (‘in’), “на” (‘on’), “с” (‘with’) among the first ten most frequent words and 18 prepositions in the first hundred. Primary Russian prepositions are highly polysemous. For example, the preposition “в” (‘in’) has more than 23 meanings in the explanatory dictionaries, though their corpus frequencies are arranged according to the Gauss law. Thus we can choose the most frequent usage of the core group of Russian prepositions and organize them into the structure of grammatical oppositions.

We take 10 topmost prepositions from the frequency list in [Lyashevskaya and Sharoff, 2009] marked as common for all functional styles and periods from Russian National Corpus: “в” (‘in’), “на” (‘on’), “с” (‘with’), “по” (‘by’), “к” (‘to’), “из” (‘from’), “у” (‘at’), “за” (‘behind’), “от” (‘from’), “о” (‘about’). Prepositions with consonant endings have vocalic variants which occur before the words beginning with a consonant cluster (vodvore), these variants concede in frequency to standard consonant variants and usually do not exceed 5% from their IPM. Hence a complete list of core prepositions looks more multiform: “в|во” (‘in’), “на” (‘on’), “с|со” (‘with’), “по” (‘by’), “к|ко” (‘to’), “из|изо” (‘from’), “у” (‘at’), “за” (‘behind’), “от|ото” (‘from’), “о|об|обо” (‘about’). Due to the common system of grammatical meanings expressed by prepositional variants, in what follows we will refer to core prepositions by their standard forms for the sake of simplicity.

We suppose that the structure of meanings and their frequency distribution expressed by prepositions from the core group in corpus contexts outlines the essential grammatical oppositions presented in the semantic continuum of prepositional constructions.

### 2.1 The Metalanguage for Prepositional Meaning Description

We claimed in [Azarova and Zakharov, 2019] that a prepositional ontology has a hierarchical structure. The most abstract concepts are semantic rubrics, which are realized as syntaxemes. This term was proposed by G. A. Zolotova [Zolotova, 2011] as a designation of the minimal syntactic-morphological prepositional constructions having particular meanings. Syntaxemes may be divided into subtypes which convey lexico-grammatical meanings and may be expressed by secondary prepositions in a variety of textual forms. Notions from the two topmost ontological levels have grammatical nature that requires a special quantitative grammatical approach for further structuring.

A syntaxeme is characterized by a morphological arrangement (a preposition plus a noun case form) which has a unity of the form and the meaning functioning as a constructive and significant component of a phrase or a sentence. A syntaxeme is a minimal grammatical construction which could not be further split into meaningful elements. The types of syntaxemes in Zolotova’s description look like semantic roles or argument specification: directive, destinative, correlative, quantitative, qualitative, locative, mediative, temporative. We use this terminology as a starting point for our metalanguage due to its particular trait – specification of items according to their use in prepositional phrases. A typical syntaxeme in Zolotova’s description is expressed by several prepositional phrases, some of them are synonyms and some are not. This fact was a reason for a more detailed designation of prepositional constructions.

A group of syntaxemes may have a common grammatical feature, for example a similar semantic range of governee and governor nouns in a prepositional construction. This fact is very informative for the quantitative grammar of prepositional constructions and led us to the notion of “semantic rubric”: a generic designation for a group of prepositional meanings. It is often the case that the rubric unites several syntaxemes as an ontological generalization.

## 2.2 Methodology for Selection Pairs “Preposition – its Meaning”

In order to solve the task of quantitative grammatical description, we need appropriate corpora. We carry out our research on morphologically annotated corpora. We used 3 Russian corpora: Russian National Corpus (<http://ruscorpora.ru/en/index.html>), with about 289 mln. tokens of different style subcorpora, Russian corpora of the Aranea – a corpus family created by the WaCtechnology (<http://unesco.uniba.sk>), and a balanced corpus developed at Saint-Petersburg in the Mathematical Linguistics Department (21 mln. tokens).

It is worth noting that frequencies of prepositional meanings obtained from various corpora differ for a variety of reasons: the balance of stylistic and thematic texts, chronological limits of texts, etc. In order to receive comparable frequencies, we use ipm (instances per million) measure of relative frequency, that is a number of occurrences of an item normalised per million.

The crucial point of our methodology is a compilation of a random sample of contexts with prepositional constructions from the chosen corpora. The sample contexts are annotated at the first stage by linguists. Prepositional meanings are ranked according to the percentage of a particular meaning of a preposition. The top ranks demonstrate the regular use of prepositional constructions, and the bottom ranks show their irregular use. The meanings from the top ranks are extrapolated due to the total frequency of a preposition in the corpus and normalized to a number of millions of tokens presented in the corpus and processed as an ipm frequency measure of prepositional meanings. They may be used for aligning the pairs “preposition – its meaning” according to the similar meaning, that is, the rubric or syntaxeme.

## 3 Prepositional Constructions of the Localization Rubric

Our pilot research [Azarova and Zakharov, 2019] shows that several syntaxemes of prepositional constructions may be assembled in the most frequent group of a meaning structure denoted as *localization*. This rubric is informative due to its frequency domination (more than 13000 ipm) in text corpora, thus various grammatical “characteristic categories” are presented in the syntaxeme’s types and subtypes. The framework of this rubric is – in some way – reproduced by other semantic rubrics conforming the localization grammatical oppositions to their particular nature.

### 3.1 Locative Syntaxemes

Syntaxemes of the localization rubric include proper *locative syntaxeme*, expressed by *в* (‘in’) plus the locative case form [3700 ipm]: *сидеть в саду* (‘to sit in the garden’), *гулять в лесу* (‘to have a walk in the forest’), the same meaning may be expressed by the preposition “на” (‘on’) with the locative case [1800 ipm] as well: *сидеть на стуле* (‘to sit on the chair’),

*дышать воздухом на веранде* ('to breathe air on the veranda'). In [Herskovits, 1985], the difference was associated with the idea of "inclusion" for the former in the contrast to "support" and "contiguity" for the latter. We point out that this "classification" is purely linguistic because the "veranda" is a three-dimensional object and a sitting person is inside it. So, we will consider these constructions to be the syntaxeme locative 1 and the locative 2 because they concede in frequency. The semantic type of governors for the locative 1 and the locative 2 is very wide: various types of verbs and verbal derivatives denoting existence, sitting, perception, etc. It is easier to point to verbal types poorly combined with these syntaxemes, which are verbs of directional movement (see the directive syntaxeme below).

A less frequent preposition from the core group also shares the static picture of localization: it is the preposition *у* ('at') plus the genitive case [250 ipm], denoting the locative 3 of immediate proximity, together with its synonymous secondary prepositions *возле* and *около* ('near'): *сидеть у (возле / около) моря* ('to sit by (near / about) the sea'); *занять место у окна* ('to take a seat by the window'). This preposition blurs the opposition between spatial and non spatial objects: *встать у кресла / стула* ('to stand at a chair'), *расположиться у города / поля* ('to settle down at a city / field').

The preposition "за" ('behind') with an ablative case [175 ipm] denotes the locative 4 designating the dividing limit (*кричать за домом* 'to scream behind the house'; *стоять за спиной* 'to stand behind'), which can simultaneously be a marker of the offered services (*стоять за прилавком* 'to stand behind the counter', *скучать за барной стойкой* 'to be bored behind the bar counter'), the latter construction leads to an "active" interpretation of the locative 4 (*быть продавцом, барменом* 'to be a seller, a bartender'). The object standing as a prepositional governee may be a real obstacle, hiding from the sight of a person what is behind it *стоять за дверью / воротами* 'to stand behind the door / gate', *находиться за забором* 'to be behind the fence'. The locative 4 syntaxeme also tends to lexicalize: *быть за городом (= на природе)* 'to be in the country', *находиться за рубежом* 'to be abroad' (to leave the country).

Another frequent preposition *по* ('over') taking the dative case [110 ipm] is considered by G. A. Zolotova predominantly a transitive syntaxeme (see below), although it is also used for a localization specification as the locative 5 in specific situations, denoting the boundaries of non-directional or chaotic movement: *бродить по городу / улицам* 'to wander around the city / the streets', *путешествовать по стране* 'to travel around the country'.

Topmost frequent and less frequent locative syntaxemes may be combined in texts. For example: locative 1 and locative 2: *сидеть в кресле на веранде* ('to sit in a chair on the veranda'), *висеть в бильярдной на стене* ('to hang in the pool room on the wall'); a combination with less frequent locatives: *грабить на открытых дорогах за городом* 'to rob on open roads outside the city', *бродить по зимнему парку в Горках* 'to wander around the winter park in Gorki', *собраться у городских ворот на высоком помосте* 'to gather at the city gates on a high platform', *сидеть у входа за столом* 'to sit at the entrance at the table'. This fact is usually considered an evidence that they have different roles, though these localization places may be included into each other.

The frequency distribution of the subtypes of locative syntaxeme is summed up in Table 1.

## 3.2 Directive Syntaxemes

The next type of localization prepositional groups reflects the trajectory of object or subject movement which is compatible with governors denoting travel verbs and verbs denoting the change of object location as well as their derivatives. Three aspects of this trajectory are usually specified in corpus texts (sorted by their frequency rank): (a) the end point of the trajectory, that is, the goal; (b) the initial or starting point of the trajectory; (c) the space traversed. Zolotova proposes 2 different syntaxemes: directive and transitive.

The specification of the end point of the movement trajectory establishes another syntaxeme group —directive. The topmost frequent prepositions “*в*” (‘in’) and “*на*” (‘on’) have impressive parallelism in their grammatical specificity, they require the accusative case of nouns, which are classified in the same way as in locative1 and locative2 syntaxemes. Thus we can introduce two syntaxemes: the directive1 [2500 ipm] and the directive2 [1250 ipm]: *прийти в сад* (‘to come to the garden’), *положить в шкаф* (‘to put in the closet’), *поставить на стол* (‘to put on the table’), *прийти на веранду* (‘to come to the veranda’). This doubling is caused by entailment: if someone has finished moving at some point X, then he was localized at X and can perform different actions and similarly, moving an object to the place X results in its localization at X. The same grammatical shift is valid for less frequent directive4 with the preposition “*за*” (in this sense ‘over’) [90 ipm]: *бросить за ограду* ‘to throw over the fence’, *выйти за ограду* ‘to go over the fence’.

The novelty in this group is the preposition “*к*” (‘to’) taking the dative case [575 ipm] denoting the directive3 which combines with governee nouns of wider range than those of the previous directives; it is – in a way – similar to governee specification of the locative3 for preposition “*у*” (‘at’): *устремиться к веранде* ‘to rush to the veranda’, *подвинуть к окну* ‘to move to the window’, *приблизиться к столбу* ‘to get closer to the pillar’. The sequence of the directive and locative has a standard interpretation: the locative in postposition is an attribute for the directive: *приехать в город на Неве* (‘to come to the city on the Neva’), *приехать на виллу в Мексике* (‘to come to the villa in Mexico’). The sequence of directives is ambivalent in a manner characteristic to locatives: *отвезти в деревню на виллу* (‘to take someone to the village to the villa’), *отправиться на дачу в Барвиху* (‘to go to the cottage in Barvikha’).

The frequency distribution of the directive syntaxeme subtypes is summed up in Table 1.

Table 1: Distribution of ipm frequencies of syntaxemes from the localization rubric in a balanced corpus (the superscript following the preposition designates the case form as its position in the standard case paradigm).

Locative			Directive			Departive			Transitive		
Locative1	<i>в</i> <sub>6</sub>	4000	Directive1	<i>в</i> <sub>4</sub>	2500	Departive1	<i>из</i> <sub>2</sub>	660	Transitive1	<i>по</i> <sub>3</sub>	360
Locative2	<i>на</i> <sub>6</sub>	2500	Directive2	<i>на</i> <sub>4</sub>	1250	Departive2	<i>с</i> <sub>2</sub>	410	Transitive2	[ <i>через</i> ] <sub>4</sub>	135
Locative3	<i>у</i> <sub>2</sub>	250	Directive3	<i>к</i> <sub>3</sub>	575	Departive3	<i>от</i> <sub>2</sub>	300			
Locative4	<i>за</i> <sub>5</sub>	175	Directive4	<i>за</i> <sub>4</sub>	575	Departive4	[ <i>из-за</i> ] <sub>2</sub>	40			
Locative5	<i>по</i> <sub>3</sub>	110									
ipm		7035	ipm		4415	ipm		1410	ipm		495

### 3.3 Departive Syntaxemes

The initial or starting point of the movement trajectory was not specified in Zolotova’s description, although prepositional constructions are rather frequent in corpus texts and, moreover, they are used with the similar group of governor words denoting movement or displacement of objects. We designate this syntaxeme departive. Directive syntaxemes have their departive matches which regularly have the same range of governees, whereas governors are antonyms of directive ones.

The departive1 expressed by “из” (‘from’) plus the genitive form [660 ipm] denotes the movement or changing place of an object or a subject opposite to that of directive1 *уйти из сада* ‘to leave the garden’, *вытащить из шкафа* ‘to pull out of the closet’, compare to *прийти в сад* ‘to come to the garden’, *положить в шкаф* ‘to put into the closet’.

The same opposition can be seen in the departive2 “с” (‘from’) plus the genitive form [410 ipm]: *убрать со стола* ‘to clear the table’, *уйти с веранды* ‘to leave the veranda’, compare to *накрыть на стол* ‘to set the table’, *прийти на веранду* ‘to come to the veranda’.

The departive3 expressed by “от” (‘from’) plus the genitive form [300 ipm] is an opposite to directive3: *отодвинуть от окна* ‘to move away from the window’, *уйти от стола* ‘to get away from the table’, compare to *подвинуть ко кну* ‘to move to the window’, *подойти к столу* ‘to come to the table’.

The departive4 is expressed by the preposition “из-за” (‘from’) [40 ipm] which goes beyond the core limits as they were specified in our research, but for the sake of consistency of the ontological structure we include it into our description: *вытащить из-за пазухи* ‘to pull out from the bosom’, *встать из-за стола* ‘to get up from the table’, compare to *положить за пазуху* ‘to put in the bosom’, *сесть за стол* ‘to sit at the table’.

The sequence of the departive and the locative has the same interpretation as for the directive’s: the locative in postposition is an attribute for the directive: *уехать из города на Неве* (‘to leave the city on the Neva’), *уехать с виллы в Мексике* (‘to leave the villa in Mexico’).

The frequency distribution of the subtypes of departive syntaxeme is summed up in Table 1.

### 3.4 Transitive Syntaxemes

The transitive syntaxeme denotes the traversed space in process of subject motion or object displacement. The preposition “по” (in this sense ‘along’) plus the dative form [360 ipm] from the core group is the only representative of this localization subtype, though there is another preposition beyond the limits “через” (‘through’) plus the accusative form [135 ipm]: *пройти по коридору / полю* ‘to walk along the corridor / field’, *спускаться по лестнице* ‘to go down the stairs’, *перекатить по полу* ‘to roll across the floor’, *пройти через холл* ‘to go through the hall’, *проехать через переезд* ‘to transport across highway crossing’.

The transitive syntaxeme co-occurs with the directive and/or departive ones specifying the trajectory completely, though the governor verbs in these contexts differ from the typical group denoting self-propelled motion or displacement of objects: *сидеть на неудобном кресле*

*по дороге из аэропорта* ‘to sit in an uncomfortable chair on the way from the airport’, *погибнуть по дороге из аэропорта в Москву* ‘to die on the way from the airport to Moscow’. Thus, in such cases, the description of the trajectory denotes the period of traveling time, that is the temporative syntaxeme. The juxtaposition of the directive and transitive syntaxemes designates two components of the trajectory: the end point and some place which is traversed and which is vital for achieving the goal: *выйти через арку на улицу* (‘to go through the arch to the street’), *ехать через Гибралтар в Ирак* (‘to go through Gibraltar to Iraq’). This combination receives another entailment meaning in Zolotova’s structure of prepositional meanings — the mediative syntaxeme, which is highly ambivalent. Combination of a transitive syntaxeme with a locative one is interpreted as a localization attribute of the trajectory: *идти по набережной в центре города* ‘to walk along the promenade in the city center’.

The frequency distribution of the subtypes of transitive syntaxemes is summed up in Table 1.

### 3.5 Overview of localization syntaxemes

The distribution of the frequencies of localization syntaxemes illustrates the quantitative realization of grammatical oppositions in the ontological structure of prepositional meanings. Jacobson’s characteristic categories can be seen in the syntaxeme group: the locative1 prevails over the locative2, and so forth, and this ratio is recurrent in every syntaxeme group. The locative syntaxeme group predominates over the directive one, the directive one — over the departive one, and the departive one — over the transitive one. This structure is transformed subsequently into other semantic rubrics, though the fundamental cognitive traits of the localization rubric are quite clear.

The significant feature of the localization syntaxeme structure is the fact that practically all syntaxemes are unambiguous: they involve different prepositions, and if they coincide, the attached case forms vary. This leads to a situation in which the juxtaposition of Russian localization syntaxemes cannot be translated into English as a valid phrase due to the repetition of the same preposition.

Therefore, we may consider enumerated syntaxemes to be a joint form of grammatical expression of the localization ontological system. English translations of the localization syntaxemes reflect the fact that in some parts the ontological structures in two languages overlap, and partially they are totally different.

Contextual examples of Russian localization syntaxemes show the correlation between prefix verbal derivatives and localization syntaxemes in use. The usual interpretation of this correlation is formulated as follows: prefixal verbal derivatives create constituents of “governed” prepositional constructions, the prefix regularly matching the preposition in such a constituent [Skoblikova, 1990]. In the next section, we examine this hypothesis for the localization rubric.

### 3.6 Distribution of Localization Syntaxeme for Prefixal Verbal Derivatives

We investigate the compatibility of prefixal verbal derivatives and the specification of the localization rubric. The total list of verbal prefixes includes orthographic variants similar to prepositional ones above: *в-* / *во-* / *вс-*, *вз-* / *взо-* / *взс-* / *вс-* / *воз-* / *вос-*, *вы-*, *за-*, *на-*, *над-*



/ *надо-* / *надѡ-*, *о-* / *об-* / *обѡ-* / *обо-*, *от-* / *ото-* / *отѡ-*, *пере-*, *по-*, *под-* / *подо-* / *подѡ-*, *пре-*, *пред-* / *предо-* / *предѡ-*, *при-*, *про-*, *раз-* / *разо-* / *разѡ-* / *рас-*, *с-* / *со-* / *сѡ-*, *у-*. For the simplicity of enumeration, we will use the most frequent variant of the prefix underlined above. Some prefixes coincide with prepositions. The number of prefixal meanings vary from one to fourteen. In Fig. 1, we see the number of prefixes compatible with the localization rubric and the number of localization syntaxemes found in contexts of governor verbal derivatives with a particular prefix.

The frequency of occurrence of localization syntaxemes in contexts of prefixal derivatives is assessed as related to the average value among the whole group of prefixal derivatives. If its value is greater than or equal to the mean value, the frequency is considered substantial, otherwise it is considered minor. The interpretation of this rating is ambivalent: (1) it may show the low corpus frequency of derivatives with a particular prefix, i.e. there are quite a few of them in the corpus with the localization meaning, (2) it may mark some localization syntaxeme as infrequent, i.e. occasional. In Table 2, the substantial occurrences of localization syntaxemes in the context of prefixal derivatives are shown.

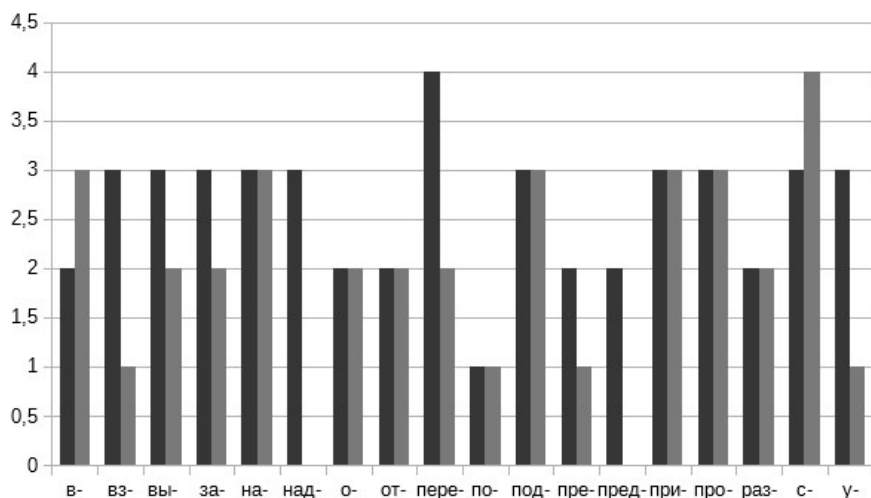


Figure 1: Conformity of the number of prefix meanings compatible with the localization rubric (2nd column) and the number of localization syntaxemes found in contexts of governor verbal derivatives with a particular prefix (1st column)

It is obvious from Fig. 1 that prefixes may be grouped into several clusters due to the number of attached syntaxemes: 1 — *по-*; 2 — *в-*, *о-*, *от-*, *пре-*, *пред-*, *раз-*; 3 — *вз-*, *вы-*, *за-*, *на-*, *над-*, *под-*, *при-*, *про-*, *с-*, *у-*; 4 — *пере-*.

It is necessary to point out, that unprefixal verbal derivatives have the capability to attach several syntaxemes, but it is considered to be an inner feature for such words whereas prefixed forms are explicitly marked [Skoblikova, 1990]. However, the distribution of substantial frequencies of localization syntaxemes over prefixal verbal derivatives presented in Tab. 2 shows that the potential of verbal semantics influences the appearance of a syntaxeme to a considerable extent. In this table, underlined prepositions are the most frequent ones, prepositions in brackets are occasional. This distribution reveals that syntaxeme subtypes tend to substitute one another under the influence of the semantic type of the governee.

Table 2: Distribution of substantial frequencies of localization syntaxemes for prefixed verbal derivatives

Syntaxemes	Locative		Directive		Departive		Transitive	
Prefixes	Prepositions	ipm	Prepositions	ipm	Prepositions	ipm	Prepositions	ipm
<i>в-</i>			в (на)	390				
<i>вы-</i>			на, (к, в, за)	330	из	150		
<i>за-</i>	на	110	в	170				
<i>на-</i>	в, (на, за)	265	на (к)	210	с, от	80		
<i>о-</i>	в, на	185						
<i>от-</i>			в (к, на)	210	от (из)	80		
<i>по-</i>			на, в (к)	520				
<i>под-</i>			к	420				
<i>при-</i>			в, на	270			через	60
<i>про-</i>	в, на	230					через, по, сквозь	90
<i>раз-</i>	в, на, по	165						
<i>с-</i>	у	120	в	360	от	120		

## 4 Conclusion and Further Work

The proposed method of ontological structuring of semantic rubrics, syntaxemes and their subtypes presented in our approach help to organize rather vague prepositional meanings. Their affinity and difference may be explicated through the overlap of semantic classes of governors and governees in prepositional constructions. The structure of corpus frequencies of prepositional constructions is a resource for a compilation of a quantitative prepositional grammar for Russian syntax.

We are going to continue our research by describing an ontological structure for other semantic rubrics by the decreasing frequency: temporative, objective, derivative, qualificative, partitive, quantificative in the outlined direction. We plan to outline the distribution of meanings of primary prepositions and then to assign meanings to secondary prepositions in these rubrics.

Further stages of our investigation include the following tasks:

- to clarify the set of syntaxemes for prepositional constructions referring to semantic types of the governor and the governee based on corpus data;
- to compile sets of prepositional constructions from corpora of different genres in order to discover the significant variation of statistical parameters;
- to describe prepositional constructions in terms of predominant semantic classes and/or lexemes used as governors;
- to list predominant semantic classes and/or lexemes used as governee for different semantic rubrics and/or syntaxemes;
- to create a database of Russian prepositional constructions accumulating corpus data with statistical information obtained;

- to compile rules of the hybrid generative grammar showing the use of prepositional phrases for expressing the comprehensive set of syntaxemes.

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