

# Argument structure of adverbial derivatives in Russian

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## Abstract

Adverbial derivatives (AdvD) of nouns of the type *v jarosti* ‘in a rage’, *s naslaždeniem* ‘with pleasure’, *pod predlogom* ‘under the pretext of’ etc. often inherit the arguments (actants) of the noun they are derived from. However, as a rule, in case of AdvDs these arguments are realized in a way very different from the nouns. The main linguistic findings of the paper consist in the set of positions the arguments may take with respect to AdvD. In a general case, a actant slot of an AdvD can be either (a) blocked, or (b) filled by a dependent of the AdvD itself (e.g. *pod predlogom bolezni* ‘under the pretext of illness’, *v dokazatel'stvo svoej nevinovnosti* ‘as a proof of his innocence’), or (c) filled by the dominating verb (*po privyčke prosnulsja rano* ‘woke up early out of habit’, *slushal pesnju s naslaždeniem* ‘listened to the song with relish’), or (d) filled somewhere within the clause organized by the dominating verb; in this case the AdvD argument may be identified based on (d1) its syntactic position (*po privyčke* ‘by habit’), or (d2) its semantic role with respect to its mother element (*v podarok* ‘as a present’), or (d3) its communicative function (*v bol'sinstve* ‘mostly’). A notation is proposed that permits to present the argument structure of AdvDs in a compact way.

## 1 Introduction

This paper is not about computation, it is about linguistics. It does not describe any electronic resource. It is not inspired by weaknesses of NLP applications that need to be fixed. We investigate certain heavily understudied and even largely unnoticed linguistic phenomena that deserve scientific study independently of whether their neglect causes serious errors in today's NLP applications or not. However, on the other hand, taking these phenomena into account is definitely useful for applications, such as semantic parsing, question answering, recognizing textual entailments, information extraction (e.g. Meyers et al. 1998), machine reading, machine translation, etc. Indeed, semantic parsers should represent the content of the text by means of elementary propositions independently of the syntactic status of the main predicate in these propositions, be it a verb, a noun, or an adverbial. They should be able to understand that such expressions as *I believe (that) he is wrong – My opinion is (that) he is wrong) – In my opinion <to my mind>, he is wrong* are different NL realizations of the same proposition. Question answering systems should be able to obtain an answer to the question *What habits does John have?* from the sentence *John woke up early out of habit*, although the argument frame of the noun *habit* does not cover this type of construction (it is the argument frame of the adverbial derivative *out of habit* that does). Similarly, textual entailment recognition systems should understand that *John woke up early out of habit* entails *John has a habit of waking up early*, which again requires correlating argument frames of three different expressions: the noun *habit*, the “support verb + noun” combination *to have a habit* and the adverbial *out of habit*.

Syntactic derivation is one of the most direct manifestations of the systemic character of the lexicon. As is well-known, language is capable of representing the same meaning (or several very close meanings) by means of words belonging to different grammatical classes. It is often possible to replace words of a certain grammatical category with those of another grammatical category without significant modification of their lexical meaning. For example, the concept ‘believe’ can be realised by means of a verb (*to believe*) or a noun (*opinion*) or an adverbial phrase (*in my opinion, to my mind*). This is one of the important ideas of *Éléments de syntaxe structurale* de Tesnière (1959). According to Tesnière, the ability to transfer one category to another at will in fluid speech is the primary tool that

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makes truly productive speech possible. This mechanism is an integral part of the linguistic capacity of humans and deserves in-depth study.

Lexical resources available to date are not sufficient for that. First, resources such as WordNet do not establish synonymy relations across category boundaries, and will not recognize these expressions as synonymous. Second, the task does not boil down to relating such expressions to the same concept. To reconstruct the proposition, one also needs to find the arguments of all the predicates and identify their roles. The latter task, also known as Semantic Role Labeling (SRL), is fairly well studied for the arguments of the verbs (cf. CoNLL-2004 and CoNLL-2005 shared tasks on semantic role labeling, Computational Linguistics Special Issue on Semantic Role Labeling, 2008). Much less is done in SRL of nouns and adjectives (Gerber 2011, Macleod 1997, 1998). Sometimes, adjectives and prepositions are included in (verbal and nominal) frames in FrameNet. However, we are not aware of any attempt to investigate arguments of adverbials. This category of words is largely understudied. It is not even represented in WordNet. In the introductory paper to the Special Issue on Semantic Role Labeling, the SRL task for adverbials is not even mentioned (Marquez et al. 2008).

Yet, adverbial derivatives are no less entitled to have arguments than the predicates they are derived from. If we want to find and identify the arguments of the verb *to cause* in (1), we would want to do the same in (2), where this concept is represented by means of the adverbial *due to*:

(1) *The minister's interview caused a dramatic fall of the market.*

(2) *The market fell dramatically due to the minister's interview.*

However, the problem is that, in a general case, it is more difficult to find these arguments in the sentence than it is for prototypical verbal or nominal predicates. The positions of these arguments in may differ greatly from the positions of «classical» arguments.

The goal of this research is to investigate these non-classical arguments with a view to their adequate representation in the dictionary and their automatic detection in the text. We intend to show (a) that the arguments of adverbials need to be found and identified, however non-trivial this task may be, (b) what their different types are and (c) how the argument structure of adverbial derivatives can be represented in the dictionary.

In this study, we will restrict ourselves to adverbial syntactic derivatives (AdvD) of Russian nouns and verbs. We will call a syntactic derivative of word *L* such a word, or phrase, *L'* that has the same (or very close) meaning as *L*, but belongs to a different syntactic category and hence displays a different behavior. We will denote the word *L* as the basic word, or keyword, of the derivation. *L'* may be a nominal derivative, or nominalization (*to construct* - *construction*, *to believe* - *opinion*), a verbal derivative (*revolution* - *revolutionize*), an adjectival derivative (*government* - *governmental*), or an adverbial derivative (*speed* - *at the speed of*, *cause* - *due to/because of*).

The plan of our presentation will be as follows. In Section 2 we will characterize briefly some properties of AdvD in Russian, then in Section 3 we will review related work on adverbial derivatives within the framework of the Meaning – Text theory. Section 4 will present different types of argument structures of adverbial derivatives. How these structures can be represented in the dictionary will be shown in Section 5. We will conclude in Section 6.

## 2 Adverbial derivatives in Russian

We will discuss two properties of AdvDs – their grammatical status and their semantic load. From the point of view of the grammatical status, there are two types of AdvD in Russian – grammatical and lexical ones. They will be explained in Sections 2.1 and 2.2. The semantic load of AdvD will be commented upon in Section 2.3.

### 2.1 Grammatical AdvDs (verbal adverbs)

Russian has a regular morphological way of constructing AdvDs of verbs – verbal adverbs (*deeprichastija*) that can be derived of virtually any verb. They serve to express a secondary predication attached to the main one.

(3) *On sprosil eto, gljadja ej v glaza.*

‘He asked that, looking into her eyes’

Russian verbal adverbs are similar to participial constructions in adverbial usage (or gerunds) existing in a variety of languages. However, they also exhibit significant differences. An important peculiarity of the argument behaviour of Russian verbal adverbs is that their subject cannot be

expressed in the surface structure and should be co-referential with the subject of the main verb. Their other arguments do not have any characteristic properties and are attached to them just as they are attached to the finite form of the verb:

(4a) *Petr pokupaet odeždu v modnyx magazinax za ogromnye den 'gi* ‘Peter buys clothes in fashionable shops for a lot of money’.

(4b) *Pokupaja odeždu v modnyx magazinax za ogromnye den 'gi, Petr večno po uši v dolgax* ‘buying clothes in fashionable shops for a lot of money, Peter is always in debt up to his neck’.

Many languages have absolute constructions, absent in Russian, which allow the subject to be attached to the participle and to be non-coreferential with the subject of the main verb:

(5) *His wife buying clothes in fashionable shops, Peter is always in debt up to his neck.*

(6) Spanish: *Habiendo pasado más de una hora, las piernas comenzaron a flaquear* ‘more than an hour having passed, his legs began to fail’.

Verbal adverbs may be active, as in (3), or passive, as in (7):

(7) *Buduči sorvannym, muxomor prodolžzaet rasti* ‘being plucked, the amanita continues to grow’.

It is to be noted that the implicit subject of the passive verbal adverb *buduči sorvannym* ‘being plucked’ is the second argument of the active form *sorvat* ‘pluck’ and, according to the general rule, is co-referential with the subject of the main verb *muxomor* ‘amanita’.

## 2.2 Lexical AdvDs

Besides verbal adverbs derived by means of inflection, there is a large number of AdvDs that are expressed by adverbs (*good – well, systematic – systematically, can – possibly*), prepositions (*cause – due to/because of*) or prepositional phrases (*love – with love*). The latter case is the most important, since a large number of AdvDs is formed in this way. It is to be noted that different AdvDs are formed with different prepositions. Semantically, lexical AdvDs are in many cases equivalent to verbal adverbs. Some examples: *otčajanie* ‘dispair’ – *v otčajanii* ‘(being) in dispair’, *interes* ‘interest’ – *s interesom* ‘with interest, feeling interest’, *odežda* ‘clothes’ – *v odežde* ‘being dressed’, *bodrstvovat* ‘be awake’ – *najavu* ‘(being) awake’, *obed* ‘dinner’ – *za obedom* ‘at dinner’, *zaščita* ‘protection’ – *pod zaščitoj* ‘under protection, being protected’, *pomošč* ‘help’ – *s pomoščju* or *pri pomošči* ‘with the help of, being helped by’.

## 2.3 Pure AdvDs vs. semantically loaded AdvDs

One has to distinguish between two types of AdvD: “pure” derivatives, which do not contain any additional meaning components absent in the meaning of the basic predicate, and semantically enriched derivatives, for which the reverse is true. As an example of the latter, let us consider the phrase *pod imenem X* ‘under the name of X’ as represented in

(8) *Napoleon exal pod imenem gerzoga Vičentskogo, to est' Kolenkura* ‘Napoleon was travelling under the name of duke of Vicenza, that is of Colencour’.

The meaning of this sentence contains a component of replacing the true name with another one. *Pod imenem X* ‘under the name of X’ does not mean that the person in question has the name of X, but rather that this person or somebody else wants other people to refer to him/her as X while the speaker knows, believes or admits that this is not the true name. Obviously, the noun *imja* ‘name’ has no such component (as opposed to *pseudonym* or *nickname*). It cannot even be ascribed to the preposition *pod* ‘under’, either, since in (8) this preposition has obviously the same meaning as in phrases *pod nazvaniem* <*zagolovkom, rubrikoj*> ‘under the title <heading>’ to which the component of concealment is completely alien. Phrases like *pod imenem* (or its English counterpart *under the name*) that are to a certain extent idiomatic are lexical units in their own right and have their own entries in the dictionary.

As for “pure”, non-idiomatic PP AdvDs, they hardly qualify for separate lexical units. However, irrespective of whether an AdvD is idiomatic or not, it should be supplied with the information about its arguments: if a sentence contains the phrase *at request*, e.g. *I called Mary at the request of my father*, we should be able to answer the question “Who asked whom to do what?” In this example, we are entitled to infer that speaker’s father asked him/her to call Mary.

Note: strictly speaking, the content of father’s request need not necessarily be “Make a call to Mary”. He could have asked his son/daughter to invite Mary for dinner. However, the phrase *I called Mary at the request of my father* is still appropriate provided the act of inviting Mary contains calling

her as its essential part.

In order to be able to make such an inference, one needs to represent the argument structure of AdvDs fully and unambiguously and relate it to the argument structure of the basic word.

As an example of how the correlation between argument structures of different words can be established, we can recall the description of converse terms in the theory of Lexical Functions within the Meaning – Text approach (Melčuk et al. 1984a, 1984b, 1988, 1992). Conversives (the input and the output of the Lexical Function Conv) are a pair of words that denote the same situation but differ in the way their arguments are ordered, e.g. *buy* – *sell*. Like any verb, *buy* and *sell* are supplied with subcategorization frames (aka government patterns in the Meaning – Text approach) that list all their arguments and their means of expression. On the other hand, their being conversives implies that their lexical functional description should indicate the correlation between their argument structures. Namely, the first argument of *sell* (“who sells?”) corresponds to the third argument of *buy* (“from whom buys?”), the third argument of *sell* (“to whom?”) – to the first argument of *buy* (“who buys?”), while the second and the fourth arguments (“what?” and “for how much?”) occupy the same positions within government patterns of both verbs. This correlation is rendered by the numerical index attached to the Conv symbol:  $Conv_{3214}(sell) = buy$ : the  $j$ -th position in the index is occupied by  $i$  if the  $j$ -th argument of the output corresponds to the  $i$ -th actant of the input.

For AdvDs the problem of the correlation of their argument structure with that of the basic predicate is particularly acute. While *sell* and *buy* are rightful lexical units entitled to have their own government patterns, adverbial collocations of the type *v jarosti* ‘in anger’, *po privyčce* ‘by habit’, *s akcentom* ‘with an accent’ or *pod predlogom* ‘under the pretext of’ are not usually treated as separate lexical units. It is assumed that all necessary information about their meaning and use should be formulated in the lexical entry of the noun. To what extent does an AdvD inherit the argument structure of the noun? If not in full, how should its argument structure be described in the dictionary?

Before answering this question, we will recall how syntactic derivatives, and AdvD in particular, are treated in the theory of lexical functions.

### 3 Syntactic derivatives in the theory of lexical functions

Two types of syntactic derivation are distinguished: “zero” and “actant” derivation. Zero syntactic derivatives ( $S_0$ ,  $V_0$ ,  $A_0$  и  $Adv_0$ ) have the same meaning as the keyword but belong to a different part of speech:  $S_0(investigate)=investigation$ ,  $V_0(investigation)=investigate$ ,  $A_0(government)=governmental$ ,  $Adv_0(good)=well$ . Actant derivatives ( $S_i$ ,  $A_i$  and  $Adv_i$ ) are oriented towards one of the actants of the keyword in the following sense.

$S_i$  is a standard name of the  $i$ -th actant of the keyword ( $S_1(teach) = teacher$ ,  $S_2(teach) = (subject) matter$  [in high school],  $S_3(teach) = pupil$ ).

$A_i$  also has a bearing to the  $i$ -th actant, but in the adjectival syntactic status. This means that its typical syntactic function is to modify a noun that fills the  $i$ -th valence slot of the keyword. A grammatical way of expressing  $A_i$  is participles.  $A_1$  is equivalent to an active participle, and  $A_2$ , to a passive participle. For example, adjectival derivatives of the verb *to control* are either an active participle *controlling* ( $A_1$ ) or a prepositional phrase *under control* ( $A_2$ ); cf. *controlling organizations* (‘organizations that control something’) – *operations under control* (‘operations that are being controlled by someone’).

Things are more complicated with adverbial actant derivatives ( $Adv_i$ ). This function is defined as follows:

« $Adv_i$  – determining property of the action by the  $i$ -th ... actant of  $L$  according to its role in the situation denoted by  $L$ .  $Adv_1$  is roughly equivalent to an active verbal adverb (‘while L-ing’) and  $Adv_2$ , to a passive verbal adverb (‘while being L-ed’).

$Adv_2(bombard) = under bombardment$

$Adv_1(speed) = at [a speed of...]$ » (Mel’čuk 1996: 55).

As this definition shows, the only link between the actantial structures of the keyword and the adverbial derivative of the  $Adv_i$  type is the  $i$ -th actant of the keyword. Although it is not stated explicitly, one can presume that the  $i$ -th actant’s position in the sentence is the position of the subject of the verb to which  $Adv_i$  is attached. In (9) the first actant of *anger* is obviously *Mary*, the first actant of the verb *reject*, and not *John* or anybody else.

(9) *Mary rejected John’s proposal with anger.*

This is understandable, since lexical function Adv<sub>i</sub> is intended to model the behaviour of verbal adverbs and, as mentioned above, they normally correlate strongly with the subject (first actant) of the main predicate (except for the absolute constructions). However, lexical function Adv<sub>i</sub> provides no information as to the position of other actants of the keyword. The next section will show that this information is essential for text understanding and that different AdvDs significantly differ in this respect.

#### 4 Argument structure of adverbial derivatives

If we compare adverbial derivation with other types of syntactic derivation, we will encounter an important difference. Argument structure of such derivatives as Conv<sub>ij</sub> or S<sub>i</sub> can be easily characterized in terms of the argument structure of the keyword. When we pass from the keyword to such a derivative, we may find that an actant either stays in its initial position (*teach mathematics – teacher of mathematics*), or changes its number (*the verb dominates the preposition – the preposition depends on the verb*), or gets blocked altogether (*drive home - \*driver home*). However, the syntactic position of the actant can only change in a very limited way. If a valence slot of the keyword is expressible in the sentence with its Conv<sub>ij</sub> or S<sub>i</sub> at all, the actant should either be attached to the derivative directly, or through a copula or other lexical functional verb (*Peter teaches mathematics – Peter is a teacher of mathematics*) or by means of the apposition (*Peter, a teacher of mathematics*).

The matters stand differently with AdvDs. Their actant properties are much more diverse than those of Conv<sub>ij</sub> or S<sub>i</sub>, or even of verbal adverbs. In some cases, the position of their actants in the sentence cannot be characterized in purely syntactic terms. In a general case, a valence slot of an AdvD can be either blocked, or:

- filled by a dependent of the AdvD itself;
- filled by the dominating verb;
- filled somewhere within the clause organized by the dominating verb; in this case the AdvD actant may be identified based on:
  - its syntactic position;
  - its semantic role;
  - its communicative function.

We will illustrate all these possibilities below.

##### 4.1 Valence slots filled by a dependent of AdvD

In the canonical case, AdvD inherits most of the governing properties of the keyword.

(10a) *skorost' 800 km/čas* 'a speed of 800 km per hour',

(10b) *Samolet letel so skorostju 800 km/čas* 'the aircraft was flying at a speed of 800 km per hour',

(11a) *sovet Ivana* 'Ivan's advice',

(11b) *po sovetu Ivana* 'at Ivan's advice',

(12a) *Eto podarok ot Viktora* lit. 'this is a present from Victor',

(12b) *Ja polučil eto v podarok ot brata* lit. 'I got it as a present from my brother'.

In some cases, governing properties of AdvD are different from those of the keyword. Let us consider the pair *predlog* 'pretext' – *pod predlogom* 'on/under the pretext of' that manifests an interesting correlation of actant properties. The noun *predlog* 'pretext' has three valence slots: *P is a pretext for X for doing Q* = 'wishing to do Q, which violates norms of ethics, or politeness, X uses situation P to do Q; he thinks that P justifies Q' (Boguslavskaya 2003). When *predlog* is used without the preposition *pod*, it can attach actant Q (= the action carried out) but not P (= false motive). The latter can only be expressed outside the phrase containing *predlog*:

(13a) *Golovnaja bol' [P] – xorošij predlog, čtoby ostat'sja doma [Q]* 'headache [P] is a good pretext for staying at home [Q]'.  
 (13b) *\*predlog golovnoj boli [P]* 'the pretext of the headache [P]'

AdvD *pod predlogom* has opposite governing properties. Actant P (= false motive) can now be a dependent of AdvD while actant Q (= the action) loses this property and moves to the position of the dominating word:

(13c) *Ona ostalas' doma [Q] pod predlogom golovnoj boli [P]* 'she stayed at home [Q] on the pretext of the headache [P]'.  
 (13d) *Ona ostalas' doma [Q] pod predlogom [P]* 'she stayed at home [Q] on the pretext [P]'.  
 (13e) *Ona ostalas' doma [Q] pod predlogom [P] [P]* 'she stayed at home [Q] on the pretext [P] of the pretext [P]'.

## 4.2 Valence slots filled by the dominating verb

Adverbial derivatives of many predicates which have a propositional valence slot fill it by means of the dominating verb. One example is (13c) above. In the following examples, the actant at issue is underlined in both the sentence with the basic predicate, and in the sentence with the AdvD.

(14a) *Ljusja dokazala polnuju sdaču svoix pozicij tem, što pocelovala Marata v nos* ‘Ljusja proved complete surrender by kissing Marat on the nose’.

(14b) *V konce koncov sama Ljusja priznala grubost’ svoego zamečanja i v dokazatel’stvo polnoj sdači svoix pozicij pocelovala Marata v nos* ‘after all, Ljusja herself acknowledged that her remark had been rude, and as a proof of complete surrender kissed Marat on the nose’ (AdvD *v dokazatel’stvo* ‘as a proof’).

(15a) *On otvetil mnogoznačitel’nym myčaniem* ‘he responded with a significant mumble’.

(15b) *V otvet on čto-to mnogoznačitel’no promyčal* ‘in response he mumbled something in a significant manner’ (AdvD *v otvet* ‘in response’).

(16a) *Ja sčitaju, čto ždat’ bol’še nečego* ‘I think there is nothing more to wait for’.

(16b) *Po-moemu, ždat’ bol’še nečego* ‘in my opinion, there is nothing more to wait for’ (AdvD *po-moemy* ‘in my opinion’).

## 4.3 Valency slots filled by dependents of the dominating verb

If a valency slot of an AdvD is filled by a dependent of the dominating verb, the question arises as to how to specify its position among other dependents of the verb. We will show that this position can be identified based on the syntactic function (4.3.1), semantic role (4.3.2) or communicative function (4.3.3).

### 4.3.1 Syntactic function

As mentioned in section 2, in the prototypical case of adverbial derivation, that of verbal adverbs, one of the actants of the keyword (the first or the second) is necessarily co-referential with the first actant (subject) of the dominating verb. Since this actant is not expressible as a dependent of the AdvD, the subject of the dominating verb is its only manifestation in the sentence. In this sense, we can say that the valence slot is filled by the subject of the dominating verb. If it is the first actant of the keyword that is co-referential with the subject, we are dealing with the active verbal adverb (Adv<sub>1</sub>, in Mel’čuk’s terminology). If it is the second actant, the verbal adverb (Adv<sub>2</sub>) is passive. If the co-reference requirement is not met, sentences with verbal adverbs are usually ungrammatical in Russian. Cf. a textbook example of a wrong use of a verbal adverb \**Podjezžaja k stancii, u menja sletela šljapa* ‘when approaching the station, my hat fell down’.

As for non-verbal AdvDs, this requirement holds for some of them and not for others. Let us discuss one example: the verb *privyknut* ‘have a habit of’. It has two valencies – ‘who has the habit?’ and ‘what does the habit consist in?’. Its AdvD is *po privyčke* ‘by habit’. Although it does not take any syntactic dependents, sentences with this AdvD provide unambiguous information on who has a habit and what it consists in/ hence, both valencies are filled:

(17) *Ivan po privyčke ostavil dver’ otkrytoj* ‘by habit, Ivan left the door open’

The identity of the first actant of *po privyčke* and the subject of the main verb can be easily demonstrated. Let’s take the verbs *zanimat’* ‘to borrow’ and *odalživat’* ‘to lend’. Being conversives, they denote the same situation and sentences (18a) and (18b) are synonymous:

(18a) *Ivan zanjaj u soseda 1000 rublej* ‘Ivan borrowed 1000 roubles from the neighbour’

(18b) *Sosed odolžil Ivanu 1000 rublej* ‘the neighbour lent Ivan 1000 roubles’.

If AdvD *po privyčke* ‘by habit’ is introduced in (18a) and (18b) in the same position, the sentences will no longer be synonymous. (19a) refers to the habit of Ivan while (19b) – to the habit of the neighbour.

(19a) *Po privyčke Ivan zanjaj u soseda 1000 rublej* ‘by habit Ivan borrowed 1000 roubles from the neighbour’

(19b) *Po privyčke sosed odolžil Ivanu 1000 rublej* ‘by habit the neighbour lent Ivan 1000 roubles’.

### 4.3.2 Semantic role

Another type of constraint is manifested by AdvDs *v podarok* ‘as a present’, *v dar* ‘as a gift’, *v nagradu* ‘in reward’. Nouns of the *present / gift / reward* type have three valence slots: the agent of

presenting something (X), the theme (Y) and the recipient (Z). The AdvDs co-occur with a large set of verbs concentrated around the meaning of ‘transfer’: *polučat* ‘receive’, *prinimat* ‘accept’, *trebovat* ‘demand’, *prosit* ‘request’; *prinosit* ‘bring (on foot)’, *privozit* ‘bring (by transport)’, *dostavljat* ‘deliver’, *posylat* ‘send’, *otpravljat* ‘dispatch’, *prednaznačat* ‘intend for’, *žalovat* ‘grant’, *podnosit* ‘offer’, *predlagat* ‘offer’, *peredavat* ‘pass (to)’, *vručat* ‘hand over’, *davat* ‘give’, *otdavat* ‘give back’, etc. It is impossible to associate the subject of the main verb with any single actant of AdvD, since each of the three actants can perform the role of the subject:

(20a) *Otec (X) privez dočeri v podarok ožerelje* ‘Father (X) brought a necklace as a present to his daughter’.

(20b) *Maria (Z) prinjala ožerelje v podarok* ‘Mary (Z) accepted the necklace as a present’.

(20c) *Ožerelje (Y) dostalos’ ej v podarok ot babuški* ‘the necklace (Y) came to her as a present of her grandmother’.

It is not syntactic constraints that regulate the position of the actants of these AdvD with respect to the main verb but semantic ones. The correlation between the valence slots of AdvD and the main verb can be formulated IN TERMS OF SEMANTIC ROLES as follows: if a valence slot of AdvD which corresponds to semantic role R (Agent, Theme, Recipient) is instantiated, it is either filled by an AdvD dependent (as in *v podarok dočeri* ‘as a present to one’s daughter’, *v podarok ot otca* ‘as a present from one’s father’), or by a dependent of the main verb which performs the role R with respect to the predicate of transfer within the meaning of the main verb. For example, in (20a-c) the subjects *otec* ‘father’, *Maria* ‘Maria’ and *ožerelje* ‘necklace’ all play different semantic roles with respect to the main verb: the father is the Agent of bringing, Maria is the Recipient of giving (‘accept’ ≈ ‘agree to be given’), and the necklace is the Theme of coming. Accordingly, these words are the Agent, Recipient and Theme of the present, respectively.

It should be stressed that the semantic role of a noun phrase with respect to the dominating verb may be different from its semantic role with respect to an inner predicate of this verb. For example, in (21a) *Ivan potreboval poltsarstva* ‘Ivan demanded half of the kingdom’ [= ‘demanded that he were given half of the kingdom’]

Ivan is the Agent of demanding and at the same time the Recipient of giving. What is important for AdvD of the *v podarok* type is the role of the actant with respect to giving. Therefore, in (21b) Ivan is the Recipient and not the Agent of reward:

(21b) *Ivan potreboval sebe v nagradu poltsarstva* ‘Ivan demanded half of the kingdom as a reward’.

#### 4.3.3 Communicative function

Boguslavsky (2005) discussed the argument frames of noun *bol’sinstvo* ‘majority, most of’ and *men’sinstvo* ‘minority’. It was shown that these words have three arguments: the whole, a part of the whole and the property of the part that is shared by most of the elements of the whole. Here we will only be interested in one of these arguments – that of the whole, expressed prototypically by preposition *iz* ‘of’ as represented in phrases *the majority of cases*, *most of the students*. In sentences with AdvD *v bol’sinstve* ‘mostly, for the most part’ this valence slot is filled, as a rule, by the subject of the dominating verb:

(22) *Oni byli arestovany i podverglis’ v bol’sinstve svoem ssylke v Gvianu i na Sejšel’skie ostrova* ‘they were arrested and mostly exiled to Guiana or Seychelles’ [= ‘most of them were exiled...’]

However, this is not the only possible syntactic role for this actant. In (23) it is the direct object *inostrannye knigi* ‘foreign books’ that fills the valence slot of the whole:

(23) *Russkie knigi byli sobrany pokojnym mužem knjagini..., inostrannye že – v bol’sinstve vyvezla sama Anna Arkadjevna iz Pariža* lit. ‘Russian books were collected by the late husband of the princess..., while foreign books (dir. object) mostly Anna Arkadjevna brought from Paris herself’ [= ‘most of the foreign books’].

And even this is not all. What is essential here is not the syntactic role of the actant but the communicative organization of the clause. The valence slot of the whole should be filled by the Topic. Since the position of the Topic is most often held by the subject, it is clear why it is the subject that for the most part fills this valence slot. The claim that the valency of the whole of *v bol’sinstve* ‘mostly’ is Topic-oriented can be confirmed by a minimal pair of sentences below.

Due to the relatively free word order in Russian, the Topic-Focus distinction is rarely marked syntactically or lexically. The same syntactic structure may correspond to different Topic-Focus

articulations. In most cases it is the clause-initial phrase that is the Topic of the sentence<sup>1</sup>. In (24a) and (24b) the syntactic structures are the same but the word order and the Topic-Focus articulations are different. Therefore, the valency slot of the whole is filled differently:

(24a) *Žeňščiny* (Topic) *v bol'sinstve svoem sideli v zale*  
lit. 'the women (Topic) in majority were sitting in the hall'  
'most of the women were in the hall'

(24b) *V zale sideli* (Topic) *v bol'sinstve svoem žeňščiny*  
lit. 'in the hall were sitting (Topic) in majority the women'  
'most of those in the hall were women'

## 5 Representation of adverbial derivatives in the lexicon

From the viewpoint of the theory of phraseology developed in Mel'čuk 1995, AdvDs belong to the class of collocations and should be represented in the dictionary within the entries of their nominal component – the keyword of the derivation (Mel'čuk 1995: 184). The entries of the keywords contain all the information on their argument frames. Based on this information, one can represent the argument frame of AdvD in a compact way.

AdvD are to be described in the dictionary entry of the keyword, as a value of the Adv Lexical Function. The argument structure of the derivative is described by means of an index attached to the Adv symbol. We showed above (in 2.3) how the correlation between the arguments of the conversives can be stated by means of the numerical index attached to the symbol of the Conv Lexical Function. We are going to describe AdvDs along similar lines, but the index should be somewhat more elaborated. Namely, the argument index of the Lexical Function Adv is constructed as follows:

- it consists of  $n$  positions, according to the number of valency slots of the keyword; the 1<sup>st</sup> position corresponds to the 1<sup>st</sup> slot of the keyword, the 2<sup>nd</sup> position corresponds to the 2<sup>nd</sup> slot etc.
- each position contains information on whether the corresponding valency can be filled if the keyword is represented by its adverbial derivative and, if so, how it should be filled. This information is one of the following:
  - 0, if the slot cannot be filled,
  - $i$ , if the slot is filled as the  $i$ -th slot of the keyword,
  - G, if the slot is filled by the syntactic governor of the AdvD,
  - $i(G)$ , if the slot is filled by a phrase that is the  $i$ -th actant of the syntactic governor of AdvD or has semantic role  $i$  with respect to this governor,
  - Topic, if the slot is filled by the Topic of the clause to which belongs AdvD.

Let us show how the properties of AdvDs of different types can be represented using this notation. Each illustration consists of three parts: (a) the keyword and its argument frame, (b) an example containing AdvD, (c) representation of the argument frame of AdvD with a short comment.

(25a) *skorost'* 'speed' («what has the speed?», «the value of the speed»)

(25b) *Avtomobil' mčalsja so skorostju 200 km/čas* 'the car moved at the speed of 200 km/hour'

(25c) *so skorostju* 'at the speed of' = Adv<sub>G,2</sub> [the 1<sup>st</sup> argument is the syntactic governor of AdvD ('moved'), and the 2<sup>nd</sup> is the 2<sup>nd</sup> argument of the keyword]

(26a) *jarost'* 'rage' («who is in the state of rage?», «what was the cause of this state?»)

(26b) *On v jarosti razorval pis'mo na kločki* 'in a rage, he tore the letter to pieces'.

(26c) *v jarosti* 'in a rage' = Adv<sub>1(G),0</sub> [the 1<sup>st</sup> argument is the 1<sup>st</sup> argument ('he') of the syntactic governor ('tore'), the 2<sup>nd</sup> argument cannot be realized with AdvD]

(27a) *naslaždenie* 'relish, enjoyment' («who enjoys?», «what does one enjoy?»)

(27b) *On s naslaždeniem vykuril sigaru* 'he smoked a cigar with relish'.

(27c) *s naslaždeniem* 'with relish' = Adv<sub>1(G),G</sub> [the 1<sup>st</sup> argument is the 1<sup>st</sup> argument ('he') of the syntactic governor ('smoked'), the 2<sup>nd</sup> argument is the syntactic governor itself. Note the important difference between (26c) and (27c): in case of 'with relish' the main predicate refers to the source of the emotional state: smoking a cigar is what made him feel relish; in (26b) the reason of feeling rage is not specified. This difference is reflected in different indices]

(28a) *sommenije* 'doubt' («who doubts?», «what does one doubt?»)

<sup>1</sup> Of course, this is a simplification, the reality is more complicated, but this is a general rule.



- (28b) *Ona vřjad li pridet* ‘she will hardly come’  
 (28c) *vřjad li* ‘hardly, unlikely’ = Adv<sub>0,G</sub> [the 1<sup>st</sup> argument cannot be realized with AdvD, the 2<sup>nd</sup> is expressed by the syntactic governor]  
 (29a) *podarok* ‘a present’ (“who gives?”, “what is given?”, “to whom?”)  
 (29b) *Otec privjoz Marii v podarok ožerelje* ‘Father brought Maria a necklace as a present’.  
 (29c) *v podarok* ‘as a present’ = Adv<sub>G(Agent),G(Theme),G(Recipient)</sub> [in (29b) all the three argument slots of AdvD are filled by the corresponding arguments of the predicate of transfer – *privjoz* ‘brought’]  
 (30a) *bol’sinstvo* ‘majority’ (“what constitutes the majority?”, “what is the whole?”)  
 (30b) *V zale sideli v bol’sinstve svoem ženšćiny* lit. ‘in the hall were sitting (Topic) the women’ ‘most of those in the hall were women’  
 (30c) *v bol’sinstve* ‘mostly’ = Adv<sub>0,Topic</sub> [this AdvD is topic-sensitive; in (30b) the Topic is ‘those who were in the hall’, therefore it is this meaning that fill the valency of the whole].

## 6 Conclusion

The data presented above show that the argument frames of the adverbial derivatives of predicates are much more diverse than it was believed before. The number of the arguments and their roles are motivated by the semantics of the predicate they are derived from, but their syntactic realization is largely different. We showed a variety of syntactic, semantic and communicative positions the arguments of adverbial derivatives may take and how these positions can be described in the dictionary in a compact way. This information is needed in many semantics-related tasks but is not available in any of the existing lexicographic resources. We proposed a way to represent this information in the lexicon in a compact way. Supplied with this information, the lexicon will be able to support the extraction of propositions for a variety of applications<sup>2</sup>.

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