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WORD ORDER IN RUSSIAN

Mottos:

1. Ю. Апресян — как много в этом звуке!

2. *«I love you!» in Russian:*

Я тебя люблю!
Я люблю тебя!
Люблю я тебя!
Люблю тебя я!
Тебя я люблю!
Тебя люблю я!

1. The Problem Stated

The words in a sentence necessarily follow each other in a particular order — speech has a strictly linear character, which is physiologically determined. But meaning expressed by a sentence is not organized linearly. Therefore, at some point in the process of sentence production, the speaker (or a model of the speaker — for instance, an automatic device) has to linearize the lexical units that are selected to construct the sentence. Thus, Linearization of a structure built from lexical units is actually **the** operation to examine while discussing word order. At least since [Tesnière 1959: 17–20], Linearization is recognized as one of the main linguistic operations, cross-linguistically universal: the expression of non-linear meaning by linear sentences.

The description of Linearization in language can be broken down into three tasks:

1) Define the **input and output representations**, i. e., specify the two sets of structures: one of these sets must be processed by Linearization rules (these are the input structures), and the other set must be arrived at (the output structures).

2) Define the **relevant linguistic factors**, i. e., determine the types of linguistic phenomena of L that affect Linearization and have to be accounted for in Linearization rules.

3) Define the **set of Linearization rules** such that any valid input is properly matched by them to some valid output.

The present paper addresses only two of these tasks: it describes (partially) the input and output representations needed for Linearization in Russian and sketches out the major classes of Linearization rules, their form and their interaction. An in-depth

discussion of linguistic factors affecting word order in Russian is left out, although such factors are used in the rules proposed. The presentation is carried out in the framework of the Meaning-Text approach, whose main principles and conventions are taken to be known to the reader (see, for instance, [Mel'čuk 1988: 43–91; 2009; Mel'čuk, Pertsov 1987]).

Due to its importance in the process of speech and universality, Linearization occupies a place of honor in linguistics. One certainly cannot complain about the scarcity of publications dealing with word order in the most diverse languages; if anything, they are too numerous to be reviewed (especially in as sketchy a paper as the present one): a Google search for the phrase «Word Order in Russian» yields 545,000 hits and for the equivalent phrase in Russian over 382,000 hits.

Apology No. 1: Since even a short list of selected references would be impossibly long, I abstain from giving any general references concerning word order as such or word order in Russian in particular.

In spite of this overwhelming wealth of texts on word order, I do not know of any work where Linearization is treated in the framework of dependency syntax: there are, to the best of my knowledge, no linguistic word order studies in which the input structure is defined in terms of dependencies and the Linearization rules are formally presented. There are only two exceptions:

• My own sketch of Linearization rules for Russian ([Mel'čuk 1965; 1974: 260–290]; see also [Mel'čuk, Pertsov 1987: 180*ff*], which presents local rules for word order in English), based on a dependency syntactic structure and the step-by-step strategy of Linearization (see Section **3**). Published 45 years ago, this proposal produced no echo in general or Russian linguistics; therefore, it seems permissible to take these rules up, using newer knowledge and newer skills, and present them in an improved form. That is what will be done in this paper.[1]

• The work of K. Gerdes and S. Kahane on word order [Gerdes 2002; Gerdes, Kahane 2001; 2004; 2007; El-Kassas, Kahane 2004; Bohnet 2007]. It is also based on a dependency syntactic structure but uses an essentially different technique of Linearization: the strategy of predefined full-sentence pattern (Section **3**), also known as «topological model». Therefore, I cannot build directly on their findings and will limit myself to this brief remark.

The description of word order must proceed in the Meaning-to-Text, i. e. synthesis, direction and appear as rules for Linearization of a starting non-linearized structure. Although the predominant philosophy in linguistics has been and still is to analyze texts and represent the results of the analysis, word order has always been studied by linguists in the synthesis direction.

Russian is chosen as the object language of the description not only because it is my mother tongue, but also because it is ideal as the target of a word order study. There are at least two reasons for this.

On the one hand, word order in Russian is extremely free in two senses.

• First, almost every permutation of words — or, more precisely, of «saturated» phrases — in a Russian sentence is grammatical, see Motto 2. However, these different word arrangements are not optional or arbitrary: they are controlled by subtle, but strict communicative conditions, so that actually they are not anarchically free, but well regulated.[2]

• Second, the Synt(actic) Structure of a Russian sentence is highly independent of its Comm(unicative) Structure: in Russian, almost any element of the sentence can play almost any communicative role. Because of that, Russian is rich in variegated and complex word order phenomena. In sharp contrast, English requires, for instance, that, as a general rule, the Synt-Theme of a sentence be expressed by the Synt-Subject; to achieve this, English often has recourse to the passive:

Rus. ***Stat´ju***$_{\text{Synt-}\mathbf{T},\ \mathbf{DirO}}$ *popravil Leo* lit. 'The article$_{\text{ACC}}$ has corrected Leo'.
vs.
Eng. ***The paper***$_{\text{Synt-}\mathbf{T},\ \mathbf{Subj}}$ *was corrected by Leo.*

On the other hand, word order in Russian is well studied (although rather informally), enabling the researcher to draw data from many sources; unfortunately, only few main references can be mentioned here: [Sirotinina 1965; Kovtunova 1976; 1980; Yokoyama 1985; 1986: 171*ff*].

Apology No. 2: The description of Linearization rules, no matter how sketchy and approximate, requires a huge number of concepts and formalisms from surface syntax. To explain all these would amount to writing a thick volume. Therefore, I use in this paper what I need without warning; I ask my readers for forgiveness and hope that examples and minimal explanations will prove sufficient.

Apology No. 3: Linearization is intimately linked to Prosodization of the Deep-Morphological Structure obtained: the word groups that undergo Linearization must feature an appropriate prosody; in fact they do not exist without this prosody (see [Yokoyama 1985; Gerdes, Kahane 2007; Zimmerling 2008] for well-justified insistence on this relationship). However, in order to simplify my task, I omit everything concerning Prosodization.

> The main goal of the present text is to outline, in a very rough way, the Linearization rules for a natural language stated on the basis of Russian data, but in a relatively general form.

In Russian, as well as in other languages where inflectional morphology is used along word order to express syntactic dependencies, Linearization rules are intimately related to Morphologization. (Morphologization is a complex operation that computes the syntactic grammemes, or syntactically-conditioned morphological values, — such as the grammatical case of the noun, the person and number of the finite verb, the gender, number and the case of the adjective — based on the information contained in the Surface-Syntactic Structure.) Although I am interested in Linearization only, it is convenient to include in the picture data on Morphologization, since this does not require special effort.

Formally speaking, Linearization rules proper should probably be kept distinct from Morphologization rules. However, two factors interfere with such an approach, a theoretical and a practical one. Theoretically, in many cases Morphologization is inextricably intertwined with Linearization: thus, languages (for instance, Arabic) often have different type of agreement of the Main Verb with the Subject depending on the linear position of the latter with respect to the verb. This is quite understandable: morphological markers constitute, together with linear arrangement, **one** complex signifier for a Surface-Syntactic Relation in a given context. Practically, mixed Linearization + Morphologization rules are more familiar for a not-too-formally minded reader and, therefore, easier to grasp. In what follows word order rules are presented in this mixed form, together with the indication of corresponding syntactic grammemes.

The remainder of the paper is naturally divided into three sections: Section **2** describes the input and output for word order rules, while Section **3** presents a fragment of Linearization + Morphologization rules for Russian; Section **4** contains some conclusions.

2. The Input and Output for Linearization Rules

Two linguistic entities are generally assumed to be the main sources of information that determines the linear arrangement of words in sentences: the syntactic structure [= SyntS] and the syntactic-communicative structure [= Synt-CommS] of the sentence to be produced. In this paper, the two are considered to be the necessary and sufficient input of the Linearization rules. They will be introduced in very general terms as postulates, without detailed justifications or explanations.

The rules for Linearization of lexemes of sentence *S*, or Linearization rules, have as their input two structures of *S*'s Surface-Syntactic Representation: the Surface-Syntactic Structure [= SSyntS] and the Surface-Syntactic-Communicative Structure [= SSynt-CommS] of *S*. They produce, as their output, the Deep-Morphological Structure [= DMorphS] of *S*, which, generally speaking, must be supplied with Deep-Morphological Prosodic Structure [= DMorph-ProsS]; however, in conformity with the convention adopted (see **Apology No. 3** above), the latter is not considered.

The Input for Linearization Rules

The SSyntS of a sentence

> The SSyntS of sentence *S* is an unordered dependency tree where each lexeme of *S* is represented by a node (of which it is the label) and whose branches represent language-specific Surface-Syntactic Relations [= SSyntRels] that link these lexemes (the names of the SSyntRels are labels on the branches).

(On SSynt-Rels, see [Mel'čuk 1974: 211*ff*; 1988: 12*ff*; 2009]; on the SSyntRels of Russian, [Mel'čuk 1963: 491–493; 1974: 221–235; Apresjan et al. 1989: 204–208; 1992:

60–73]; on the SSyntRels of English, [Mel'čuk, Pertsov 1987: 85–162; Apresjan et al. 1989: 71–121; Mel'čuk 2009: 52–58]).

The SSynt-CommS of a sentence

> The SSynt-CommS of sentence *S* is a division of *S*'s SSyntS into communicative areas (= subtrees), each labeled with a value of a Synt-Comm opposition.

(On Comm-oppositions and Comm-Dominance, see [Mel'čuk 2001].)

The SSynt-CommS (as well as the Deep-Synt-CommS) uses fewer communicative oppositions than the Semantic-Communicative Structure [= Sem-CommS], namely — the following five:

1. SSynt-Thematicity
2. SSynt-Givenness (not relevant for Linearization in article languages)
3. SSynt-Focalization (not relevant for Linearization in languages with lexical expression of Focalization)
4. SSynt-Perspective
5. SSynt-Emphasis

The remaining Sem-Comm-oppositions of Assertivity, Unitariness and Locutionality are fully transcoded at the syntactic level into lexical units, grammemes and syntactic constructions; they disappear from the scene. Moreover, the Synt-Comm-oppositions are different with respect to their Sem-Comm-sources [Ibid.: 64–66]. In this paper, only the Synt-Comm-opposition of Thematicity is taken into account. This reduces, of course, the power of my description, which misses several word arrangements that are possible in Russian for the expression of Focalization, Perspective, and Emphasis; yet it simplifies the presentation a great deal.

Output of Linearization (+ Morphologization) Rules

The DMorphS of a sentence

> The DMorphS of sentence *S* is a linear sequence of *S*'s lexemes supplied with all relevant grammemes.

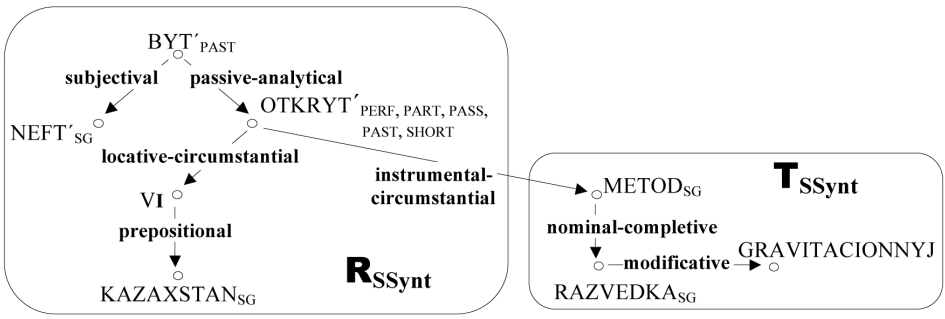
As a basic example for this paper, let me consider Russian sentence (1), its SSyntS with the superposed partial SSynt-CommS presented in (2), and its DMorphS in (3).

(1)	*Metodom*	*gravitacionnoj*	*razvedki*	*byla otkryta*	*neft'*	*v Kazaxstane*
lit.	'By.method	of.gravitational	exploration	was discovered	oil	in Kazakhstan'. ≈
	'The method of gravitational	exploration		led to the discovery of	oil	in Kazakhstan'.

This sentence comes from an elementary physics manual, where the preceding paragraph is dedicated to the characterization of gravitational technology in exploration geophysics. This justifies associating (1) with the partial SSyntR (2); the sentence cor-

responds to the underlying question *What else about gravitational exploration?* In the diagram, **T** stands for Theme (= topic), and **R**, for Rheme (= comment).

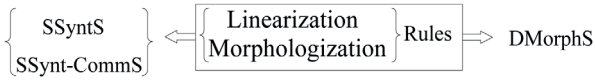
(2)



The corresponding DMorphS is straightforward:

(3) $\text{METOD}_{\text{SG, INSTR}} + \text{GRAVITACIONNYJ}_{\text{SG, FEM, GEN}} + \text{RAZVEDKA}_{\text{SG, GEN}} + \text{BYT′}_{\text{PAST, SG, FEM}} + \text{OTKRYT′}_{\text{PERF, PART, PASS, PAST, SHORT, SG, FEM}} + \text{NEFT′}_{\text{SG, NOM}} + \text{V} + \text{KAZAXSTAN}_{\text{SG, LOC}}$

Word order rules — that is, Linearization (+ Morphologization) rules, — which carry out the transition from (2) to (3), are responsible for producing, based on (2), the linear arrangement of fully inflected lexemes in (3), that is, the DMorphS of the sentence (without prosodic organization, as stated above). Linearization rules together with Morphologization rules constitute a submodule of the SSynt-module of the Meaning-Text Model (this module also includes rules for Prosodization, omitted here). Schematically:



SSyntS and SSynt-CommS, which essentially determine Linearization, are represented as input structures for word order rules.

There are, to be sure, other factors that affect Linearization:

- semantic factors (e. g., semantically different circumstantial may be positioned differently; the position of a circumstantial can depend on its semantic scope; etc.);
- rhetorical factors (e. g., a particular arrangement may be highly colloquial or poetic);
- stylistic factors (e. g., longer word groups preferably follow shorter ones in postposition to the common governor; some languages encourage the word order that produces chaining dependencies rather than embedded ones:

a→b→c→d is preferred over **a c→d b);**

- lexical factors (e. g., the adverb *enough* is placed after its adjectival governor; pronouns may be positioned differently with respect to their governor than the corresponding non-pronominal lexemes);
- the clarity of the text produced (a particular word arrangement can be chosen to avoid ambiguity or else to reduce the number of embedded dependencies).

All these factors are accounted for in the word order rules.

3. Linearization (as Illustrated by Russian)

Linearization rules are presented here in general form, but illustrated with specific Russian examples. The rules given are sufficient to carry out the transition from (2) to (3): they describe word order in the Russian sentence (1).

Apology No. 4: My characterization of word order in Russian concerns but a small fragment of the possible arrangements in written texts of a scientific-official nature — that is, the most neutral word arrangements, whatever that means.

3.1. Three Major Types of Linearization Rules

The general architecture of the Linearization submodule of the SSynt-module of a Meaning-Text linguistic model depends on the researcher's choice of the overall Linearization strategy; there are at least two possibilities.

The first Linearization strategy is top-down: it uses a Predefined Full-Sentence Pattern [= PFSP]. First, the researcher constructs a general pattern (or patterns) of whole sentences in language **L**—a sequence of hierarchically embedded slots, which represent linear positions of sentence elements. The sentence word-order pattern is divided into fields, each of which is filled by boxes, themselves divided into fields, and so on; a box is provided for a particular element of the sentence. Under the PFSP-strategy, Linearization rules compute for each element of the starting dependency structure its place in the PFSP and the box it opens, with appropriate fields for its dependents. In the course of this operation, all other word-order factors, such as communicative structure, special lexical properties, etc. are equally taken into account. Such an approach seems to be especially good for German — see the above-mentioned work by Gerdes & Kahane and Bohnet.

The second Linearization strategy is step-by-step, or bottom-up: Linearization rules compute, by stages, the mutual disposition of the elements of the starting dependency SSyntS; they first build (≈ linearize) simple phrases, then unite them in complete phrases, then build clauses out of complete phrases, and, finally, position clauses to produce the sentence. Here, again, two approaches are possible: a one-stage or multiple-stage approach.

— The one-stage approach would be to formulate the rules for each SSynt-relation, supplying every rule with all the conditions necessary for a correct placement of its dependent member. For instance, a rule for the Direct Object [= DirO] would say that a DirO follows the governing verb and precedes its other Synt-actants, if 1) it is not part

of the Synt-Theme, 2) it is not part of Synt-Rheme-focus, 3) the DirO is not a pronoun, 4) it is not a very long ('heavy') word group followed by another shorter group, which is another Synt-actant of the same verb, etc.

— The other, multi-stage, approach, which I favor, stipulates that all such conditions are formulated separately (from purely syntactic rules) in very general terms: Synt-Communicative Linearization rules, Pronoun Linearization rules, Word-group Heaviness-based Linearization rules, etc. This is possible to do since these rules are logically and linguistically (at least in Russian!) independent from syntactic rules. Such a presentation allows for a more compact and better organized set of rules, avoiding unnecessary repetitions of the same conditions in several rules. But the price to be paid for this advantage is to separate the Linearization process into stages: first you do approximate linearization, according only to general syntactic rules; then you reshuffle the preliminary arrangement thus obtained, pressing into service all additional rules; finally, you check the result for inadmissible sequences and reshuffle more to avoid these. It is this — step-by-step — strategy that is adopted here.

Let me emphasize, lest confusion should arise, that I do not mean here a real procedure separated into three consecutive stages. I am talking only about a WAY OF REPRESENTING things that better agrees with a linguist's intuition. All the constraints introduced in different blocks of rules below can in fact be applied together. This is, however, a question that exceeds the limits of this paper.

In accordance with the above strategy, Linearization — that is, roughly speaking, the transition from an SSyntS to the corresponding DMorphS — is performed using three major types of rules:

I. **Syntactic** linearization (+ morphologization) rules, which are responsible for Stage 1. Based exclusively on the SSyntS, they produce the preliminary «frame» of the linearized sentence — an arrangement of wordforms that may be good if not for the impact of other factors, see immediately below. This is the most neutral, unmarked word order, or the default case.

II. **Adjusting** linearization rules, which, at Stage 2, apply to the output of syntactic linearization rules — that is, to the preliminary frame of the sentence — and alter it to reflect all additional factors: requirements of the Synt-Comm structure, obligatory extractions (WH-words) and inversions (***Is he*** *busy?*), pronominalization (especially cliticization, where it exists), reshuffling of word groups according to their heaviness, etc. These rules lead to serious modifications of the neutral word order.

III. **Filtering** linearization rules work at Stage 3 and apply to the output of Stage 2. They constitute, in fact, a list of undesirable word sequences. Each «bad» sequence is assigned a «fine», which is an empirically established negative number; the sentence-to-be receives a cumulative fine and is processed — that is, undergoes possible permutations of word groups — in such a way as to reduce to zero or at least to minimize the overall fine «slapped on» the arrangement under consideration.

It is assumed that these three major types of Linearization rules are sufficient for the description of word order in many (if not most) languages.[3]

Although the types of Linearization rules are presented in sequence, one type after another, this is only a manner of speaking: these rules are not externally ordered — that is, there are no special indications concerning the order of their application. Each rule is formulated in such a way that it will effectively apply only when this application produces a correct result. The linguistic model can try to apply them in any order, in parallel and/or repeatedly; I assume that this will never lead to incorrect Linearization.

3.2. List of Linearization Rules

Some illustrative Linearization rules for Russian are presented below in three subsections corresponding to the three above types.

3.2.1. Type I: Syntactic Linearization (+ Morphologization) Rules

Syntactic Linearization rules fall into five groups: **I.A – I.E**.

I.A: SSyntS ⇔ DMorphS Correspondences

These rules do two things:

— they establish the preliminary, or the most unmarked, arrangement of words in the sentence, according only to the SSyntRels that link them;

— they produce the necessary syntactic grammemes, i. e., they carry out Morphologization.

A rule stating an SSyntS ⇔ DMorphS correspondence has the general form

$$L_{1\xi} - r \rightarrow L_{2\zeta} \Leftrightarrow 1)\ L_{1\xi'} +(\ldots+)\ L_{2\zeta'} \mid C_1$$
$$\Leftrightarrow 2)\ L_{2\zeta'} +(\ldots+)\ L_{1\xi'} \mid C_2$$

where:

• The left-hand side contains a minimal SSynt-subtree with the SSyntRel **r**; L_1 and L_2 are lexemes, ξ and ζ being sets of appropriate semantic grammemes.

• The right-hand side contains two or more possible strings made up of the same lexemes, with ξ′ and ζ′ being ξ and ζ with addition of necessary syntactic grammemes.

• «+» indicates the linear sequence, while «…» shows a possible gap between lexemes L_1 and L_2 (= the presence of other lexemes separating L_1 and L_2); parentheses mark optionality.

• *C* is a set of conditions that are essentially constraints on X and Y; among other things, they describe the context in which the particular subrule applies and thus determine different linear arrangements of L_1 and L_2. *C* also may include additional indications concerning the placement of L_1 and L_2 into particular positions in Linearization patterns; see below.

Such a rule specifies the linear — and, when needed, morphological — expression of the SSyntRel **r**. (Stating that the dependent element of **r** can be positioned both after or before its governor also constitutes an indication of the linear expression of **r**.)

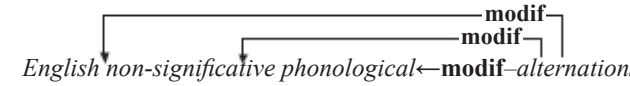
From the viewpoint of Linearization, there are three types of SSyntRels: local, semi-local, and non-local.

1) Local SSyntRels control Linearization within rigidly organized minimal word groups [= MWGs], such as a nominal minimal word group [MWG_N], an adjectival minimal word group [MWG_A], etc.; see MWG linearizing patterns below, p. 516. An MWG represents a sequence of wordforms with a completely fixed order (within the framework of this paper — neutral academic-register texts — no element of a MWG can change position).

A local SSyntRel **r** has the following three properties:

— **r** specifies the only possible linear disposition for its members. (Within MWGs there are no options for different word arrangements, and neither the Synt-CommS nor other factors have significant impact here.)

— **r** is unique, or not repeatable: **r**'s governor can have only one immediate **r**-dependent. (**Exception**: the **modificative** SSyntRel, which allows for several parallel adjectival modifiers depending on the same governor, as in the phrase



Such adjectives have to be ordered in a unique position in the linearizing pattern according to special rules such as those discussed in [Vendler 1968; Iordanskaja 2000]).[4]

— The mutual disposition of all local co-dependents is fixed: they are assigned preestablished positions in the corresponding linearizing pattern.

Local SSyntRels include cross-linguistically the **prepositional** SSyntRel (PREP→N), the **determinative** SSyntRel (DET←N), the **quantitative** SSyntRel (NUM←N), the **modificative** SSyntRel (A←N), the **coordinate-conjunctional** SSyntRel ($CONJ_{coord}$→Ψ), etc. One important local SSyntRel is **coordinative** (Ψ→Ξ): its dependent always follows the governor, as in

John–**coord**→*and Mary* or *attacked*,–**coord**→*advanced*–**coord**→*and captured*, etc.

An MWG corresponds to a «very compact» phrase, which practically cannot be torn apart by any factors and is moved around as a whole.

2) Semi-local SSyntRels control Linearization of MWGs within complete word groups [= CWGs], that is, linearly ordered word sequences that roughly correspond to complete clause elements: the subject CWG, the direct-object CWG, the duration-circumstantial CWG, etc. Within CWGs, word order is more flexible than within MWGs, yet it still remains rather constrained: the co-dependent MWGs can be arranged differently among themselves, but all of them are allowed to occupy only one position with

respect to their governor: all of them either precede the governor or all of them follow it. Note that:

• the dependencies between MWGs are of course those between their heads;

• semi-local SSyntRels also control the linear disposition of clauses within the sentence.

The properties of a semi-local SSyntRel **r** are:

— **r** also specifies just one linear disposition for its members.

— **r** is also near-unique: **r**'s governor can have, in most cases, only one immediate **r**-dependent.

— The mutual disposition of semi-local co-dependents is not fixed, and special rules are needed to compute the arrangement into one CWG of several MWGs that «semi-locally» depend in parallel on the same governor.

Semi-local SSyntRels include the **nominal-completive** ($N_1 \rightarrow N_{2GEN}$) SSyntRel, the **relative** SSyntRel ($N \rightarrow CLAUSE_{rel}$), the **circumstantial** SSyntRel ($N \rightarrow PREP$), etc. (Note that with a verb the **circumstantial** SSyntRel is non-local, see immediately below.)

A CWG represents a phrase that traditionally corresponds to an element of the clause: the subject, the direct object, a circumstantial, etc. Such a phrase is also relatively compact, but less so than an MWG: it can be cut in two parts that exchange their linear positions following the requirements of the Synt-CommS.

3) Non-local, or global, SSyntRels, responsible for the mutual arrangement of CWGs within a clause, link the top node of the clause SSyntS, that is, the finite verb (in Standard Average European type languages), to its immediate dependents (i. e., actants and circumstantials). A non-local SSyntRel **r** is opposed to local and semi-local SSyntRels:

— **r** normally does not specify a unique order of its members (even in languages with a rigid word order various inversions and/or permutations are possible between the Main Verb and the Subject, the Main Verb and the DirO, etc.).

— **r** is not necessarily unique: **r**'s governor can have several immediate **r**-dependents (several oblique objects or several circumstantials).

— The mutual disposition of non-local dependents is not fixed; it depends on numerous, very complex and sometimes even contradictory factors.

An SSyntRel can simultaneously be of more than one type as a function of its governor. Thus, all **circumstantial** SSyntRels are non-local if their governor is a finite verb, but semi-local otherwise.

In accordance with the three types of SSyntRels, four further groups of Linearization rules are needed: **I.B** — for local SSyntRels (= for the construction of MWGs by means of linearizing patterns); **I.C** — for semi-local SSyntRels (= for the construction of CWGs); **I.D** — for non-local SSyntRels (= for the construction of clauses); and **I.E** — for arranging the clauses within the sentence.

Note

The moment seems ripe for a short theoretical digression: dependency *vs*. constituency (see, e. g., [Mel'čuk 2009: 89–95]). As is well known, dependency description of the syn-

tactic structure of a sentence is opposed to the phrase-structure, or constituent, approach. The dependency approach categorically rejects constituents, no matter how this concept is interpreted, as a **means for representing the syntactic structure** of a sentence. This is due to the fact that constituent syntactic structure combines, or, if we do not mince our words, confuses two very different relations between lexical units: syntactic dependency (governor ~ dependent) and linear order (before ~ after), a distinction that cannot be ignored following [Tesnière 1959]. Linear order is the most important means that natural languages use for expressing (= marking) syntactic relations. In languages without inflectional morphology (like Chinese or Vietnamese) it is the only means; in languages like English it is the central and most exploited means; and even in Russian, where on many occasions the word order seems irrelevant (cf. Motto 2), it still plays a leading role: for a number of constructions it remains the basic marker of syntactic relations. Therefore, constituency logically cannot be used as a formal means to represent a syntactic structure. It is no longer necessary to have long discussions about two ways of representing syntactic structure: constituency in syntactic structures is a logical absurdity. However, constituents, or phrases, do of course exist and have to be modeled in any linguistic description. But their legitimate place is 1) in the DMorphS, where they appear as prosodic phrases, and 2) in the Linearization rules, where they serve as building blocks in the process of Linearization. These two types of constituents do not stand in one-to-one correspondence. The above-mentioned MWGs and CWGs are nothing but constituents of the second kind; each represents a projection of the corresponding subtree. These constituents change during linearization: they are united, cut in two, have their parts moved around separately, etc., and finally they emerge as phonological phrases, or constituents of the first kind (which can be different from projections of the corresponding subtrees). And now, back to Linearization rules.

Since the SyntS of sentence (1) contains 7 different SSyntRels, at least 7 SSynt-rules for Russian must be presented. The following conventions are used:

— $\mathbf{AGREE}_{V(N)}$ («Verb-Noun agreement operator») is a set of rules that describe agreement of the Main Verb [= MV] with the noun that in most cases is its subject; $\mathbf{AGREE}_{A(N)}$ («Adjective-Noun agreement operator») is a set of rules that describe agreement of a modifying adjective with the modified noun.

— $_{(\Sigma)}$ is a feature of the syntactics of a lexeme (e. g., the feature $_{(subj\text{-}gen)}$ marks in the lexicon a verb that requires its subject to be in the genitive, like XVATAT′ «be sufficient»).

— «L ➡ No.*n*(MWG_X)» means that the lexeme L must go into the *n*-th position in the corresponding linearizing pattern (these patterns for MWGs are described below, **I.B**, p. 516*ff*).

— «g(X)» stands for the syntactic word group of the lexeme X (the «projection» of the full subtree having X as the top node; units of g(X) type do not appear at any representation level: they are used only within syntactic rules).

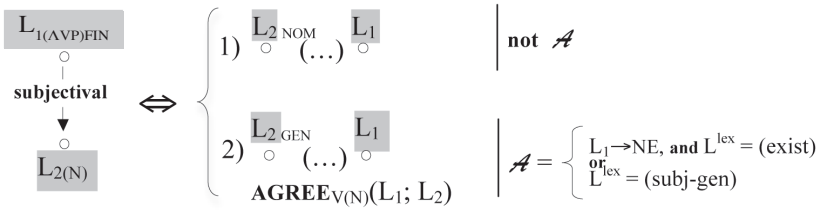
— In order to save space, the syntactics of the elements in the left-hand side of the rule are not repeated in the right-hand side. (The syntactics, which are elements of the lexicon, actually constitute the context of the application of the rule and could have been indicated in the Condition part.)

— Shading indicates the context — that is, the elements that are not affected by the rule, but whose presence is necessary for the rule to apply.

The SSyntS⇔DMorphS rules for Russian presented below are extremely approximate; their conditions are simply hinted at. In fact, each of these rules is just a placeholder for a serious study of all contextual factors.

Actantial dependency rules

SSynt-rule **I.A**-1: SSynt-subject [a non-local SSyntRel]



Comments

1. Rule **I.A**-1 does not uniquely specify the linear position of the subject with respect to the MV, since both positions are possible; the appropriate one must be established by rules **I.DII**, see below, p. 519.

2. ΔVP stands for 'verbal standard subtree' (on standard subtrees, see [Mel'čuk, Pertsov 1987: 485*ff*]): a chain of subsequently dependent lexemes of the form $L_{1FIN} \rightarrow L_{i-1} \rightarrow L_{i-2} \rightarrow \ldots \rightarrow L^{lex}$, where possible L_i have to be specified by a list (for instance, *could*$_{L1FIN}$ *have*$_{Li-1}$ *begun*$_{Li-2}$ *to*$_{Li-3}$ *separate*$_{L\text{-}lex}$; L^{lex} is the lexical verb whose combinatorial properties concerning the subject percolate to the top node of the standard subtree). This is what was called the Verbal Nucleus by S. Kahane ([Kahane 1997, 2001; Kahane, Mel'čuk 1999]). ΔVP is used only in the formulation of syntactic rules and does not appear as such in the SSyntS of a sentence. The notation «$L_{(\Delta VP)}$» means 'lexeme L that is the syntactic head of ΔVP.'

3. The condition $\mathcal{A}$ is intended to capture the use of the genitive on the subject with some verbs marked «(exist)» that are negated and with other verbs that always have the subject in the genitive (marked «(subj-gen)»).

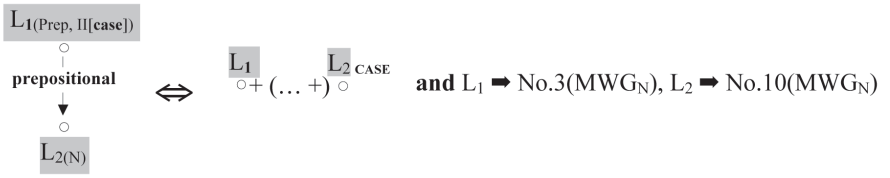
4. Rule **I.A**-1 ignores the case of the copula MV's agreement with its complement (rather than with the subject), when the subject is ÈTO 'this' (*Èto* ***byl*** *Ivan* 'This was$_{MASC}$ Ivan'. ~ *Èto* ***byla*** *Marija* 'This was$_{FEM}$ Mary'); it also ignores agreement with an infinitive or a subordinate clause (the MV must be in the 3SG, NEU).

Examples (the glosses here and below are literal)

mogla$_{L1}$ *byt´ obnaružena* ***neft***$_{L2}$ 'could be discovered oil' ~
neft´$_{L2}$ ***mogla***$_{L1}$ *byt´ obnaružena* 'oil could be discovered';
My$_{L2}$*, kak uže jasno,* ***možem***$_{L1}$ *sčitat´…* 'We, as it is already clear, can believe ...' ~
Možem$_{L1}$ *li* ***my***$_{L2}$ *sčitat´…* 'Can whether we believe ...'
Nikakix novyx ***ulik***$_{L2}$ ***ne pojavilos´***$_{L1 = L^{lex} = (exist)}$ 'Of.no new evidence not appeared'.
Ètoj ***nefti***$_{L2\text{-}GEN}$ ***xvatilo***$_{L1= L^{lex} = (subj\text{-}gen)}$ 'Of.this oil was.sufficient'. ~
Ètoj ***nefti***$_{L2\text{-}GEN}$ *ne* ***xvatilo***$_{L1}$ 'Of.this oil was.not sufficient'.

SSynt-rule **I.A**-2: Complement of a Preposition [a local SSyntRel]

Notation: «$L_{(II[\textbf{case}])}$» means 'DSyntA II of L is expressed by the grammatical case **case**'.



Examples

v$_{L1}$ *našem* ***rasporjaženii***$_{L2}$; ***vo***$_{L1}$ *vsex* ***nix***$_{L2}$; ***dlja***$_{L1}$ ***togo***$_{L2}$, *čtoby*…; *ni* ***s***$_{L1}$ ***kem***$_{L2}$
at our disposal in all them for this that... no with body = 'with nobody'

Comments

There are several complications in the use of Russian prepositions; for instance:

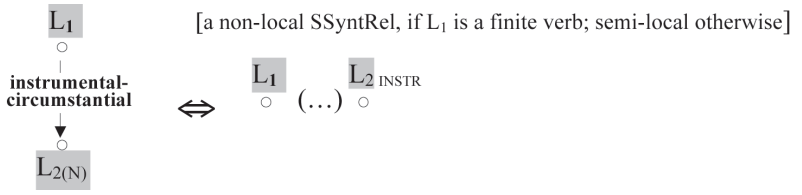
• Some prepositions can or must be postposed to the nouns they introduce: *Boga* ***radi!*** 'God's sake!', *rassudku* ***vopreki*** 'to.reason in.spite', *mesjac* ***tomu nazad/spustja*** 'month ago'. For such prepositions, another SSynt-rule of type **I.A** is needed.

• A preposition is always postposed in quantitative-approximate and ordinal-approximate constructions: *dnja* ***na*** *tri* 'days for three' = 'for approximately three days', *den´* ***na*** *tretij* 'day on third' = 'approximately on the third day'.

• Some special choices have to be carried out: the choice of the vocalic form of a consonantal primary preposition (*vo* instead of *v*, *ko* instead of *k*, etc.); the choice of the **n**-form of a substitute pronoun governed by the preposition (*nix* instead of *ix*, *nemu* instead of *emu*, etc.); the choice of the split form of such negative pronouns as NIKTO, NIČTO, etc. (**s nikem* ⇒ *ni s kem*, etc.). These and similar complications are taken care of by deep-morphological rules that realize the corresponding radical morpheme of the preposition, of the substitute pronoun and of the negative pronoun.

Modifying dependency rules

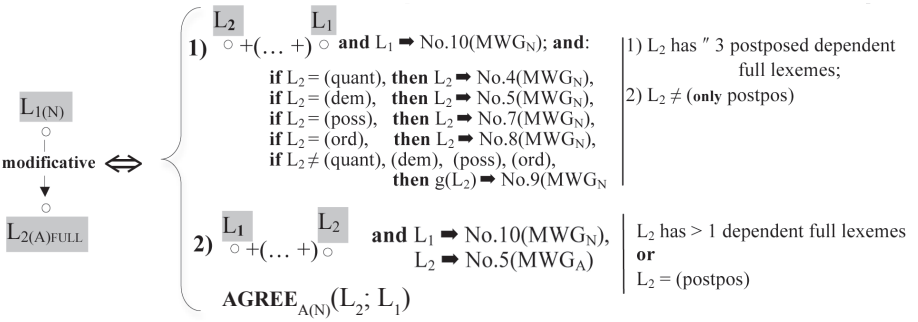
SSynt-rule **I.A**-3: Instrumental Circumstantial



Examples

Polučajut$_{L1}$ *sok sledujuščim* ***obrazom***$_{L2}$.
'[They] obtain juice in.following way'.
Tekst byl ***sostavlen***$_{L1}$ *izvestnym* ***metodom***$_{L2}$.
'Text was constructed by.known method'.

SSynt-rule **I.A**-4: Adjectival modifier [a local SSyntRel, if L_2 is a single A; semi-local otherwise][5]



[L_2 can be only a full adjective, i. e., an adjective bearing the grammeme FULL.]

Examples

važnaja$_{L2}$ ***ocenka***$_{L1}$; ***èta***$_{L2'}$ *isključitel´no* *važnaja*$_{L2''}$ ***ocenka***$_{L1}$;
important estimate this extraordinarily important estimate

važnaja$_{L2}$ *dlja vsex nas* ***ocenka***$_{L1}$ **=** ***ocenka***$_{L1}$, ***važnaja***$_{L2}$ *dlja vsex nas, …*
important for all us estimate

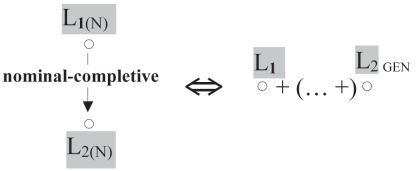
ocenka$_{L1}$, ***važnaja***$_{L2}$ *dlja vsex nas v svjazi s processom formirovanija*
estimate important for all us in connection with process of.formation

novyx grupp, …
of.new groups

polnyj$_{L2}$ *tragizma* ***period***$_{L1}$ **≡** ***period***$_{L1}$, ***polnyj***$_{L2}$ *tragizma*
full of.tragic.events period

papa$_{L1}$ ***rimskij***$_{L2 = (\textbf{only postpos})}$ 'Pope Roman' ~ ****rimskij***$_{L2}$ *papa*$_{L1}$

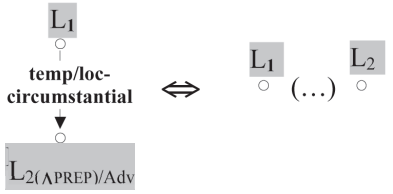
SSynt-rule **I.A**-5: Nominal complement [a semi-local SSyntRel]



Examples

razdača$_{L1}$ ***bogatstv***$_{L2}$; ***važnost***$_{L1}$ *ètoj* ***zadači***$_{L2}$; ***granicy***$_{L1}$ *evropejskix* ***stran***$_{L2}$
distribution of.wealth importance of.this problem borders of. European countries

SSynt-rule **I.A**-6: Prepositional / Adverbial circumstantial of Time or Location
[a non-local SSyntRel, if L_1 is a finite verb; semi-local otherwise]

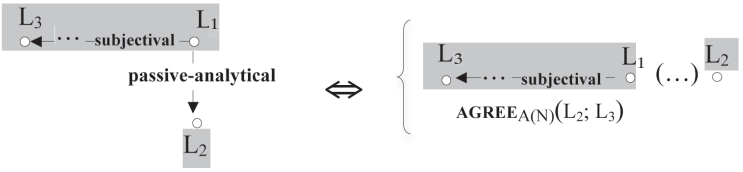


Examples

polučennoe$_{L1}$ ***v***$_{L2}$ ***Moskve*** *pis´mo*; ***V***$_{L2}$ ***1989 godu*** *Ivan* ***rabotal***$_{L1}$ ***v***$_{L2}$ ***Moskve***.
received in Moscow letter In 1989 year Ivan worked in Moscow
Včera$_{L2}$ ***šël***$_{L1}$ *dožd´* 'Yesterday was.falling rain'.

Ancillary dependency rules

SSynt-rule **I.A**-7: The analytical form of the passive [a non-local SSyntRel]



Comment

The **passive-analytica**l SSyntRel is introduced as a special SSyntRel because both of its members are fixed. In contrast to the **copular** SSyntRel, it accepts as its Governor only the verb BYT´, but no other copula; and as its Dependent, it takes only a short perfective passive past participle:

(5) a. **Passive-analytical**
*byl polučen ~ *okazalsja polučen, *stal polučen, *kažetsja polučen*

b. **Copular**
byl cennym ~ okazalsja cennym, stal cennym, kažetsja cennym
byl vračom ~ okazalsja vračom, stal vračom, kažetsja vračom

Examples

Ocenka$_{L3}$ ***byla***$_{L1}$ *by nemedlenno* ***polučena***$_{L2}$. *Ivan*$_{L3}$ ***Ø***$_{\textit{BYT}\,L1}$ ***uvolen***$_{L2}$.
Estimate would have.been immediately obtained Ivan s fired
Buduči$_{L1}$ ***prinjaty***$_{L2}$, *èti studenty*$_{L3}$ *polučajut stipendiju.*
Being admitted these students receive scholarship

I.B: Linearization Patterns for MWGs

The linearization of the members of a local SSyntRel is done by means of linearizing patterns, describing the word order in MWGs. A linearizing pattern is a rigid sequence of positions, each of which admits one syntactic element L; these positions correspond to local SSyntRels.

Exception: Position No.9 for the **modificative** SSyntRel admits several co-dependent adjectives; their mutual order is established by special rules attached to this position. (For a sketch of such rules, based on semantic and syntactic properties of Russian adjectives modifying the same noun, see [Iordanskaja 2000 and 2003].)

If an L meant to occupy a position in the linearizing pattern LP has its own dependents, L is not put into the MWG under construction: another linearizing pattern LP′ ensures the construction of L's own MWG, which, at the next stage, is united with the MWG specified by LP. Thus, if a NUM(eral), which is supposed to go into Position No.6 of a nominal MWG [= MWG_N], is a compound NUM (e. g., *tri milliona šest′sot sorok sem′ tysjač dvesti tridcat′ odin* '3 647 231'), then a numeral MWG [= MWG_{NUM}] is first built, and it is embedded into MWG_N as a whole at the stage of uniting MWGs into CWGs (see example below).

There are several MWG linearizing patterns for a language; they correspond to MWGs of different word classes: for instance, MWG_N, MWG_A, MWG_{NUM}, MWG_{ADV}, $MWG_{V\text{-}INF}$ and $MWG_{V\text{-}FIN}$ in Russian. A SSyntS ⇔ DMorphS rule indicates for both members of the SSyntRel described the positions in the corresponding pattern. Not all of the positions in a linearizing pattern have to be filled: the pattern represents a maximal possible string associated with an MWG, i. e., a potential minimal phrase.

Two linearizing patterns of MWGs are cited here for Russian: MWG_N and MWG_A.

Pattern of a nominal minimal word group

(in a broad sense: including the prepositional groups)

1	2	3	4	5	6	7	8	9	10	11
$CONJ_{coord}$	PARTICLE	PREP	A_{quant}	A_{dem}	NUM	A_{poss}	A_{ord}	A	N	Ψ_{invar}
no 'but'	liš′ 'only'	dlja 'for'	vsex 'all'	ètix 'these'	semi 'seven'	našix 'our'	vtoryx 'second'	važnyx 'important'	čisel 'numbers'	λ_i

Ψ_{invar} stands for any non-Russian expression: a technical symbol, a number, a formula, etc.

Pattern of a adjectival minimal word group

1	2	3	4	5
$CONJ_{coord}$	PARTICLE	A_{aux}	ADV	A
ili 'or'	tol′ko 'only'	takoj 'such'	očen′ 'very'	tëmnyj 'dark'

For better readability, both patterns are simplified. Thus, the position for the negative particle NE 'not' is not shown (NE can precede practically any element of a pattern, except for the first one), nor is the position for a contrastive particle such as ŽE ≈ 'as for' (*Natural′nye čisla* ***že*** *rassmatrivat′sja ne mogut* ≈ 'As for natural numbers, they cannot

be considered') or UŽ ≈ 'very' (*ne takoj už tëmnyj* 'not so very dark'). Such particles are «squeezed» into MWGs by the corresponding Linearization rules of type **I.A**.

The MWG_N admits the embedding of the MWG_A and MWG_{NUM}: for instance, MWG_{NUM} *pjat´ tysjač sest´sot sorok sem´* 'five thousand six.hundred forty seven' and MWG_A *ne nastol´ko už važnyx* ≈ 'not so very important' can be introduced as wholes into positions No.6 and No.9 of an MWG_N, respectively. In a similar way, practically all positions admit embedding of coordinated WGs: for instance, *ètix ili tex* 'these or those' must be embedded in position No.5, or *vtoroj, četvërtyj i desjatyj* 'the second, fourth and tenth', in position No.8, etc. Such embeddings are carried out by rules of type **I.C**.

Let me emphasize the following interesting fact: what is known in the Russian grammatical tradition as a «complex verbal predicate» (auxiliary BYT´ 'be' + the infinitive, auxiliary BYT´ + passive participle, copula BYT´ 'be' + attributive noun/adjective, etc.) does not correspond to an MWG or even to a CWG. From the viewpoint of linearization, the complements/attributives of auxiliary and copular verbs behave like any other SSynt-actants: they are non-local dependents and are ordered at the stage of linearizing CWGs inside the clause.

For the SSyntS of (2), Rules **I.B** (= linearizing patterns) produce six MWGs, listed in alphabetical order:

1. *byla*; 2. *gravitacionnoj razvedki*; 3. *metodom*; 4. *neft´*; 5. *otkryta*; 6. *v Kazaxstane*

I.C: Arranging Word Groups within a Complete Word Group

I.CI: Positioning of the dependent word group Ψ with respect to the governing group Ξ

In these rules, the following convention is used: the dependency shown between two word groups [= WGs] represents the dependency between their top nodes. The WGs that form a complete WG can be themselves both minimal and complete.

• **r = coord**:

I.CI-1. **Ξ–coord→Ψ** ⇔ **Ξ** + (…+) **Ψ**

• **r ≠ coord:**

I.CI-2. WG_N´→ **WG_N** ⇔ WG_N´ + (…+) **WG_N**

Exception
NP of the form *takogo roda* 'of such a type' can be anteposed—by another rule of I.CI type not given here

I.CI-3. WG_N→**WG_A** ⇔ 1) WG_N + (…+) **WG_A**
⇔ 2) **WG_A** ➡ No.9(WG_N)

The choice between the two subrules is made according to Conditions not specified here

I.CI-4. WG_N →**WG_{inf}** ⇔ WG_N + (…+) **WG_{inf}**

I.CI-5. WG_N → **WG_{Adv}** ⇔ WG_N + (…+) **WG_{Adv}**

I.CI-6. WG_A → **WG_N** ⇔ WG_A + (…+) **WG_N**

I.CI-7. WG_A → **WG_{Adv}** ⇔ 1) WG_A + (…+) **WG_{Adv}**
⇔ 2) **WG_{Adv}** + (…+) WG_A

The choice between the two subrules is made according to Conditions not specified here

Examples

I.CI-2 : [*maksimal´naja verojatnost´*]$_{\text{WG-N}}$ [*vsex podobnyx raspredelenij*]$_{\text{WG-N}}$
maximal probability of.all such distributions

I.CI-3(1) : [*ili veličina*]$_{\text{WG-N}}$ [*ne polnost´ju opredelënnaja*]$_{\text{WG-A}}$ 'or [a] magnitude not fully determined'

I.CI-3(2) : [*ili* [*ne polnost´ju opredelënnaja*]$_{\text{WG-A}}$ *veličina*]$_{\text{WG-N}}$ 'or [a] not fully determined magnitude'

I.CI-4 : [*ego udivitel´naja sposobnost´*]$_{\text{WG-N}}$ [*spat´*]$_{\text{WG-inf}}$ 'his amazing ability to.sleep'

I.CI-5 : [*vse simvoly*]$_{\text{WG-N}}$ [*sleva*]$_{\text{WG-inf}}$ 'all symbols on.the.left'

I.CI-6 : [*polnost´ju lišeny*]$_{\text{WG-A}}$ [*neobxodimyx sredstv*]$_{\text{WG-N}}$ '[are] fully deprived of.necessary means'

I.CI-7(1) : [*vstrečajuščiesja*]$_{\text{WG-A}}$ [*liš´ izredka*]$_{\text{WG-Adv}}$ 'encountered only rarely'

I.CI-7(2) : [*liš´ izredka*]$_{\text{WG-Adv}}$ [*vstrečajuščiesja*]$_{\text{WG-A}}$ 'only rarely encountered'

I.CII: Mutual arrangement of codependent groups Ψ_i

either $\Xi + \text{WG}_{\text{agent}} + \text{WG}_{\text{compl.adnom}} + \text{WG}_{\text{compl.adnom}} + \text{WG}_{\text{Circ, non-manner}} + \text{WG}_{\text{obl-obj}} + \text{WG}_{\text{obl-obj}} + \text{WG}_{\text{Circ-manner}}$

or $\Xi + \text{WG}_{\text{Circ-manner}} + \text{WG}_{\text{compl.adnom}} + \text{WG}_{\text{agent}} + \text{WG}_{\text{Circ-manner}}$

In our test sentence, Rule **I.CII** unites MWGs 2 and 3, which gives us five CWGs:

1. *byla*, 2. *metodom gravitacionnoj razvedki*, 3. *neft´*, 4. *otkryta*, 5. *v Kazaxstane*

I.D: Arranging Complete Word Groups within a Clause

The arrangements proposed here are valid only without taking into account the SSynt-CommS and other «perturbing» factors — that is, for the word order traditionally called neutral. The neutral word order obtains in cases where the SSyntS and the SSynt-CommS are not in conflict (the subject is (in) the SSynt-Theme, there is no Focalization, etc.). Rules **I.D** perform three operations:

I.DI — linearizing the elements of the verbal nucleus (referred to below as $\widetilde{\text{MV}}$, MV being the lexical verb, the last element of the nucleus)

I.DII — linearizing the actants with respect to $\widetilde{\text{MV}}$

I.DIII — linearizing the circumstantials with respect to $\widetilde{\text{MV}}$ and the actants

I.DI: Building the verbal nucleus $\widetilde{\text{MV}}$

Within an $\widetilde{\text{MV}}$, with a neutral word order, a dependent follows its governor: $\Xi \rightarrow \Psi \Leftrightarrow \Xi + \Psi$. In our case, Rule **I.D-I** gives

[*byla* + *otkryta*]$_{\widetilde{\text{MV}}}$

I.DII: Linearizing the actants

Below, the SSynt-actants are numbered: A_1 is the subject; A_2 is the DirO, the strongest OblO with an intransitive verb or the complement of a copula; A_3 is the IndirO or an OblO; and A_4 is another OblO. Different arrangements of the actants A_i with respect to the $\widetilde{\text{MV}}$

are mostly determined by the nature of the MV: the MV is a copula, the MV is an existence verb, or the MV is neither. An additional case is a non-finite verb governing actants.

Governor = MV
MV = (copula)

	additional conditions	arrangement	examples
1.	$A_1 \neq V_{inf}$ **or** $A_2 = V_{inf}$	A_1+...+ $\widetilde{MV}$ +...+A_2	*Saša*$_{A1}$ – $_{MV}$ *naš vožd´*$_{A2}$ 'Sasha [is] our leader'. *Saša*$_{A1}$ *byl* $_{MV}$ *našim voždëm*$_{A2}$ 'Sasha was our leader'. *Saša (budet) dovolen*$_{A2}$ 'Sasha (will be) happy'. *Ves*$_{A1}$ *okazalsja ravnym 1,008* 'The.weight turned.out.to be equal [to] 1.008'. *Postupit´*$_{A1}$ *tak označalo by poterjat´*$_{A2}$ *kontrol´ nad situaciej* 'To.act like.this would.mean lose control over the.situation'.
2.	$A_1 = V_{inf}$/ $CONJ_{(subord)}$ **and** $A_2 = A/Adv_{(pred\text{-}inf)}$	$A_2(A_2)$+...+ $\widetilde{MV}$ +...+A_2+...+ A_1 ["$A_2(A_2)$" means 'second actant of the second actant']	*Ø*$_{BYT´\text{-}MV}$ *neobxodimo/Budet*$_{MV}$ *neobxodimo*$_{A2}$ *učest´*$_{A1}$ *vse faktory* '[It is/will.be] necessary to.account for.all factors'. *Vam*$_{A2(A2)}$ *budet*$_{MV}$ *nado*$_{A2}$ *učest´*$_{A1}$ *vse faktory* 'To.you [it] will.be necessary to.account for.all factors'. *Osobenno važno*$_{A2}$*, čto*$_{A1}$ *učteny vse faktory* '[It is] especially important that [are] accounted.for all factors'.

MV = (exist)

	additional conditions	arrangement	examples
3.	———	A_2+...+ $\widetilde{MV}$ +...+A_1	*Šël sil´nyj dožd´* '[It] was.falling [a] heavy rain'. *Na doroge pojavilsja vsadnik* 'On.the road [it] appeared [a] rider'. *U nas imeetsja veličina*$_{A1}$ *c > 0, zavisjaščaja ot P* lit. 'At us, [there] is magnitude c > 0, depending on P'.

MV ≠ (copula), ≠ (exist)

	additional conditions	arrangement	examples
4.	MV ≠ (pred-inf), ≠ (aux)	A_1+...+ $\widetilde{MV}$ +...+A_2+...+A_3+ ...+A_4+...+A_5+...+A_6	*Ètot operator sopostavljaet čislo A čislu B s pomošč´ju funckcii* ***f*** 'This operator associates number A to number B by using function **f**'.
5.	MV = (pred-inf)	A_2+...+ $\widetilde{MV}$ +...+A_1	*Mne*$_{A2}$ *xočetsja žit´*$_{A1}$ lit. 'To.me is.desire to.live'·
6.	MV = (aux), A_2 = PART, PASS **and** $A_2(A_2)$ = —	$\widetilde{MV}$ +…+ A_1 [A_2(MV) is inside $\widetilde{MV}$]	*V Avstralii byl predotvraščën*$_{A2}$ *krupnyj terakt*$_{A1}$ lit. 'In Australia, [it] was thwarted [a] serious act.of.terror'.

Governor ≠ MV
Governor = (V)$_{NON-FIN}$

	additional conditions	arrangement	examples
7.	———	Governor + A_2 + A_3 + A_4	*svesti*$_G$ *zadaču*$_{A2}$ *k*$_{A3}$ *predyduščej* 'to.reduce [the] problem to.the previos [one]'; *svjazyvavšix*$_G$ *indejcev*$_{A2}$ *s*$_{A3}$*francuzskimi perekupščikami* 'that.were.connecting Indians with French merchants'

The application of Rule **I.DII**-4 results in the following arrangement of actantial groups:

[*byla* + *otkryta*] $_{\widetilde{MV}}$ + *neft´*$_{A1}$

I.DIII: Linearizing the circumstantials

Linear disposition of circumstantials is controlled mainly by their semantic nature. Thus, Time and Location circumstantials tend to occupy the left edge of the clause, while Direction circumstantials mostly follow the $\widetilde{MV}$; manner circumstantials behave differently — as a function of their own structure: a simple adverb precedes the $\widetilde{MV}$, while a prepositional phrase follows $\widetilde{MV}$. Therefore, the rules for circumstantial linearization need a list of all circumstantial types (in the rules below only 8 such types are given). The semantic type of a Circum is identified by the SSyntRel which subordinates it and/or by its lexicographic features, semantic and syntactic. For instance, "L = $Circum_{time}$" means — **temporal-circum**→L, etc.

In the table below, numbers attached to an arrangement indicate mutual order of two codependents; negative numbers specify the distance from the governor to the left, and positive numbers specify the distance from it to the right. The number after the indication

"leftmost" is to be understood as follows: 0 — the very first element of a clause (a conjunction), +1 — the second element (a non-conjunctional connector: A_0, *sledovatel´no*$_{+1}$, ... 'And, consequently, ...'), etc. Thus, Rules **I.DIII**-4/5 stipulate that Circum$_{manner}$ is positioned closer to the verb than the Circum$_{quant}$.

	the type of Circum	arrangement	examples
1.	Circum$_{time}$	left of [MV, A_i], –3	***V 1932 godu*** *on pereexal v Moskvu* 'In year 1932 he moved to Moscow'.
2.	Circum$_{loc}$	left of [MV, A_i], –3	***V Moskve*** *on rabotal nad knigoj* 'In Moscow he worked on [the] book'.
3.	Circum$_{dur}$	right of [MV, A_i], +2	*On rabotal nad knigoj* ***vsju nedelju*** 'He worked on [the] book [the] whole week'.
4.	Circum$_{manner}$	left of G, –1 **and** right of A_1	*On mog by* ***tščatel´no*** *proverit´*$_{MV}$ *zamki* 'He could.have carefully checked [the] locks'.
5.	Circum$_{quant}$	left of G, –2 **and** right of A_1	*On* ***tri raza*** *tščatel´no proveril zamki* 'He three times carefully checked [the] locks'.
6.	Circum$_{way}$, Circum$_{instr}$, Circum$_{comit}$	right of [MV, A_i], +1	*On pereskočil čerez lužu* ***odnim pryžkom***. 'He jumped over [the] puddle in.one leap'. *On poexal v Moskvu* ***s dvumja druz´jami*** 'He went to Moscow with two friends'.
7.	Circum$_{parenth}$	left of MV	***Kak izvestno****, on poexal v Moskvu s dvumja druz´jami* 'As [is] known, he went to Moscow with two friends'. ~ *On,* ***kak izvestno****, poexal v Moskvu s dvumja druz´jami* 'He. as [is] known, went to Moscow with two friends'.
8.	Circum$_{connect}$	leftmost, +1	***Sledovatel´no****, my dokazali naše predpoloženie* 'Therefore, we have.proven our assumption'.

According to Rules **I.DIII**-2 and **I.DIII**-6, the locative circumstantial *v Kazaxstane* and the instrumental circumstantial *metodom gravitacionnoj razvedki* are positioned as follows:

$$[V + Kazaxstane]_{C\text{-}loc} + [byla + otkryta]_{\widetilde{MV}} + [neft´]_{A1} + [metodom\ gravitacionnoj\ razvedki]_{C\text{-}instr}$$

I.E: Arranging Clauses within a Sentence

The linear position of a clause inside the sentence depends on the type of the clause — that is, on the SSyntRel that subordinates its top node — and on the conjuction that introduces it, being its top node. Thus (Ξ stands for the top node of a clause; «clause(L)*» means 'the clause headed by L minus the clause headed by Ξ'):

I.E-1. L —**subject**→ Ξ ⇔ 1) clause(Ξ) + clause(L)★ | L = (V)
⇔ 2) clause(L)★ + clause(Ξ) | L = (A/Adv)
I.E-2. L —**object**→ Ξ ⇔ clause(L)★ + clause(Ξ)

L —**circum**→ Ξ ⇔ 1) clause(Ξ) + clause(L)* | Ξ = ESLI, KOGDA
⇔ 2) clause(L)★ + clause(Ξ) | Ξ = ČTOBY
I.E-4. L —**relative**→ Ξ ⇔ L + clause(Ξ) | clause(Ξ) becomes part of CWG(L)

Recall that the linear arrangements indicated here are valid only for neutral word order and may be changed by communicative and other factors.
Examples

I.E-1(1): *Čto*$_{Ξ}$ *on ušël, nikogo ne udivilo*$_{L}$ 'That he left nobody not astonished'.
I.E-1(2): *Bylo očevidno*$_{L}$, *čto*$_{Ξ}$ *on ušël* '[It] was obvious that he left'.
I.E-2: *Ja znaju*$_{L}$, *čto*$_{Ξ}$ *on ušël* 'I know that he left'.
I.E-3(1): *Esli*$_{Ξ}$ *on pridët, ja ujdu*$_{L}$ 'If he comes I will.leave'.
I.E-3(2): *On pridët*$_{L}$, *ctoby*$_{Ξ}$ *ja mog ujti* 'He will.come that I could leave'.
I.E-4: *professor*$_{L}$, *k kotoromu ja prišël*$_{Ξ}$ 'professor to whom I came'

The output sentence (1) consists of just one clause, so that Rules **I.E** do not apply.

3.2.2. Type II: Adjusting Linearization Rules

Adjusting rules account for special linear arrangements determined by such factors as Synt-Comm-organization, WH-words, pronouns and similar phenomena. Numbers given after some rules indicate mutual arrangements of elements claiming the same position. Thus, in Rule **II.1**-2, number +3 means that the group Ψ may be preceded only by the elements with numbers 0 (conjunctions) +1 (WH-words), and +2 (Comm-Specifiers); these numbers are associated with conjunctions and WH-words in the corresponding rules for their positioning. Adjusting linearization rules can be thought of as transformations defined over established preliminary arrangements.

II.1. Expressing Synt-Comm-organization
II.1-1. If Ψ ⊆ **Rheme** in a declarative clause, then Ψ must be rightmost in the clause.
II.1-2. If Ψ ⊆ **Theme** in a declarative clause, then Ψ must be leftmost in the clause, +3.

The presentation of these rules (**II.1**) is approximate: other Synt-Comm-rules are of course needed that ensure the expression of Focalization and Emphasis; all Synt-Comm-rules must also take care of the corresponding prosody, etc. (Eight linear-prosodic transformations of Russian presented in [Zimmerling 2008: 560] correspond to our Type **II.1** rules.)

II.2. Extractions
g(Ξ$_{(wh)}$) stands for a word group consisting of a WH-word (a relative or interrogative pronoun) and the string of its successive governors — up to, but with the exclusion of, the MV. This is what is

called *nominal nucleus* in [Kahane 1997, 2001].
$g(\Xi_{(wh)})$ must be leftmost in the clause, +1.
**i ja prišël k kotoromu* 'and I came to which' ⇒
i [*k kotoromu*]$_{g(\Xi(wh))}$ *ja prišël* 'and [to which] I came'

II.3. Nominal Pronouns

$MV + A_{2(N, pron)} \Rightarrow A_{2(N, pron)} + MV$

Èto	*udivilo*$_{MV}$	*vsex*	*issledovatelej*$_{A2}$.	⇒	*Èto*	***vsex***$_{A2(N, pron)}$	*udivilo*$_{MV}$.	
'This	astonished	all	researchers'.		'This	all [= everybody]	astonished'.	
Maša	*možet*	*ljubit'*$_{MV}$	*Ivana*$_{A2}$.	⇒	*Maša*	*možet*	***ego***$_{A2}$	*ljubit'*$_{MV}$.
'Masha	may	love	Ivan'.		'Masha	may	him	love'.

II.4. Interrogative Inversion

$A_1 + MV \Rightarrow MV + A_1$ | in a general question

Since in our test example the CWG_1 [= $Circum_{instr}$] is the Synt-**T**, everything else belonging to the Synt-**R**, Sem-Comm-Rules **II.1-**1 and **II.1-**2 give the prefinal arrangement (6):

(6) Prefinal arrangement:

[*metodom gravitacionnoj razvedki*]$_{C\text{-}instr}$ + [*v* + *Kazaxstane*]$_{C\text{-}loc}$ + [*byla* + *otkryta*]$_{\widetilde{MV}}$ + [*neft'*]$_{A1}$

3.2.3. Type III: Filtering Linearization Rules

These rules identify bad sequences of words in the sentence under construction and slap on them numerical «fines», after which a special mechanism carries out permutations of CWGs in order to get rid of fines — or, at any rate, to minimize the cumulative fine of the sentence. Such permutations should not be applied to the elements that belong to the SSynt-Theme and the Rhematic Focus.

Notation: *l*(X) stands for 'length of the word group X in terms of the number of stressed wordforms'

	situation to avoid	"fine"	examples
1.	**Relative heaviness of adjacent CWGs**[6]		
	$CWG_1 + CWG_2 \mid CWG_2 \not\subset$ **Rheme**: ***l***$(CWG_1) - $***l***$(CWG_2) > 0$ **and** ≤ 3	–2	?*On peredal* [*knigu v krasnom pereplëte*]$_{CWG1}$ *Ivanu*$_{CWG2}$ 'He passed [the book in a red binding] to.Ivan'.
	>3 **and** ≤ 6	–6	??*On peredal* [*ètu tolstuju knigu v krasnom pereplëte i obe tetradi*]$_{CWG1}$ *Ivanu*$_{CWG2}$ 'He passed [this thick book in a red binding and both notebooks] to.Ivan'.
	> 6	–15	???*On peredal* [*ètu tolstuju knigu v krasnom pereplëte i obe tetradi, kotorye byli najdeny našimi sotrudnikami,*]$_{CWG1}$ *Ivanu*$_{CWG2}$ 'He passed [this thick book in a red binding and both notebooks that were found by.our collaborators] to.Ivan'.

2.	**Unbalanced distribution of CWGs around MV**		
	On one side of $\widetilde{\text{MV}}$ there are ≥ 2 CWGs **and** on the other side there is none	–10	?[*V Moskve*]SSynt-**т,** $_{\text{CWG1}}$ [*sem´ja Ivana*] $_{\text{CWG2}}$ *živët*$_{\text{MV}}$ ‘[In Moscow] [Ivan’s family]lives’. ?*Budet*$_{\text{MV}}$ [*možno*]$_{\text{CWG1}}$ [*svesti*]$_{\text{CWG2}}$ [*priznaki fonem*]$_{\text{CWG3}}$ [*k dvoičnym*]$_{\text{CWG4}}$‘[It]will.[possible] [to.reduce] phoneme features] [to binary [ones]]’.
3.	**Misplacement of a non-manner circumstantial**		
	$\widetilde{\text{MV}} + \text{C}_{\textbf{non}\text{-manner}} + \text{A}_1$	–3	?*Ètu knigu*$_{\text{A2}}$ *pročël*$_{\text{MV}}$ ***v***$_{\text{C}}$ ***2005 godu*** *Ivan*$_{\text{A1}}$ ‘This book read in year 2005 Ivan’.
4.	$\text{C}_{\textbf{non}\text{-manner}} + \widetilde{\text{MV}} \mid \text{C} \neq$ a SSynt-**Specifier**[6]	–2	?*Kolumbom* ***v***$_{\text{C}}$ ***1492 godu*** *byla*$_{\text{MV}}$ *otkryta Amerika* ‘By.Columbus in year 1492 was discovered America’.
5.	**Misplacement of the agent of a passive verb**		
	$\text{A}_2 + \text{A}_1 + \text{MV}_{\text{PASS}}$	–3	?***Kolumbom*** *Amerika byla otkryta v 1492 godu posle dolgogo plavanija* ‘By.Columbus America was discovered in year 1492 after [a] long sea.voyage’.

Another «bad» arrangement is typical of article languages: thus, in French [Abeillé, Godard 2000] a phraseologized complement that has no determiner cannot be separated from its verb by another complement:

(7) **a**. **Cela donne à Marie* ***faim*** lit. ‘This gives to Mary hunger’.
~ *Cela donne* ***faim*** *à Marie*.
b. *Cela donne à Marie une grande faim* lit. ‘This gives to Mary a big hunger’.
Cela donne une grande faim à Marie lit. ‘This gives a big hunger to Mary’.
c. *Jean donne à Marie une pomme* ‘John gives Mary an apple’.
Jean donne une pomme à Marie ‘John gives an apple to Mary’.

However, in Russian such a situation is impossible because of the absence of determiners. But being part of a collocation or an idiom may impact the linear position of a clause element.

In our example, the prefinal arrangement in (6) gets the fine of –2 (by Rule **III**-4: the Circum$_{\text{loc}}$ *v Kazaxstane* is not marked as a **Specifier**: it is part of the SSynt-**R**. To reduce the fine to zero the following permutation can be used (the permuted element is in boldface):

$$\text{C}_{\text{instr}} + \textbf{C}_{\textbf{loc}} + \widetilde{\text{MV}} + \text{A}_1 \;\Rightarrow\; \text{C}_{\text{instr}} + \widetilde{\text{MV}} + \text{A}_1 + \textbf{C}_{\textbf{loc}}$$

The result is a good linear arrangement:

(8) *Metodom gravitacionnoj razvedki byla otkryta neft´ v Kazaxstane*.

Sentence (8) coincides with our test sentence (1).

4. Conclusions

This paper has presented a rough sketch of how Linearization (+ Morphologization) of the Surface-Syntactic Structure can be captured for Russian, a language with extremely free word order, within the framework of the Meaning-Text approach. The overview presented here (an improved and enhanced version of a paper published decades ago) has partially defined the input and output representations needed for Linearization in general and sketched out the major classes of Linearization rules, their form and their interaction. One example Russian sentence has been worked through in some detail, showing how these Linearization + Morphologization rules function to yield a good linear arrangement of words inside a sentence.

The next step seems to be obvious: to elaborate a more or less exhaustive set of word order rules for Russian. In the process, the researchers must consider and describe systematically prosodic aspects of Linearization.

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Notes

[1] Within the framework of a pilot project on the automatic rephrasing the claim sentences in patents, S. Mille and L. Wanner (2008) developed some Linearization rules for English (drawing upon the rules implemented by F. Lareau in the scope of the MARQUIS Project). See also [Filippova, Strube 2009; He et al. 2009].

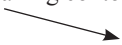
[2] Let me indicate the communicative differences that determine the six arrangements in Mot-to 2. But first, two important remarks.

- Each of the linear arrangements of words in (i)—(vi) can be associated with a particular intonation contour that expresses the communicative organization of the utterance (see [Yokoyama 1985], where the importance of the relationship between word order and intonation — especially in Russian — is properly emphasized). These contours are shown here in an approximate way.
- Each of the arrangement of words (i)—(vi) admits in principle several other prosodizations expressing different communicative structures, of which only one is arbitrarily chosen to illustrate my point.

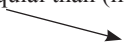
↗ ↘ ↘

(i) *Ja tebja ljublju*, uttered with neutral, or level (i. e., unmarked) intonation, is a simple declarative utterance — a «logical» statement of fact; the whole utterance is Rhematic.

(ii) *Ja ljubljú tebja* is an emphatic utterance, with strong stress on the verb and uninterrupted falling contour; JA is the Synt-**T**, and the rest, the Synt-**R**.



(iii) *Ljubljú ja tebja* is also an emphatic utterance, as well with strong stress on the verb and uninterrupted falling contour; the whole utterance is Rhematic and much more colloquial than (ii).



(iv) *Ljubljú tebja ja* is the same as (iii).

(v) *Tebja já ljublju* has TY as the Synt-**T**, everything else being the Synt-**R**—with JA as Rhematic Focus (contrasting with another candidate, understood, but not named: 'and not …!').

(vi) *Tebja ljublju já* is the same as (v).

[3] Some languages have, without any doubt, additional factors perturbing neutral word order. However, I think that any such additional difficulty can be treated as a new subtype of Adjusting rules. Thus, for instance, languages featuring Second-Position clitics, such as Serbian/Croatian, need special rules to position the clitic cluster after all other elements of the sentence are linearly arranged [Milićević 2009]. These rules are part of our Type 2 rules.

[4] Rules that are referred to in this paper as «special» do not fall into any of major rule types introduced; they are really special. These special rules are organized in blocks, or «kits»; such a kit is attached to one or several «normal» rules.

[5] The position of a complex adjectival modifier depends in fact on many subtle and closely intertwined factors; see [Sannikov 1963].

[6] On the role of relative heaviness of word groups to be linearized (and other interesting factors), see [Abeillé, Godard 2000].

[7] A Comm-Specifier is a part of a Sem-CommS/Synt-CommS that is outside of its Communicative Core (= Rheme + Theme) and semantically bears on this core, specifying some details about it; Comm-Specifiers are divided in Comm-circumstantials, Comm-characterizers and Comm-connectors ([Mel'čuk 2001: 96–100]).

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