Types Of Russian Sentences

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In relation to problems of MT from Russian to English one must first of all consider the nucleus-centers of the source language, because it is only on the basis of these that one can obtain proper equivalents in the target language.

It seems appropriate to make a few preliminary remarks which will clarify some technical aspects of this paper. First among them is my belief that a sentence definition should be positive. We need to know what a sentence *is* and not what it is not.

Since our formulation is to be applied to computers, it is advisable to express it in logical and concise terms. For that reason, I have included such terms as *independent and dependent* variable in my definition of the Russian sentence, and to the greatest extent possible I have reduced the complexity of Russian structural types to symbolic formulas.

One necessary condition for MT research is the knowledge of morphophonemic process both in Russian and in English. In Russian, an example of this would be variation within pronominal forms. Examples:

1. получена фракция
   a fraction was obtained

2. выход почти количественный
   the yield is almost quantitative

We believe that Russian sentence types can be described only on the assumption that Russian speakers, while generating sentences, are guided by a general relational meaning of two types:

1) the actor-action
2) the actor-action goal.

This is especially true of morphemic types where there is no graphemic difference between nominative and accusative case. In such instances word order in Russian becomes functional.

For the field worker who watches how words behave within Russian structure, it becomes clear that there are usually two nucleus-forms:

1) the nominative case of the noun, personal pronoun, cardinal numeral, or the series of words which can assume the function of the nominative case (infinitives, adverbs, etc.); here the nominative function is expressed in writing by a delimiting punctuation mark " ", and in speech by a special intonation;

2) the personal verbal indicator or the form which can replace it. (In speaking of substitutes, we have in mind short pronominal forms.)

Thus, from a *positive* point of view, the Russian sentence may be expressed as a function of the nominative case and the personal indicator, the nominative case being the independent, and the personal indicator the dependent variable. The verbal form is predictable on the basis of the nominative case, but not vice versa.

Such a definition of the Russian sentence overcomes the difficulties arising from a situation in which there is interdependence of whole sentences or separate members thereof. Examples: Russian personal pronouns он, она, он, etc., cannot be transferred as он—he, она—she, etc., since он may be rendered in English by *he, she* or *it* depending on the source item to which он refers. The details on this problem were discussed in a separate Georgetown University work paper on MT. The definition of the Russian sentence is satisfactory in all such instances.

Since we consider the largest unit for syntactic search to be a sentence, the whole Russian syntactic field can be thought of as consisting of sentence types which are not subject to further breaking down, and of transformational operations which can be effected in terms of these irreducible Russian sentence types. This refers to the syntactic transformation and kernel theory of Harris.

Graphically, one can describe the syntactic field as a circle divided into the nominative case and the personal indicator with their interrelationships.

From combinations of those two, we can produce the following sentence types:

1) Both parts are explicitly present;
2) one of them is lacking;
3) both are lacking.

Type One is of highest frequency; Type Two is next highest; Type Three is of lowest frequency.

If we start to analyze Type 3, in which both components are absent, we would see that here belong titles, headlines, slogans, inscriptions, formulas, etc. From the structural point of view, they represent a government structure, whose determiners can be listed. Within the government structure an agreement restriction may occur. The latter does not hinder the string operation[1] of such a structure if it is taken for granted that selection and arrangement problems must be dealt with, anyway.

Examples: 3. On the spread of culture in countries situated in the African continent
О распространении культуры в странах, расположенных на африканском материке.

4. Concerning science in the USSR
О положении науки в СССР

5. Concerning the action of triarylbromethanes on alkylpyrocatechol esters of phosphorous acid.
О действии триарилброметанов на алкилпирокатехиновые эфиры фосфористой кислоты

6. Experimental Part
Экспериментальная часть

7. Hydrolysis of the ester
Омыление эфира

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[1] *By the string operation* we understand the set of operations being performed after the syntactic transfer was affected; i.e. H and P were transfered. In a string operation we transfer
 a) lexical meaning which may involve a lexical choice
 b) desinences which may cause a rearrangement or insertion of a preposition before certain nouns
 c) rearrangement of post-modifiers, etc.

Type No. 2 in which one component is lacking, comprises impersonal and nominal structures in Russian. The nominal type is characterized by the absence of a verbal indicator, the impersonal type by the absence of the nominative case. There are special transformations within the Russian sentence indicating which item assumes the function of the nominative case. Examples:

8. I have a headache   У меня голова болит
9. I hate to look at him   Мне противно на него смотреть

10. The wind carried away the boat   Лодку унесло ветром
11. Not a word about it   Ни слова больше об этом

In comparison with Russian, the English translation shows that the English equivalents of the Russian non-nominative items expressed in genitive, dative, prepositional, and instrumental cases, are the nuclei of the noun phrase. The Russian speaker would never look for a preposition before the nucleus of the English noun phrase. Example:

12. a new paper—   новая работа

If in a Russian sentence the verbal indicators are missing, then we have nominal phrases. For example:

13. The question of mutual relations between the West and East
    Вопрос о взаимоотношениях между востоком и западом

14. Melting of bromide and iodide systems
    Плавление бромидных и иодидных систем

From the point of view of translation it is necessary to point out that in this category the verbal nouns when they *do* occur are determiners for the string operation and will have in the immediate vicinity a non-nominative case, usually genitive. For example:

15. The obtaining of the ethylpyrocatechol ester of phosphorous acid.
    Получение этилпирокатехинового эфира
    фосфористой кислоты

One has to remember that quite frequently the zero verb can be a problem if the cues for its transfer are not properly identified. *In this case, we depart from the pure linguistic point of view.* We attack this problem *not* structurally, but rather in terms of transfer.

-138-

Since the copula of the complex predicate equals zero, we take the nominal part of it as a cue and effect a transfer either as present/past and singular versus plural with insertion of "IS/ARE" or "WAS/WERE" depending on the source cues.

Examples:

16. The yield is almost quantitative — Выход почти количественный
17. My father is a physician — Мой отец врач
18. The physician is my father — Врач мой отец
19. It is not very good — Это не очень хорошо
20. It's bad — Это плохо
21. The system of fusibility was studied — Система плавкости исследована
22. The data are given — Приведены данные

Among the type in which both components are present, we differentiate two subgroups:

1) non-third person indicator plus a noun or third person pronoun;
2) first or second person indicator plus the personal pronoun of the 1st or 2nd person.

In the latter case the pronoun may be missing, since it is redundant.

Example: Иду. Я иду. Люблю грозу в начале мая...

One has to consider forms where the lack of a morphemic signal identifying the accusative and nominative cases causes the word order to become functional. (We will not go into that question since it will be discussed separately in this morning's session.)

Thus we can list the Russian kernels with corresponding English kernels in the following manner:

Those kernels where only the relational meaning of the actor-action is expressed as in

Russian	*English*
1) HP	1) NvV
Реакция должна итти	The reaction should proceed .

-139-

Russian	*English*

2) HPc:H
   а/ мыход 10 г.
   б/ Продуктом омыления явля-
      ется пирокатехин и триарил-
      метилфосфиновая кислота.

2) N is N
   a) The yield is 10 g.
   b) The product of hydroly-
      sis are pyrocatechol
      and triarylmethylphos-
      phinic acid.

3) HPc:A
   Эфиры...устойчивы
   Формулы приведены
   Выход высок

3) N is A
   The esters ... are resistant
   The formulas ... are given
   The yield ... is high

4) HPc:D
   Карандащ здесь

4) N is D
    The pencil is here

Versus those where the relational meaning of the actor-action-goal
structure is expressed like in:

Russian	*English*

5) HP #g(Government)
   Реакция протекает по
   указанному уравнению

5)   NVD (NV+N *is* PN)
   The reaction actually pro-
   ceeds according to the
   above mentioned equation

6) H Pg
   Поведение /их/
   подтвердило правильность

6) NVN
   (Their) behavior ... con-
   firmed ... the correctness...

7) HPc:#g
   Диметиланилин — в
   эфирном растворе

7) N isPN
   The dimethylaniline is in
    ether solution

and finally a typical Russian structure which has no English equi-
valent, i.e. impersonal structures such as:

8) Pc:I
   Необходимо отметить

8) It is A to V
   It is necessary to note ...

In terms of spoken Russian, one has to remember that a Russian sentence can be described further in terms of the open or closed intonation contours. These are reflected in the writing system by two categories of Russian punctuation marks, namely, separators and delimitators. (These categories will be discussed in a separate paper.) Conjunctions, specifically coordinating conjunctions, are used for the same purpose.