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On Subject-Verb Agreement in Bulgarian
(An HPSG-based account)[2]

1. Introduction

Bulgarian is assumed to be a grammatical-gender and subject-null language like other Slavic languages, but unlike them it has a highly developed temporal system and has no declension types for the noun system.

In this paper we aim at modeling the Subject-Verb Relation called "agreement" in the non-derivational and constrained-based framework of HPSG (see Pollard and Sag, 1994). Such an approach allows for suppressing the misleading directionality-based approach to agreement (where the features of the controller are "copied" to the target) and viewing this phenomenon as a mutual Subject-Verb contribution to the relation.

In order to propose our analysis, it is necessary to discuss the HPSG-based view on agreement, to present Bulgarian Subject-Verb pattern typology and to choose an appropriate agreement theory to be applied.

The paper is structured as follows: the next section briefly introduces the HPSG theory and discusses some approaches to agreement in HPSG. Section 3 discusses Subject-Verb pattern typology in Bulgarian. Section 4 focuses on the mismatch triggers within Subject-Verb relation. In Section 5 our idea on the treatment of agreement is proposed. The last section makes conclusions and lists topics left for further research.

2. HPSG and Agreement in HPSG

The Head-driven Phrase Structure Grammar (HPSG) is a lexicalist linguistic theory, in which the linguistic objects are represented via feature structures. It includes: a linguistic ontology (*sort hierarchy*) and grammar principles (*constraints over the sort hierarchy*). The sort hierarchy represents the main type of linguistic objects and their basic characteristics. The principles impose restrictions on the objects and thus predict the well-formed phrases. The main linguistic object in HPSG is of sort *sign* (whose subsorts are *word* and *phrase*)[3]. It is a complex element that is assigned two features: PHON (string of phonemes) and SYNSEM (syntactic and semantic characteristics). Further within the sign attribute there are three important attributes: CATEGORY (which encodes the syntactic information), CONTENT (which encodes the semantic information) and CONTEXT (which encodes the pragmatic information).

The HPSG94 agreement theory does not rely on separate agreement principles. The agreement mechanism is rather ensured by other grammar principles, such as Head-feature principle, Subcategorization principle and Semantics principle. The concrete agreement features belong to the INDEX attribute within CONTENT (*person*, *gender* and *number*) and to the HEAD feature within the CATEGORY (*case*). The agreement is seen as a relation where two elements specify partial and compatible information about a single linguistic object (HPSG94, p. 60). As only signs of sort *nominal object* have the feature INDEX, the verb lacks

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[3] Here we present the HPSG94 sort hierarchy, but it should be noted that there are further modifications and suggestions in later works.

its own agreement characteristics getting them via its subject's INDEX. This treatment of the agreement as government (i.e. specifying agreement features only on the subject, but not on the verb) is criticized in Kathol (1997). He argues that agreement markings should be present not only on the argument (source), but also on the selector (target). He proposes the head feature AGR (within the feature MORSYN) and divides the agreement relations into two in the theory:

Morphosyntactic: selector's AGR is structure-shared in its relevant parts with its argument's AGR;
Semantic: selector's AGR is structure-shared in its relevant parts with its argument's INDEX.

Thus the so posited relations between *anchoring conditions-index-morphosyntax* clarify the mappings between the linguistic objects and their relevant features. Kathol's extension of HPSG94 theory on agreement is further tested for Polish (see Czuba, Przepiorkovski 1995) and fine-grained for Serbo-Croatian (see Wechsler, Zlatic 2001). These approaches are consistent with the Corbett's hierarchy (1991), but at the same time they keep the distinction between different agreement mechanisms: local (subject-verb relation) vs. nonlocal (anaphora); NP internal vs. Subject-Verb agreement. Wechsler and Zlatic's theory follows Kathol's approach, dividing the local agreement into the semantics-based INDEX agreement, which includes features *person, number* and *gender* and the syntactic-based CONCORD agreement (similar to Kathol's AGR feature), which includes features *case, number* and *gender*. The former is relevant for pronouns and verbs and the latter is relevant for NP-internal agreement. They propose the following schema: *declension-concord-index-semantics* and specify the relations between the phenomena. Thus the 'mixed agreement' types and mismatches are predicted by violation between any of the types.

All of the works, mentioned above, consider the Subject-Verb agreement as an index-based one in contrast to syntactic-based NP-internal agreement. One of the strongest arguments is that the feature *person*, for example, plays no role in NP-internal agreement and thus remains an INDEX feature. In our opinion there is evidence that supports rather the unifying, than distributive approach to agreement. First of all, as it will be seen in the next sections, Subject-Verb agreement relation depends on the NP-internal agreement as well as on the discourse factors. Secondly, there is an overlapping between the agreement features within different domains. For example, in Wechsler and Zlatic's interpretation (p.30-32) the features *number* and *gender* belong at the same time to both CONCORD and INDEX features. Thus for some linguistic items (predicative adjectives and participles, relative pronouns) it is difficult to decide whether they participate in a syntactic or a semantic agreement relation. Thirdly, there are alternative agreement patterns – semantic and syntactic – which in some cases are equally applicable.

Given the facts, we aim at highlighting the agreement relation as a mechanism that captures the variety of agreement phenomena via set of principles.

3. Subject-Verb patterns in Bulgarian

Before proposing the Subject-Verb patterns in Bulgarian, we would like to express our opinion on the notion of 'pro-dropness', because it affects our analyses. We support the following ideas: (1) 'pro-dropness' is not a matter of language, but rather a matter of constructions. That means it is not considered to be an all-or-nothing affair, but rather a matter of degree (see Alexiadou 2001, Bennis 2001), and (2) 'pro-dropness' is not just a syntactic phenomenon, but it has to do with discourse factors as well (see Butt 2001). Even in highly

inflected languages there exists syncretism that brings about ambiguities and thus the potential overtness becomes dependent on discourse factors. For example, in third person singular non-analytical verb forms in Bulgarian the gender is underspecified as to the three genders. Similarly, in the past singular forms of some verbs the person is underspecified as to the second and third values.

Here we present our typology model based on the Subject status and content. We assume that the Subject is an NP which comprises different properties (see Penchev 1993 for more details on the typology of null subject patterns):

Subject can be: unexpressed, expressed or partially expressed
The unexpressed one can be: personal or impersonal
The personal one can be: definite, indefinite or general
The expressed one can be: a coordinated structure[4] or a non-coordinated structure

The formal representation of Subject-Verb agreement patterns is to be done in accordance with the dissociation of the Subcategorization list (SUBCAT list, in HPSG94, I-VIII chapters) into argument structure list (ARG-ST), which is responsible for lexical head's selection and valence structure list (VAL, in which SUBJECT, COMPLEMENTS and SPECIFIERS features are distinguished), which is responsible for local combinatorical potential (see Manning, Sag (1995) and Bouma, Malouf, Sag (2000)). We adopt the idea that the subject may or may not be present in valence structure, but it is always expressed on the ARG-ST. That means the subject can be present only on the lexical level, or it can be realised on the syntactic level as well[5].

Bulgarian, in contrast to English, resembles German and Polish in having more complicated structure of the *subject-finite verb patterns*: for the unexpressed subject they are *personal* and *impersonal* and roughly obey the following constraints:

Personal
$$
\begin{bmatrix}
\text{VAL|Subj} & <> \\
\text{ARG-ST} & < \text{NP [INDEX } ref \text{ [person, number, gender]] } >
\end{bmatrix}
$$

Impersonal
$$
\begin{bmatrix}
\text{VAL|Subj} & <> \\
\text{ARG-ST} & < \text{NP [INDEX } non\text{-}ref \text{ [3person, singular]] } >
\end{bmatrix}
$$

Note that we assume INDEX to be specified as *referential* or *non-referential* (instead of *ref|it|there*, HPSG94, p. 24). The personal pattern is further subdivided into three types with additional restrictions:

1. *def* type has underspecified agreement features. It covers the whole verb paradigm:

(1)   *Dojdox*
         Came-I (1,sg)
         I came

2. *indef* type has only a 3 person, plural form, but no explicit antecedent:

[4] The coordinated structures are left out for further research.
[5] A mechanism for diathetic relations in Bulgarian is proposed in Avgustinova (2000) using the mediating dependency list, but in this paper we focus mainly on the agreement relations.

(2)   *Arestuvaxa*   *go*
       Arrested-they(3, pl)   *him* (acc, m, sg)
       They arrested him.

3. *gen* type has a 2 person, singular form and refers not only to the hearer, but to the speaker as well:

(3)   *Nikoga*   *ne*   *znaeš*   *kakvo*   *šte*   *ti*   *se sluči*
       Never   *not* *know-you*(2, sg) *what*   *will*   *you*(Dat,sg)   *happen*
       One never knows what might happen to him.

The expressed subject pattern is structured as follows:

$$
\begin{bmatrix}
\text{VAL|Subj} & < \text{NP(1)} > \\
\text{ARG-ST} & < \text{NP(1)[INDEX } \textit{ref} \text{ or } \textit{non-ref}\text{[person, number, gender]] } >
\end{bmatrix}
$$

The partially expressed pattern can be considered as a non-standard one regarding agreement, because there is a mixture of implicit and overt agreement at the same time.

$$
\begin{bmatrix}
\text{VAL|Subj} & < \text{NP[CONTENT } \textit{npro}\text{[INDEX } \textit{ref}\text{[person, number, gender]]] } > \\
\text{ARG-ST} & < \text{NP[CONTENT } \textit{ppro}\text{[INDEX } \textit{ref}\text{[person, number, gender]]] } >
\end{bmatrix}
$$

We need a principle to license the relations between ARG-ST list and VAL-list in the case when there is a mismatch between the type of the nominal object[6]. It says: *The characteristics person and number of the expressed part of the subject, whose CONTENT's nominal object has value npro, are underspecified and coindexed with the characteristics person and number of the unexpressed part of the subject, whose CONTENT's nominal object we claim to be of type ppro.* Thus examples like the following are allowed[7]:

(4)   *Decata*   *otidoxme|otidoxte*   *v*   *gradinata*.
       Children-the(3per.,pl.) *went(*1pl|2pl)   *to*   *garden-the*
       The children went to the garden.

The relation between the Subject and the Verb is influenced by the NP type of the Subject. It is discussed in more detail in the next section.

4. The sources of agreement mismatches

In the previous section we focused on the typology of subject-verb relations. But a bundle of factors happen to influence it: the type of the verb, the type of the subject, the discourse etc. All these factors become triggers for agreement mismatches.

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[6] When the CONTENT value of the sign is *nominal object*, then it is further subdivided into two subsorts: nonpronoun (npro) and pronoun, which in turn is divided into personal pronoun (ppro) and anaphor (ana).
[7] Such an example is discussed in Barlow for Latin (1999, p.191) as well.

We support the idea that it is impossible to set strict boundaries within agreement. As Corbett (2000, p. 8) says: *Rather there are several different domains for agreement, related in hierarchical fashion.*

Another alternative is the property-based account of agreement, i.e. *unitary information-merging view of agreement in which the relevant structures are sets of properties associated with discourse structures* (Barlow, p. 207).

First, we suggest some generalizations over the presented in the previous section Subject-Verb patterns and thus highlight the role of the 'disagreeing' factors:

When the types of the verb forms are relevant:

- the agreement of the non-analytical verb forms in comparison with analytical verbs becomes discourse motivated, because they do not bear gender specifications. Compare:

    (5) *Dojde*
        Came-2 or 3 person; <u>m, f or n</u>
        You/he/she/it came

    (6) *Došâl e*
        Come-3 person; <u>m</u>
        He has come

When the type of the subject is relevant:
(with an unexpressed subject)

- the agreement of impersonal constructions in comparison to personal becomes syntactic and referent-independent, because of the expletive nature of the subject.
- the agreement of the *indef* personal patterns in comparison to *def* and *gen* patterns is syntactic and referent-independent, but discourse motivated, because it is antecedentless and thus is only pragmatically recoverable.

(with an expressed subject)

The expressed subject is difficult to deal with because of its non-homogeneous internal structure. Within the domain of non-coordinated structures there are some special NPs such as collectives, partitives and proper names, which are triggers for mismatches.

Hence we discuss these patterns mainly in the context of disagreement, adopting Wechsler-Zlatic's approach. As Bulgarian lacks declension types, we rely on the following reduced schema: *concord-index-semantics* (see section 2)

part-whole type mismatches

This is similar to index-semantics mismatches in Wechsler-Zlatic's theory. In this case the pure syntactic Subject-Verb agreement is preserved:

- pluralia tantum, where plural agreement refers to non-aggregate entities. Note that in Bulgarian some of the pluralia tantum items have non-pluralia tantum counterparts:

(7) *Nožicite*   *sa*   *na*   *masata.*
Scissors-the(pl)   *are*   *on*   *table-the*
The scissors are on the table.

(8) *Nožicata*   *e*   *na*   *masata.*
Scissors-the(sg)   *is*   *on*   *table-the*
The scissors are on the table.

- honorific agreement with a participle ending in -l, where the plural agreement can refer to non-aggregate entities:

(9) *Vie*   *ste*   *došli!*
You(2p,pl)   *have*(2p,pl)   *come*(pl)
You have come.

index-concord mismatches

Here the pure syntactic Subject-Verb agreement is violated:

(10) *Negovo*   *Veličestvo*   *e*   *došâl*
His(neut)   *Majesty*(neut)   *has*(3psg)   *come*(masc)
His Majesty has come

(11) *Vie*   *ste*   *pokanena!*
You(2p,pl)   *are*(2p,pl)   *invited*(fem,sg)
You are invited

set-member type mismatches

We call this type of mismatch index-concord selective power, because the agreement with the verb depends on the different behaviour of the subject group elements.

1. *Competitive patterns*: in Subject-Verb agreement the verb may agree with one or another part of the subject NP due to different reasons such as word order, NP semantics, animacy etc. Here collectives, partitives and some proper names are included.

1.1. The competitive parts of the Subject are overtly expressed.

(12) *Grupa*   *studenti*   *pristignaha.*
Group(f,sg)   *students*(pl)   *come*(aorist-pl)
A group of students arrived

(13) *Pristigna*   *grupa*   *studenti.*
Came(aorist-3,sg)   *group*(f,sg)   *students*(pl)
A group of students arrived

(14) *Čast*   *ot*   *xorata*   *dojdoxa.*
Part(f,sg)   *of*   *people-the*(pl)   *came*(aorist-pl)
Part of the people came

(15) Čast   ot   materialite   ne   e   tuk.
Part(f,sg) of   materials-the(pl)   not   is   here
Part of the materials is not here.

One suggestion we are aware of about how to deal with alternatives like this is proposed in Przepiorkowski (2000, p.8). It concerns the case agreement with numerals in predicative Polish phrases as in the following example: *Kilka drzew bylo wyrwane/wyrwanych z zemi*. It postulates the percolation of ARG-ST feature to the NPnum phrasal node in order to allow for the two possible agreement patterns - with the accusative numeral and with the genitive NP. But the same problem in Bulgarian concerns the number agreement as it is demonstrated in the above examples.

1.2. The competitive agreement patterns are due to some unexpressed part of the NP. Usually the head noun is dropped out and the proper name implicates collectiveness at different levels: summative (then the verb is singular) and distributive (then the verb is plural). The recovery of the head noun blocks the distributive possibility:

(16) *"Levski"   pobedi/pobediha.*
"Levski"   has won(3p,sg|3p,pl).
"Levski"   has won.

(17) *Futbolnijat   otbor   "Levski"   pobedi/*pobediha*
*Football-the   team   "Levski"   has won(3p,sg|*3p,pl)*
The football team "Levski" has won.

2. *Alternative patterns*: the verb agrees with one fixed part of the subject NP depending on a semantic principle (see Wechsler and Zlatic (2000, p. 16) for the formalisation of the principle). It roughly says that the indices restricted to refer to females or males have respectively feminine or masculine gender. We use the principle to predict the grammaticality of some structure types.

2.1. Vacuous satisfying of the constraint:

(18) *Grad   Veliko Târnovo   e razpoložen   na   sever.*
Town-the(masc,sg) Veliko Tarnovo   is situated(masc,sg) to   north
The town of Veliko Tarnovo is situated on the north

(19) *Veliko Târnovo   e razpoloženo   na   sever.*
Veliko Turnovo(neut,sg)   is situated(neut,sg) to   north
Veliko Tarnovo is situated on the north.

2.2 Non-vacuous satisfying of the constraint:

(20) *Major   Petrov   e   došâl.*
Major(masc,sg) Petrov(masc,sg) has   come(masc,sg)
Major Petrov has come

(21) *Major   Petrova   e   došla.*
Major(masc,sg) Petrova(fem,sg) has   come(fem,sg)
Major Petrov has come

(22) *Petrova   e   došla.*
     Petrova(fem,sg) *is*   *come*(fem,sg)
     Petrova has come

(23) *Majorat   e   došâl.*
     Major-the(masc, sg) *is*   *come*(3 p,sg,masc)
     The major has come.

but the noun in this example could refer to both - a male or a female.

3. Problematic cases:

They concern some nouns, which are gramatically masculine or feminine but refer to both sexes. Usually they are used predicatively: *Toj/tja e topmodel* ('*He/she is a topmodel*'), *Toj/tja e sekssimvol* ('*He/she is a sexsymbol*') or *Toj/tja e filmova zvezda* ('*He/she is a film star*').
When nouns like these are used non-predicatively, there is some tendency to violate the grammatical agreement and to adapt it to the sex of the referent:

(24) Topmodelât   vljazla
     Topmodel-the(masc,sg)   came(fem,sg)
     The top model came in

Such a tendency is interesting, because there are other words in the lexicon, which can refer to both sexes, but obey the grammatical agreement constraint:

(25) Žertvata   vljazla
     Victim-the(fem,sg) came(fem,sg)
     The victim came in.

(26) Čengeto   vljazlo
     Police-officer-the(neut,sg)   came(neut,sg)
     The police officer came in.

5. Agreement revisited (preliminary version)

It became clear from the previous sections that the subject-verb agreement cannot be treated in isolation to the other agreement relations. As a whole, agreement is an area, where a lot of different mechanisms interleave. For this reason, it is natural to divide it according to the nature of the agreement triggers – syntactic, semantic, pragmatic. But in our opinion the agreement relation has to be as simple as the mechanism in HPSG94 and at the same time to take into account the contribution of the different factors (as suggested in Kathol's work). The diversity of the factors might reflect in the grammar[8].
In our view there are two possible solutions to this problem:

1. A single AGREEMENT (AGR) feature, whose values represent the relevant for the agreement characteristics. Then language-specific principles have to be specified in order to ensure the specific contribution of the different factors in different agreement relations.

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[8] As it is stated in Witner,s work *HPSG does not account for agreement processes in the grammar; all other agreement constraints are listed in the lexicon* (Wintner, to appear)

Thus we propose a feature, called AGREEMENT (AGR) which is a mediator between CAT (and) INDEX[9]. AGR feature is valid for every sign taking agreement features from CAT and/or INDEX depending on different factors. Thus a local mechanism dealing with agreement is activated. Then a principle is needed to ensure the relation between inter-sign AGR features. First, we need the following general principle: *The agreement features of the subject NP are structure-shared with the agreement features of the verb*.

Secondly, we have to explicit the following facts:
- If the CONTENT of the *sign* has value *nominal object*, then the AGR feature can take the appropriate features from CAT and/or from INDEX (as INDEX feature is assigned only to nominal objects)
- If the CONTENT of the *sign* has value which is not *nominal object* (i.e. it is of type *psoa* or *quant*), then the AGR feature can take the appropriate features only from CAT. Practically this means that AGR feature=CAT feature.

2. It is possible to convert the agreement INDEX features into semantically decomposed properties as it is proposed in Barlow (1999). Shortly, it means that all the morphological agreement markers will have their semantic counterparts. For example: *number:plural = <individual>* or *<composed of individuals>*. The potential hierarchy is language-specific. Thus the problem of doubling features as number and gender could be avoided and the distinction between syntax-semantics could be explicitly kept. In the paper we will not discuss this possible analysis and leave it for further research.

Here are the possible constraints on the main subject-verb patterns in Bulgarian according to the new idea:

Unexpressed Subject-Verb pattern

We assume that the INDEX features of the unexpressed subject coincide with the CAT features of the verb and hence the AGR feature has the same values (with underspecifications for person and gender where it is needed. It is due to the syncretism of some forms which triggers intervention of the discourse factors!)

Partly expressed Subject-Verb pattern

The AGR feature of the expressed part of the subject NP is underspecified as to person or number. In this case the verb AGR feature is promoted.

Expressed Subject-Verb pattern

When the expressed NP is internally coherent (i.e. the agreement features between elements are structure-shared), the AGR feature takes the CAT features of the elements.

index-semantics mismatch

Here the CAT features are sufficient for the agreement relation. When the subject NP is pluralia tantum or is honorifically used, then the CAT features are present on the AGR feature, while the INDEX feature '*number:singular*' that shows non-aggregateness, remains in the INDEX. Thus the agreement is ensured and the information about the source of the mismatch is kept.

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[9] Similarly to DEPENDENCY list as a mediator between ARG-ST list and VAL-list. For more details see (Bouma, Malouf, Sag 2000). Such an idea is explored for Polish (to appear). There the INDEX itself serves as a mediator between the syntactic and semantic agreement. It is divided into two subsorts: agr-index and conx-agr and then appropriate constrains ensure the application of the syntactic or semantic agreement.

index-concord mismatch

In this case the INDEX features are relevant for the subject-verb agreement relation and they are present on the AGR feature, thus ensuring the compatibility between the gender and number characteristics:

index-concord selective power
- collectives, partitives, the names of some organizations license competitive AGR features (containing CAT features) of the subject NP. Additional restrictions influence the promotion of the one or the other.
- the names of the places allow for the promotion of the AGR feature of the head word 'city', 'village' etc. in the case of a two-member NP, otherwise the AGR feature of the overt part is structure-shared with the AGR feature of the verb.
- the names of professions allow for the promotion of the AGR feature of the person name in a two-member NP, otherwise the AGR feature of the overt part is structure-shared with the AGR feature of the verb.

Hence keeping the distinction between different mechanisms, we can say which of them is relevant for agreeing of the elements in a particular agreement structure.

6. Conclusion

This paper highlights the Subject-Verb relation in Bulgarian within HPSG-based framework mainly from a *Subject-NP-type* of view. It suggests informally a new treatment of agreement where a direct interaction between agreement features is ensured. After accepting the dissociation of the agreement features between syntax and semantics, we aimed at combining their force in a single AGR feature via set of principles.

The presented idea needs further fine graining as to formal mechanisms, detailed typology description and testing the aspects of its plausibility.

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