

Finiteness, Operators and Auxiliaries in North Slavic

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Abstract

The present paper is concerned with the sentence structure in modern North Slavic languages, namely Czech, Polish and Russian. Proceeding from the classical distinction between *form* and *meaning*, a system is outlined where the grammatical categories of *verbal mood* and *tense* are uniformly encoded in I°_v, while inflectional markers appearing on verb forms below IP merely reflect them. Thus, both ‘synthetic’ and ‘analytic’ structures can be given a uniform analysis. Also, the notoriously vague notion of *finiteness* receives a minimalist definition in terms of ϕ -features and argument structure. This, in turn, makes it possible to account for the differences obtaining between *operators* and *auxiliaries* which are proposed to be distinct manifestations of I°_v. As such, they provide the respective structure with a particular mood and tense semantics. However, apart from this ‘functional’ class of auxiliaries, there is yet another type to be considered which might be called ‘lexical’ as it is void of any grammatical meanings whatsoever. The relevant forms are heads of VPs in the c-command domain of I°_v which render the respective periphrastic structure finite. They either reflect the presence of some mood–tense operator or satisfy selectional requirements of some auxiliary in I°_v.

1 Introduction

Czech, Polish and Slovak, as a rule, are subsumed under “West Slavic”, while Belarusian, Russian and Ukrainian are classified as “East Slavic” – a dichotomy that indicates two subgroups with a clear dividing line in between.

West Slavic	East Slavic
Czech	Belarusian
Polish	Russian
Slovak	Ukrainian

Table 1: West Slavic vs. East Slavic.

Often, however, both groups are subsumed under “North Slavic” (cf. Hoek³1998: 31 ff.) which relies on very basic similarities between the relevant lan-

guages.¹ At the same time, they are set off against South Slavic languages which are usually also subdivided into a Western and an Eastern branch.

North Slavic		South Slavic	
western	eastern	western	eastern
Czech	Belarusian	Bosnian	Bulgarian Macedonian
Polish	Russian	Croatian	
Slovak	Ukrainian	Serbian	
		Slovene	

Table 2: North Slavic vs. South Slavic.

The present paper will show, among other things, that the subsumption under “North Slavic” is legitimate also wrt. auxiliaries and sentence structure. This, in turn, indicates a similar if not identical architecture concerning the verbal categories aspect, tense and mood.² Moreover, I suggest that North Slavic verbs rely on the same featural architecture, focussing on the (morphosyntactic) encoding of ‘finiteness’.

The paper is organized as follows: Section 2 sketches out the theoretical foundations. Section 3 sorts out the details of the particularly important notion of ‘finiteness’. Section 4 deals with periphrastic structures, introducing the distinction of two auxiliary types in North Slavic. Section 5 reveals the relation between morphological aspect marking and semantic future tense in these languages. The paper is summarized in section 6.

2 Theoretical Framework

2.1 Foundations and Goals

The primary theoretical goal of the present analysis is to adhere to both descriptive and explanatory *minimalism*. This term is meant literally in the sense that any linguistic analysis ought to propose only the minimum necessary to explain the relevant data. Accordingly, I will avoid any expendable theoretical assumptions as far as possible.

Another basic assumption builds on a claim that has been occurring in various formulations in the linguistic literature. Related analyses on North Slavic are, a. o., Paslawska & Stechow (2003), Stechow (2007a, 2007b), Zimmermann (2013), and Pitsch (2014). The key idea is that inflectional morphology (here: on verb forms) does not carry the grammatical meaning usually associated with

¹ Minor languages are omitted. The paper uses data from Czech, Polish and Russian.

² Aspect refers to ‘outer/verbal aspect’ with the values IMPERFECTIVE, PERFECTIVE, PERFECT (see Klein 1994: 108; Paslawska & von Stechow 2003: [6]). It is distinguished from ‘inner aspect’ corresponding to the ‘Vendlerian aktionsarten’ STATE, ACTIVITY, ACHIEVEMENT, ACCOMPLISHMENT (cf. Paslawska & von Stechow 2003: [8]). Mood relates to ‘verbal mood’ with the values INDICATIVE and CONJUNCTIVE. Finally, ‘sentence mood’ has the values DECLARATIVE, INTERROGATIVE and IMPERATIVE (see Zimmermann 2009).

it *itself*. Instead, it is supposed to be a mere ‘reflex’ of semantic operators = functional heads in a higher syntactic position. In other words, inflectional morphology merely “visualizes” (Stechow 2007b: 25) features and grammatical meanings which are situated elsewhere.³

The latter proposal will be of primary importance wrt. a specific class of North Slavic auxiliaries that will be called *lower auxiliaries* (cf. Pitsch 2014: 185 ff.). These are involved in periphrases such as the imperfective future tense or the participial passive. Apart from that, modal verbs are instances of lower auxiliaries, too. The present analysis will show that, in most cases, lower auxiliaries merely spell out features and, thus, ‘reflect’ grammatical meanings in the above sense. But it will also be shown that there is yet another class of auxiliaries in North Slavic. It will be called *upper auxiliaries* since the relevant items are realizations of the functional head I⁰. In contrast to lower ones, upper auxiliaries indeed have a grammatical meaning, viz. verbal mood and tense. What I am going to claim is that upper auxiliaries represent the elementary ingredients of the North Slavic *past tense* and *conjunctive mood* periphrases.

2.2 Syntactic Minimum

I start out from (1) as the syntactic minimum of North Slavic clauses:⁴

(1) CP > IP > VP

CP encodes clause type and – in main clauses – sentence mood. IP encodes verbal mood and tense. VP contains the clausal predicate with its arguments.⁵ Different from Zimmermann (2009: 486), who proposes a Mo[o]dP between CP and TP, I do not propose a specialized functional projection for verbal mood as I do not see any convincing evidence in favor of its independent representation in North Slavic. Since tense and verbal mood are closely intertwined, I propose

³ To a certain extent, Chomsky’s (1995, 2000, 2001) distinction between interpretable and uninterpretable ϕ -features also follows this idea. Accordingly, the ϕ -features of, e. g., an NP are *interpretable* since they are relevant for its interpretation. The agreeing ϕ -features appearing, e. g., on a verb are, however, *uninterpretable* as they merely double the relevant categories but do not contribute to interpretation. Whereas there can be only one interpretable feature of a particular type in a clause, there may well be more than one uninterpretable occurrences of the same feature (*Multiple Agree*; Zeijlstra 2004). Uninterpretable features must be deleted on LF. Chomsky (2001) adds that uninterpretable features enter the derivation unspecified; hence they must receive some value in the course of derivation. The latter is achieved by establishing agreement with the syntactic item bearing the interpretable feature. In other words, the interpretation of certain inflectional markers is ‘delayed’ until valuation has taken place. A similar concept of ‘delay’ can be found in Zimmermann (2003b: 642–643, fn. 1).

⁴ The inventory in (1) holds for declarative and interrogative sentences. I follow Zimmermann (2009: 490) in that IP (ModP + TP in her model) is absent in imperative sentences.

⁵ I do not share the view that external arguments are introduced by a ‘light verb’, nor that such notions as *agentivity*, *causation*, etc. are associated with v^0 . I consider both external arguments and such notions to be inherent components of verbal lexical entries (cf. Junghanns 2008).

them to be collectively represented in I^0 .⁶ No specific position concerning sentence polarity is taken up, but I suggest that a NegP is projected if the sentence is negated. Finally, I do not exclude the possibility of an articulated left periphery in the sense of Rizzi (1997) such that CP might be split into several projections. This question is, however, of no particular importance for the present investigation.

2.3 Mental Lexicon and Lexical Entries

According to minimalist lexicalist assumptions (cf. Bierwisch 1983, 1988, 1997, 2007; Wunderlich 1997; Zimmermann 1992, 2003a, 2003b, 2009), the mental lexicon is the place where lexical items (roots, stems, affixes, operators, etc.) are stored in lexical entries (LEs). Any such LE contains at least four blocks of information, namely Phonetic Form (PF), Grammatical Features (GF), Argument Structure (AS), and Predicate Argument Structure (PAS).⁷ As an example, the general format of a verbal LE is given in (2).⁸

$$(2) \quad \begin{array}{cccc} /.../ & [V,ASP\dots] & \lambda x_n \dots \lambda x_1 \lambda t \exists s & [[\tau(s) \text{ REL } t] : s \text{ INST } [x_1 \dots\dots\dots x_n]] \\ \text{-PF-} & \text{----GF----} & \text{-----AS-----} & \text{-----PAS-----} \end{array}$$

I consider (inflectional) morphology a submodule of the mental lexicon. As such, it has direct access to not yet fully inflected lexical items.⁹ Once inflection is added, GF and AS of the relevant lexical items allow syntax to properly combine them to sentences.

A very brief overview of the grammar model will finish this section: Inflected forms from the mental lexicon (morphology) serve as input for syntax.

⁶ Lehmann (2013: 256) suggests that tense implies mood: If there is a tense specification, verbal mood will be indicative. Semantically, this is reflected by the fact that topic time is related to utterance time (= tense) before the former gets existentially quantified (= verbal mood).

⁷ PAS represents the ‘invariant meaning’. The ‘two-level theory’ (cf. Lang & Maienborn 2011) distinguishes between an ‘invariant’ and a ‘pragmatic’ level of meaning. The latter involves factors such as context, world knowledge and inferences. Gutzmann (2012), a. o., suggests a third level called ‘use-conditional meaning’. In the present paper, the invariant level of descriptive meaning plays the crucial role.

⁸ In LEs, $x_1 \dots x_n$ are argument variables, t is “topic time”, and s is “situation time”. Recall that Davidson (1967) suggests that verbs have an additional argument referring to a situation in the real world. The functor INST relates s to the verbal proposition, thus linking the linguistic form and meaning of a verb with its reference (Bierwisch 1988: 23–24; 1997: 242). According to Klein (1994), verbal aspect is a relation between “situation time” and “topic time”. In establishing this relation, aspect binds the situation ($\exists s$) and introduces a topic time (λt). Note that the representation of aspect is generalized in (2). North Slavic verbs enter syntax marked and specified for aspect (cf. Pitsch 2014: 158–159). Thus, the ASP-feature in GF is always either [PF] or [IPF], whereas the relation REL in PAS is either \supseteq (IMPERFECTIVE), \subseteq (PERFECTIVE) or $<$ (PERFECT) (cf. Paslawska & Stechow 2003). This view on aspect could be called ‘temporal’. See Arregui, Rivero & Salanova (2014) as to the alternative ‘modal view’ on aspect.

⁹ Zimmermann (2003b: 630) uses the feature $[\pm\text{max}]$ to characterize the word structure level, hence to distinguish ‘non-words’ $[-\text{max}]$ from ‘words’ $[\text{+max}]$. I will adopt this in my LEs, albeit in the form of a superscript on GF.

Syntax, in turn, is a mere combinatorial device building well formed structures that yield both semantic and phonetic representations. By means of adequate interfaces, the latter are subsequently sent to ‘performance systems’ being part of the ‘language faculty in the broad sense’ (Hauser, Chomsky & Fitch 2002).

2.4 θ -Roles and Argument Realization

I suppose that the syntactic realization of verbal arguments should be separated from the assignment of θ -roles. This is in line with the broader assumption that syntax is a mere combinatorial device which is ‘blind’ to semantic notions. Thus, the fact that some verbal argument has some θ -role follows from semantics and interpretation. More precisely, a θ -role follows from the relative position of the respective argument variable within PAS. Whether some verbal argument can be realized in syntax is quite another matter. It depends on whether the respective argument also appears as a λ -bound variable in AS. In short, this means that verbal arguments receive their θ -roles from the verbal predicate irrespective of the fact if, when and where they are ultimately realized in syntax, and if the predicate itself is realized as a finite or a non-finite verb form (see also fn. 18).

3 On Finiteness

3.1 Initial Observations

The question of what it means for an inflected verb form to be finite or non-finite is of special importance for the present discussion. The reason is that periphrastic (analytic) structures consist of (at least) a finite and a non-finite verb, where the latter is the sentence predicate, while the former is some type of auxiliary. Thus, auxiliaries seem to be able to render a periphrastic structure finite. But this statement is little illuminating without a definition of ‘finiteness’.

One may start with the question whether ‘finite’ means the same as ‘to be inflected’. If ‘inflected’ is understood as synonymous with ‘to have a morphological marker’, this question has to be denied since non-finite forms *are* morphologically marked in North Slavic. An alternative view links ‘finiteness’ to the presence of a mood and tense specification.¹⁰ Undoubtedly, there is no such specification in infinitives and participles as can be seen from the Czech examples in (3).¹¹

¹⁰ More precisely, the tense specification can be an absolute one with finite forms, but at most a relative one with non-finite forms. Following Junghanns (1995: 171, 1996: 132), ‘non-finite’ means to lack a proper tense affix. However, I will argue that there is no tense morphology altogether on North Slavic finite verb forms.

¹¹ **Glosses used:** ACC – accusative; AUX – auxiliary; CONJ – conjunctive mood; F – feminine; FUT – future; GEN – gender; INF – infinitive; LA – lower auxiliary; LPT – [active] *l*-participle; M –

- (3) **no mood and tense specification** **NON-FINITE FORMS**
- | | |
|--|--|
| <p>a. psát/napsat
write-INF/PERF-write-INF
'(to) write'</p> | <p>b. psala
write-LPT-SG.F
'written' [<i>active</i>]</p> |
| <p>c. napsáno
PERF-write-NPT-SG.N
'written' [<i>passive</i>]</p> | |

By contrast, forms inflected for person and number have (or receive) such a specification (or interpretation). In combination with aspectual marking, such forms express present or future tense in North Slavic as shown in (4) and (5).¹²

- (4) **topic time AT utterance time** **PRESENT TENSE**
- | | |
|--|--|
| <p>a. píšu
write-1.SG
'(I) am writing'</p> | <p>b. píšeme
write-1.PL
'(we) are writing'</p> |
|--|--|
- (5) **topic time AFTER utterance time** **FUTURE TENSE (PERF)**
- | | |
|---|--|
| <p>a. napíšu
PERF-write-1.SG
'(I) will write'</p> | <p>b. napíšeme
PERF-write-1.PL
'(we) will write'</p> |
|---|--|

Auxiliaries in mood and tense periphrases are, in fact, also verb forms inflected for person and number. As such, they manage to 'finitize' the respective structures. It follows that it is these auxiliaries which are responsible for the mood and tense specification of the whole. This means that periphrases as the Czech ones in (6)–(8) are eventually on a par with synthetic forms as in (4) and (5).

- (6) **topic time BEFORE utterance time** **PAST TENSE**
- | | |
|---|---|
| <p>a. jsem psala
AUX_{PAST}-1.SG write-LPT.SG.F
'(I) was writing/wrote'</p> | <p>b. jste napsaly
AUX_{PAST}-2.PL PERF-write-LPT.PL.F
'(you) have written'</p> |
|---|---|
- (7) **topic time AFTER utterance time** **FUTURE TENSE (IMPF)**
- | | |
|--|--|
| <p>a. budu psát
AUX_{FUT}-1.SG write-INF
'(I) will be writing'</p> | <p>b. budete psát
AUX_{FUT}-2.PL write-INF
'(you) will be writing'</p> |
|--|--|
- (8) **proposition is IRREAL/HYPOTHETICAL** **CONJUNCTIVE MOOD**
- | | |
|---|--|
| <p>a. bych napsala
AUX_{CONJ}-1.SG PERF-write-LPT-SG.F
'(I) would write/would have written'</p> | |
|---|--|

masculine; N – neuter; NOM – nominative; NPT – [passive] *n/t*-participle; NUM – number; OP – operator; PAST – past; PERF – perfective aspect; PL – plural; PS – person; SG – singular; UA – upper auxiliary; 1/2/3 – first/second/third person.

¹² How morphological aspect is exploited to express semantic tense will be taken up below. In (4) to (7), tenses are described by relating "topic time" to "utterance time" (see Klein 1994).

- b. bychom psali
 AUX_{CONJ}-1.PL write-LPT-PL.M
 ‘(we) would (have) be(en) writing’

But can ‘finiteness’ be identified with the presence of morphological markers for mood and tense? Data show that North Slavic finite verbs are marked for person and number only. In fact, there is not one instance of explicit mood and tense markers.¹³ Forms that are usually labelled ‘present tense’ such as in (4) are, in fact, forms that are explicitly marked for person and number only.¹⁴ The same holds for the verb forms in (5) which differ from those in (4) only in that they are marked for perfective aspect.

Hence, it is still unclear what the core of ‘finiteness’ is and how it should be formalized. An apparent solution seems to be a [\pm finiteness]-feature. But this is rather *ad hoc* and amounts to a mere reformulation of the question. What I will argue for is a different view that relies on a number of rather ‘simple’ observations:

- Finite forms inflect for person and number, but not for tense and verbal mood (which indicates that mood and tense semantics originate somewhere else).
- Finite forms license a subject DP.
- Non-finite forms neither inflect for person¹⁵ nor do they license a subject DP.

These facts are illustrated in (9)–(11).¹⁶

	FINITE	NON-FINITE
(9)	a. já píšu I-NOM write-1.SG ‘I am writing’	b. * já psát (Cze) I-NOM write-INF

¹³ Explicit mood and tense markers existed in earlier stages, such as the suffixes of the aorist and imperfect tenses which certainly corresponded to tense features. It is logical to assume that, when these tenses vanished, the corresponding features vanished along with them. As a result, a ‘global preterite’ (Lehmann 2013: 416) arose which was, and still is, expressed periphrastically (it developed from an analytic perfect). I believe that this chain of events enabled (or forced) the person category to entirely assume the function of encoding ‘finiteness’.

¹⁴ Some analyses claim that there *are* morphological tense markers in North Slavic finite verbs, namely the ‘theme vowels’ (Jakobson 1948/71: 123; Panzer 1975: 116). As an example, tense is supposed to be encoded in *-i-* in Russian *nosit* ‘(s/he) carries’. But this is problematic as diachronic insights are applied to contemporary data. Jakobson’s (1948/71) approach is specifically problematic as he suggests the ‘theme vowels’ to have different ‘meanings’ in different verb forms, viz. *tense* in 1st/2nd person forms, but *number* in 3rd person forms.

¹⁵ Isačenko (1962: 279–280) claims that person is a ‘predicative’ category. He adds that number on finite verbs is no independent category but ‘bound to the content of person’. Thus, the feature hierarchy is *person* > *number*, with person being the crucial feature wrt. ‘finiteness’ (see also footnote 13).

¹⁶ These examples are VPs only. The absence of IP excludes the presence of any (phonetically empty) mood and tense auxiliaries that might render (10b) and (11b) grammatical.

3.3 Derivation

From a derivational point of view, the above analysis implies that only person (and number) suffixes allow to derive finite verb forms in North Slavic, while the attachment of all other inflectional markers creates non-finite forms. Importantly, the lack of an explicit person specification is typical of the latter. The LEs in (14a–c) all belong to the same Russian verbal lexeme RABOTAT ‘work’. They illustrate both a non-finite and a finite derivation. While the LE in (14b) represents the infinitive, the one in (14c) shows the finite 3.SG form. The mutual base for both these inflected forms is the stem entry in (14a).

- (14) a. /rabota/ [V,IPF]^{MIN} $\lambda x \lambda t \exists s$ [[$\tau(s) \supseteq t$] : s INST [x WORK]]
 b. /rabotaʔ/ [V,IPF]^{MAX} $\lambda x \lambda t \exists s$ [[$\tau(s) \supseteq t$] : s INST [x WORK]]
 c. /rabotaet/ [V,IPF]^{MAX} $\lambda x_{[3,SG]} \lambda t \exists s$ [[$\tau(s) \supseteq t$] : s INST [x WORK]]

The only difference between (14b) and (14c) lies in the absence vs. presence of a ϕ -annotation on the highest argument position. Its presence equals to ‘finiteness’, its absence to ‘non-finiteness’. Apart from that, it is worth noting that the LE of the stem in (14a) is nearly identical to the derived LE of the infinitive in (14b). The only difference is the word level which is indicated by the MIN and MAX superscripts, respectively. Thus, it is not too bold a claim to say that an infinitive is, in fact, a fully inflected verb stem which can, hence, be used in syntax.¹⁹

3.4 Infinitives vs. Participles

In (15), I summarize the differences in AS and GF discussed so far that hold between verb stems, infinitives and finite forms.

- (15) a. [V,ASP]^{MIN} ... λx ... STEM
 b. [V,ASP]^{MAX} ... λx ... INFINITIVE
 c. [V,ASP]^{MAX} ... $\lambda x_{[PS,NUM]}$... FINITE FORM

However, this list leaves open how infinitives differ from participles.²⁰ Clearly, both of them are fully inflected non-finite verb forms. But whereas infinitives are not marked for agreement, participles spell out number and gender.

My proposal is that the marking of participles differs distinctly from the one of finite verbs. While the latter spell out person and number and license the realization of a subject, the former spell out number and gender and do not license a subject DP; cf. (16).

¹⁹ This matches with Isačenko’s (1962: 346) claim that the infinitive does not express any of the ‘predicative’ categories (person, tense, mood). He claims that this is why the infinitive is often perceived as a ‘basic form’. On the other hand, its ‘emptiness’ allows it to be used in a wide range of (modal) contexts. Hence, the infinitive is versatile due to underspecification.

²⁰ Imperatives and gerunds are not considered. While the former seem to involve a special feature [IMP], the latter seem to be relators, probably (parts of) PPs (see, e. g., Růžička 1990).

- (16) person > number > gender
- | | | |
|--|--------------|--|
| | FINITE FORMS | |
| | PARTICIPLES | |

The fact that participles are unspecified for person seems to be the crucial criterion for their ‘non-finiteness’: Since a person value is needed to *license* a subject DP, participles cannot do so. All they can do is to *agree* with the subject DP in number and gender. From that I conclude that the ϕ -features of participles are part of their GF and characterize these forms as such. In other words, they are mere agreement features. By the same token, finite forms are capable of realizing a subject DP due to the fact that they are specified for person. Put differently, ϕ -features within GF are agreement features, while ϕ -features within AS are licensing features (cf., a. o., Wurzel 1984: 116; Sternefeld ³2008: 1). These insights are summarized in (17).

- (17)
- | | | | |
|----|--------------------------------|--------------------------------|-------------|
| a. | [V,ASP] ^{MIN} | ... λx ... | STEM |
| b. | [V,ASP] ^{MAX} | ... λx ... | INFINITIVE |
| c. | [V,ASP,NUM,GEN] ^{MAX} | ... λx ... | PARTICIPLE |
| d. | [V,ASP] ^{MAX} | ... $\lambda x_{[PS,NUM]}$... | FINITE FORM |

To summarize: Infinitives are, in a way, fully inflected verb stems. Participles are different in that they inflect for number and gender.²¹ What non-finite forms have in common is the inability to ϕ -annotate their highest argument position. As explained above, this is due to the fact that they do not specify person. Finite forms, on the other hand, do so. Because of that, they are able to restrict the properties of – and, thus, license – a possible subject DP.

3.5 Infinitives vs. Finite Forms

Until now, it is not yet fully clear how some selector in syntax should distinguish a finite verb from an infinitive. To illustrate the point, I repeat two LEs from (17).

- (18)
- | | | | |
|----|------------------------|--------------------------------|--------------|
| a. | [V,ASP] ^{MAX} | ... λx ... | INFINITIVES |
| b. | [V,ASP] ^{MAX} | ... $\lambda x_{[PS,NUM]}$... | FINITE FORMS |

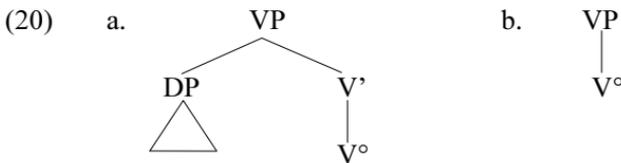
Both forms have the same GF. This would pose a serious problem if there was no further criterion allowing a possible selector to distinguish between them. But as

²¹ The difference between active and passive voice participles is AS-related. While the AS of an active participle is the same as the one of the underlying stem, the highest argument position in the AS of a passive participle has been ‘blocked’. Due to this, the relevant argument is prevented from canonical syntactic realization. Thus, the next argument in line is realized as the sentence subject (cf. Fehrmann, Junghanns & Lenertová 2010: 219–220). As regards GF, it may be necessary to have some feature(s) that allow(s) to differentiate active from passive participles (the former are selected by *upper auxiliaries*, the latter by *lower auxiliaries*). I leave this point open since it is not crucial for the present investigation.

(18) shows, there is actually a difference in AS. I propose that this difference provides a possible selector with the criterion needed. A closer look into syntax will reveal the relevant mechanism.

What the difference in AS mirrors is that a finite VP is of a different arity than a non-finite VP. In case of a finite V° , the subject DP is realized in Spec-VP due to the presence of a ϕ -annotation. By the same token, a non-finite V° cannot realize its highest argument in syntax. It follows that a finite VP such as in (19a) is built as shown in (20a), while an infinitival VP as in (19b) has the structure depicted in (20b).²² Note that Czech PRACOVAT ‘work’ is an intransitive example.²³

- (19) a. Jan pracuje
 Jan-NOM work-3.SG
 ‘Jan is working’
 b. pracovat (Cze)
 work-INF
 ‘(to) work’



Concerning arity – and taking into account the topic time variable of verbs –, this means that a finite VP as in (20a) is a *one-place predicate* since the highest argument position has already been saturated. Hence, topic time (t) is the only variable left unbound. On the other hand, an infinitival VP as in (20b) is a *two-place predicate* as its highest participant argument has not yet been realized. Thus, such a VP has two unbound variables (x and t). This difference also shows in the AS and PAS corresponding to (19a) and (19b), respectively. They are given in (21).

- (21) a. $\lambda t \exists s [[\tau(s) \subseteq t] : [\text{JAN WORK}]]$
 one-place predicate
 b. $\lambda x \lambda t \exists s [[\tau(s) \subseteq t] : [x \text{ WORK}]]$
 two-place predicate

²² According to Junghanns (1996: 132), infinitival verbal heads project their subject already in Spec-VP. It must, however, move to Spec-AgrSP (via Spec-TP) to get its case licensed. In my account, there is no Spec in non-finite VPs at all such that in periphrases, the subject DP cannot be realized until some finite auxiliary has been projected. Since I do not link the syntactic realization of verbal arguments to the discharging of θ -roles (see section 2.4), this poses no theoretical problems. However, if the latter proposal is refused, a technical alternative would be (a) to include potential auxiliary VPs and even IP into the so-called ‘thematic domain’, or (b) to assume LF-movement of non-finite V-heads into auxiliary heads such that the relevant θ -role can be locally discharged. I thank Uwe Junghanns for drawing my attention to this.

²³ Being in line with the ‘classical’ X-bar theory, the trees in (20) ff. include ‘vacuous’ projections (e. g., from V° to V' , or from V° to VP). Although more economic representations are possible (cf., e. g., Chomsky’s 1995 considerations on bare phrase structure), I adhere to X-bar primarily for ease of exposition.

How can this difference in arity serve as a criterion due to which a selector in syntax is able to distinguish between finite forms and infinitives? The key is the fact that in the course of selection, a selector does not only demand its selectee to have certain GF, but also to be of a certain arity. The selector in (22) will serve as an example. Czech, Polish and Russian share this particular variant of the functional head I° . It encodes *indicative mood* and *present tense*.²⁴

$$(22) \quad / \emptyset / [I, \text{IND}]^{\text{MAX}} \lambda P_{[V, \text{IPF}]^{\text{MAX}}} \exists t [[t \text{ AT } t^\circ] \wedge [P \ t]]$$

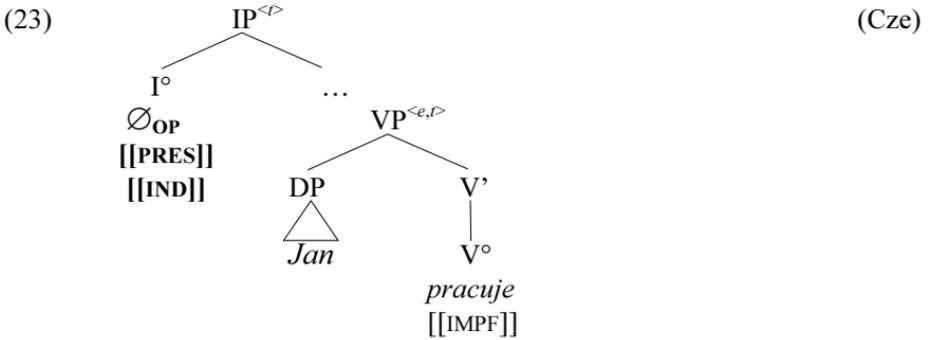
This I-head adds the semantic specification of *present tense* to “ $P \ t$ ”, i. e., to the meaning of some predicate that has some (not yet interrelated) topic time. At this point, we have to focus on AS. What we find is “ $\lambda P_{[V, \text{IPF}]^{\text{MAX}}}$ ” and “ $\exists t$ ”. The latter corresponds to *indicative mood*, saying something like ‘there is at least one topic time in the world such that ...’ (Zimmermann 2009: 486). “ λP ” is the argument position for the predicate which the topic time argument relates to. The subscript “[V, IPF]^{MAX}” determines the GF of the potential selectee. Accordingly, the I-head in (22) selects a VP headed by an imperfective verb form.

However, these selectional requirements alone do not say whether this verb form should be an infinitive or finite (recall that both share the same GF). At this point, arity comes into play. A suitable selectee of the I-head in (22) must be of the type $\langle e, t \rangle$ (*one-place predicate*).²⁵ Hence, the imperfective VP which is to be selected by (22) must have one unbound variable – no more, no less. This is λt . As a result of this selection, topic time is specified as being AT utterance time which corresponds to *present tense*. Right after, *indicative mood* is specified as λt gets bound by the existential operator.

Thus, I° in (22) is compatible with the finite VP in (19a) due to the fact that the latter is a *one-place predicate* headed by an imperfective verb. Eventually, the finite VP receives its grammatical meaning, i. e. *present tense* and *indicative mood*. This ‘reception’ is, however, an indirect process as the VP never did – and still does not – bear any grammatical meaning *itself*. Being selected by the I-head in (22), what it does is merely to reflect or ‘visualize’ the presence of the latter. This view is compatible with standard assumptions proposing I° to be the ‘home’ of verbal grammatical categories; cf. (23).

²⁴ Recall that mood and tense are collectively encoded in I° . Accordingly, I propose multiple I-heads stored in the lexicon, the content of which are the semantic components associated with the various possible mood–tense combinations (cf. Pitsch 2014: 158–166).

²⁵ This holds if “topic time” is taken to be of the entity type e . However, temporal variables are sometimes analyzed as being of a special interval type i . Then, λP in (22) would be of type $\langle i, t \rangle$. Since $\langle e, t \rangle$ and $\langle i, t \rangle$ are equally *one-place predicates*, this question is secondary.



3.6 Operators vs. Auxiliaries

The I-head in (23) is labelled an **operator (OP)**. This is to indicate that it supplies its selectee with some mood and tense semantics, but does not provide an argument slot to realize the subject DP. Recall that (22) requires finite VPs with the subject already realized. Thus, the structure in (23) is a typical ‘OP example’.

But OPs cannot be the only option due to the fact that there are not only finite, but also non-finite VPs. What we need in order to build sentences based on non-finite VPs are **auxiliaries (AUX)**. As opposed to OPs, AUXs do license the realization of a subject DP. Hence, they obviously provide a non-thematic argument slot that is equipped with a ϕ -annotation such that the highest participant argument of the non-finite verb can be canonically realized as the sentence subject.

To capture AUXs, we must return to the infinitival VP *pracovat* in (19b)–(21b). Such a VP cannot occupy the complement position of an OP. The reason is that it is a *two-place predicate*. Hence, it has one too many unbound variables. What we need is an AUX to ‘assist’ the non-finite VP in the syntactic realization of its highest argument. Taking our Czech example from (19b), a suitable candidate is, e. g., the finite modal verb *musí* ‘(s/he) must’. I propose that this inflected verb has the derived LE in (24).^{26,27}

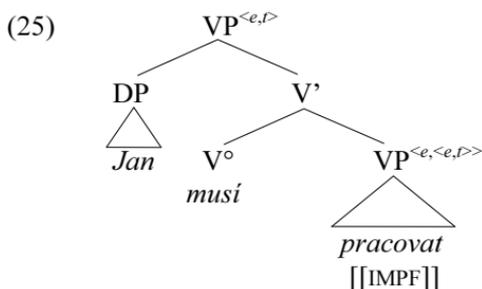
$$(24) \quad /musí/ \ [V,ASP]^{MAX} \ \lambda P_{[V,ASP]^{MAX}} \ \lambda x_{[3,SG]} \ \lambda t \ [NECESS \ [P \ x \ t]]$$

²⁶ West Slavic modals may select imperfective or perfective infinitives (cf., e. g., Błaszczak & Klimek-Jankowska 2013: 27), but are neutral wrt. aspect. Russian *moč’* ‘can’, however, seems to have an ‘aspectual partner’ *smoč’*. But as Choi (1999) shows, the two forms differ considerably wrt. interpretation and use. Thus, they seem to be separate lexemes. Yet, *smoč’* is used to express future tense which is fully compatible with the present view of how morphological aspect marking on finite verb forms is exploited to reflect semantic tense.

²⁷ From (24) onwards, underspecified features are printed in *ITALICS*. Note that the underspecified aspect feature on λP in (24) reappears in the GF of the modal. This means that the latter ‘assumes’ (or ‘agrees’ with) the aspect of the infinitive it selects.

This LE captures that the modal selects a *two-place predicate* which must be an infinitive. Additionally, a ϕ -annotation is added to the highest argument position. Due to the fact that (24) is an AUX, this position is not assigned a θ -role. From that it follows that the highest participant argument of the non-finite verb can be realized in the Spec of the AUX phrase. Semantically, *musí* adds the meaning of *necessity*. Noticeably, it merely ‘passes along’ the topic time argument of the VP. Thus, it does not add any tense or mood specification. Rather, it ‘modalizes’ the proposition and enables the canonical syntactic realization of a subject DP.

When the finite modal in (24) selects the non-finite infinitival VP in (19b), the ‘modalized’ structure in (25) arises.



The upper VP is finite (a *one-place predicate*) and imperfective (the modal takes over the aspect of the infinitive). This again means that the structure in (25) can be selected by an OP such as the one in (22). What we get is the IP in (26). Only at this level, the semantics of *indicative mood* and *present tense* have become part of the syntactic structure.

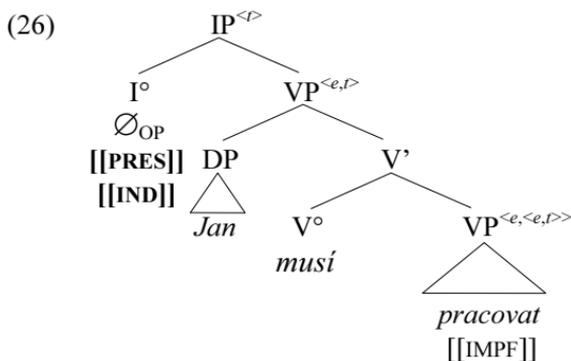


Table 3 summarizes the crucial properties of finite and non-finite VPs, respectively. Table 4, on the other hand, does the same wrt. OPs and AUXs.

Since modal verbs select infinitives, *musi* cannot immediately select the passive participle *zamieszczony* ‘located’. As a consequence, an infinitival form is inserted in order to fulfil the selectional requirements of the modal. In (29), this is achieved by the auxiliary *być* ‘(to) be’, the primary task of which is indeed to bear the infinitival marker *-ć*.³⁰

Such AUXs as the modal *musi* or the infinitive *być* are truly verbal. An important property of this AUX type is (i) its relatively ‘lower’ position in syntax and (ii) a complete inflectional paradigm as in the case of ‘normal’ verbal lexemes. Under the present approach, the inflectional markers that show up on these AUXs are as void of grammatical meaning as is the case with ‘normal’ verbs. The question is: Where, then, do these grammatical meanings originate?

My answer is that mood and tense semantics are located in I° , i. e., in an ‘upper’ position. Furthermore, I propose that I° is a phonetically empty semantic operator in the case of the ‘synthetic’ present tense and future tense, the presence of which is merely reflected by a verb form in its c-command domain. In the case of the analytic past tense and conjunctive mood, on the other hand, I propose that I° is a(n either overt or covert) finite form. Hence, what we find is yet another – ‘upper’ – type of auxiliary. It will be considered in the next section.

4.2 Two Types of Auxiliaries

The relevant syntactic heads for the present discussion are mentioned in (30).

(30)	I	V*	V
	upper	lower	NON-FINITE
	a u x i l i a r i e s		

As can be seen, verbal heads between I° and the non-finite sentence predicate (V) are labelled *lower auxiliaries* (LAs). These are opposed to *upper auxiliaries* (UAs) that are immediately situated in I° .³¹ Unlike the former, UAs do not merely add finiteness and reflect the presence of some semantic item above them. Rather, they represent a particular mood and tense specification *themselves*. Hence, UAs – being manifestations of the functional head I° – are verbal

³⁰ More AUXs are possible. Thus, the sentence in (i) includes four verb forms ‘in a row’. Here, the modal is an active participle due to the selectional requirements of the future tense AUX.

(i) Komunikat będzie musiał być zamieszczony na pierwszej stronie.

V_4 V_3 V_2 V_1

‘The communicate will have to be located on the front page.’

³¹ Two AUX types are proposed by Borsley & Rivero (1994) and Dornisch (1997) wrt. Polish. For Czech, such a distinction shows up in Toman (1980), Veselovská (1995), Kosta (2001), Skoumalová (2003). Pitsch (2014) applies it to Russian and Polish. As to terminology, Borsley & Rivero (1994) differentiate ‘lexical’ and ‘functional’ AUXs, while Kosta (2001) labels them ‘lower’ vs. ‘upper’ AUXs. Pitsch (2014) uses the terms ‘V-AUXs’ vs. ‘I-AUXs’.

mood and tense. In this respect, they match with OPs such as the one given in (22) above.

As opposed to LAs, UAs are generally clitic. Furthermore, they have person and number forms only (hence no full paradigm). Finally, they can be overt or null. In North Slavic languages, UAs are involved in the analytic past tense and conjunctive mood. These structures will be discussed in more detail below.

4.3 Past Tense

Past tense AUXs (which stem from former perfect tense AUXs) are overt in West Slavic only. In East Slavic, they are generally null. Due to their visibility in West Slavic, I will start with Czech and Polish examples.

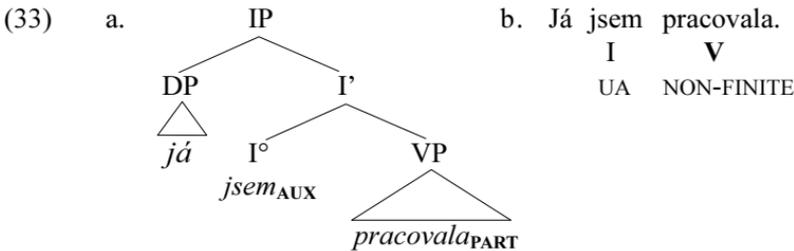
In Czech, UAs are rather easily recognizable because of their ‘independent’ orthographical representation; cf. (31).

- (31) Já **jsem** pracovala. (Cze)
 I-NOM UA_{PAST}-1.SG work-LPT-SG.F
 ‘I was working/worked.’

Note that the UA *jsem* is enclitic, and that the overt and emphatic subject pronoun *já* ‘I’ is used for presentational reasons as it allows leaving the basic word order intact. With a null subject pronoun (*pro*), the participle *pracovala* would necessarily adjoin to the enclitic UA to support it phonologically; cf. (32).

- (32) *pro* pracovala_v *jsem* t_v

Under the claim that UAs are located in I° , the example in (31) has the syntactic structure in (33a/b).



The non-finite verb form is immediately selected by the finite UA. The latter is an overt I-head. As such, it bears the semantics of *indicative mood* and *past tense*. Recall that the *present tense* example in (19a) above had almost the same structure, except for the fact it involved an OP in I° that selected a *finite* verb form; cf. (34) as opposed to (33b).

- (34) ∅ Jan pracuje
 I V
 OP FINITE

Both cases have in common that the element in I° bears the semantics of mood and tense. But as (34) shows, an OP has nothing to do with the realization of the subject DP. In fact, it does not have to be involved since the subject DP has been realized in Spec-VP already. On the contrary, an UA is responsible for the syntactic realization of the subject DP by providing a non-thematic argument position equipped with a ϕ -annotation. Hence, the Czech past tense UA *jsem* has the LE given in (35).³²

$$(35) \quad /sem/ [I,IND]^{MAX} \lambda P_{[V,ASP,SG]^{MAX}} \lambda x_{[1,SG]} \exists t [[t < t^\circ] \wedge [P x t]]$$

Since both UAs and OPs in I° have mood and tense semantics, the VP selected by them is void of grammatical meaning. In fact, it contains nothing more than the descriptive meaning of the verbal lexeme and possible argument expressions.

The Polish equivalent of the Czech *past tense* in (33) is given in (36). Note that this particular example has an ‘archaic’ flavour due to the position of the clitic UA *-m* directly after the subject pronoun *ja* ‘I’.

$$(36) \quad \begin{array}{c} ja_m \quad pracowała \\ \quad \quad I \quad \quad V \\ \quad \quad UA \quad NON-FINITE \end{array} \quad (Pol)$$

Much more common is the word order shown in (37), where the *l*-participle has adjoined to I° in order to ‘host’ the clitic UA.

$$(37) \quad ja \quad pracowała_{V_m} \quad t_V$$

Yet more unmarked is the sentence in (38) with *pro*. It is the exact Polish equivalent of the Czech sentence in (32) above.

$$(38) \quad pro \quad pracowała_{V_m} \quad t_V$$

The LE of the Polish past tense UA *-m* is, hence, the one given in (39).

$$(39) \quad /(\epsilon)m/ [I,IND]^{MAX} \lambda P_{[V,ASP,SG]^{MAX}} \lambda x_{[1,SG]} \exists t [[t < t^\circ] \wedge [P x t]]$$

It should be noted that Franks & Bański (1999) claim the Polish markers involved in the past tense and in the conjunctive mood (see next section) to be ‘schizophrenic’.³³ Accordingly, these markers oscillate between syntax (auxiliaries) and morphology (inflectional suffixes). Transferred into the present model, this would mean that they could either be merged as UAs in I° , or that they could be suffixes on the sentence predicate in V° . The former version is illustrated in (40a), while the latter one is depicted in (40b).

³² Note that the number feature on λP and λx is the same. Eventually, this causes the *l*-participle to agree with the subject expression. Furthermore, the aspect feature on λP is underspecified. Consequently, the *l*-participle may be either imperfective or perfective.

³³ Franks & Bański (1999) claim that person agreement should be separated from the marking of tense and mood. Although I reject this, the authors’ concentration on person agreement remarkably parallels my claim that person is the crucial category in encoding ‘finiteness’.

- (40) a. \mathbf{m}_I pracowała (UA)
 $UA_{PAST-1.SG}$ work-LPT-SG.F
- b. \emptyset_I pracowałam \mathbf{m}_V (suffix)
 OP_{PAST} work-LPT-SG.F-1.SG
 ‘I was working/worked’

As should be clear by now, I completely agree with the former view according to which *-m* (like all other past tense markers) is an UAs in I° which selects a non-finite *l*-participle. The assumption of the latter view saying that *-m* could also be an inflectional suffix on the verb in V° would effectively mean that one needs to propose two separate LEs for *-m*, namely one to capture the UA, i. e. (39), and another one to capture the suffix. Apart from that, one would have to accept that in the case of past tense, I° could either be an overt UA as shown in (40a) or a covert OP as indicated in (40b). Since such additional assumptions would enlarge the lexicon, they should be avoided for the sake of minimalism as far as possible. I claim that the latter can indeed be done by analyzing forms as in (40b) in quite the same way as the ones in (40a), hence by assuming that *-m* is *always* an UA. Then, the order in (40b) is a mere variant of (40a). It arises due to the adjunction of the *l*-participle to the UA in I° . See (38) above for the latter analysis.

To conclude, I suppose that it is unnecessary to assume a ‘schizophrenic’ or ‘twofold’ nature of the Polish past tense markers as suggested by Franks & Bański (1999). Instead, I claim that their varying syntactic positions follow from movement (at PF) due to their cliticity.

I mentioned above that past tense UAs are overt in West Slavic. There is, however, one exception, namely the third person forms which are generally null. Polish and Czech examples are mentioned in (41a/b).

- (41) a. ona \emptyset pracowała (3.SG) (Pol)
 b. ony \emptyset pracowały (3.PL) (Cze)
 I V
 UA NON-FINITE

These null UAs must be specified as 3.SG and 3.PL; cf. the LEs in (42a) and (42b), respectively.

- (42) a. $/\emptyset/ [I,IND]^{MAX} \lambda P_{[V,ASP,SG]}^{MAX} \lambda x_{[3,SG]} \exists t [[t < t^\circ] \wedge [P x t]]$
 b. $/\emptyset/ [I,IND]^{MAX} \lambda P_{[V,ASP,PL]}^{MAX} \lambda x_{[3,PL]} \exists t [[t < t^\circ] \wedge [P x t]]$

These two LEs can be conflated into a single one if the number feature within the φ -annotation is taken to be underspecified; cf. (43).

- (43) $/\emptyset/ [I,IND]^{MAX} \lambda P_{[V,ASP,NUM]}^{MAX} \lambda x_{[3,NUM]} \exists t [[t < t^\circ] \wedge [P x t]]$

Being specified wrt. φ -features is the crucial property of UAs as opposed to OPs; see, e. g., the OP in (34) above which is completely unspecified.

UAs may also co-occur with (multiple) LAs in the same clause. This is illustrated by the authentic Czech example in (44).³⁴

- (44) [O]bec \emptyset musela být zobrazena na jednom mapovém listě. (Cze)
 I V V V
 U A N O N - F I N I T E
 ‘The community had to be depicted on one map sheet.’

As already mentioned, null past tense UAs are restricted to the third person, thus presenting an ‘exception’ in West Slavic. By contrast, past tense UAs are *always* null in East Slavic. Hence, they must be completely underspecified as regards the ϕ -features person and number; cf. (45).

- (45)
- | | | | | | |
|----|-------------------------|-----------------------|-------------------------|----------------------|------|
| | SG | | PL | | |
| a. | ja | \emptyset rabotal/a | d. my | \emptyset rabotali | 1.PS |
| b. | ty | \emptyset rabotal/a | e. vy | \emptyset rabotali | 2.PS |
| c. | on/a | \emptyset rabotal/a | f. oni | \emptyset rabotali | 3.PS |
| | I | V | I | V | |
| | U A N O N - F I N I T E | | U A N O N - F I N I T E | | |

Thus, it suffices to have only one single LE. Due to the underspecified ϕ -features it captures all possible occurrences of the East Slavic (Russian) past tense UA:

- (46) $/\emptyset/$ [I,IND]^{MAX} $\lambda P_{[V,ASP,NUM]^{MAX}} \lambda x_{[PS,NUM]} \exists t [[t < t^{\circ}] \wedge [P x t]]$

The fact that East Slavic past tense is – at the surface – represented by *l*-participles only has given rise to the ‘tradition’ of describing it as a synthetic form. But this leads to problems wrt. the description of conjunctive mood. The problem is that the latter involves *l*-participles, too, while it is obviously an analytic structure since its second distinctive part is the *by*-AUX (see next section). Thus, if past tense would really be synthetic, the *l*-participles occurring in it would necessarily be quite different from the ones appearing in conjunctive mood.³⁵

It is much more plausible to have uniform *l*-participles in both structures. Thus, the differences must originate somewhere else. I propose that the relevant location is I^o which can be occupied by different UAs. This is consonant with the proposal of an underspecified past tense UA in East Slavic as shown in (46). Since this UA bears the semantics of *indicative mood* and *past tense*, the

³⁴ Šnebergerová, Hana (2006): Kontrola homogenity přesnosti a výskytu hrubých chyb na katastrálních mapách v sáhovém měřítku porovnáním s digitálním ortofotem. Univ. Plzeň, p. 28.

³⁵ In fact, two fundamentally different ‘*l*-forms’ would be needed, namely (i) a non-finite *l*-participle for conjunctive mood, and (ii) a finite past tense *l*-form. According to the present account on finiteness, the latter would ϕ -annotate its highest argument position, but different from ‘normal’ finite forms with number and gender. As a consequence, this view would imply the existence of two types of agreement in East Slavic (NB not in West Slavic!). An analysis proceeding from uniform *l*-participles and two types of UAs seems far more economic and can be applied to North Slavic as a whole.

l-participle can be treated as being void of any grammatical meaning whatsoever. As such, it can occur in another periphrastic structure, i. e. conjunctive mood, without any problem.

4.4 Conjunctive Mood

The latter analysis implies that there are particular UAs for conjunctive mood. Since all of them share the stem *by-*, I will call them *by*-UAs. In Czech and Polish, they inflect for person and number. As a rule, they resemble past tense UAs in selecting *l*-participles; cf. (47).

- (47) a. *já_bych pracovala* (Cze)
 b. *ja_bym pracowała* (Pol)
 I V
 UA NON-FINITE
 ‘I would (have) work(ed)’

The LEs of the conjunctive UAs occurring in (47a–b) are formulated in (48a–b), respectively. The conjunctive semantics is adopted from Zimmermann (2013).³⁶

- (48) a. */bych/* [I,CONJ]^{MAX} $\lambda P_{[V,ASP,SG]}^{\text{MAX}} \lambda x_{[1,SG]} \exists t [P x t]$ (Cze)
 | $\neg[\wedge \exists t [P x t] \cap M_{EP} u]$
 b. */bym/* [I,CONJ]^{MAX} $\lambda P_{[V,ASP,SG]}^{\text{MAX}} \lambda x_{[1,SG]} \exists t [P x t]$ (Pol)
 | $\neg[\wedge \exists t [P x t] \cap M_{EP} u]$

In Polish subordinated clauses, an impersonal variant of the *by*-UA co-occurs with infinitives; cf. (49). I suppose that this is due to the ‘needlessness’ of agreement in impersonal contexts. Since an infinitive is not marked for agreement, it perfectly fits here. Thus, both the impersonality of the *by*-UA and the non-agreeing infinitive correspond to the lack of a ‘true’ (identifiable) subject.³⁷

- (49) ... *że_by pracować* (Pol)
 I V
 UA NON-FINITE
 ‘... (in order) to work’

³⁶ Zimmermann (2013: 225) claims that conjunctive mood amounts to a presupposition that says that the indicative proposition is not part of the modal subject’s (u) epistemic model (M_{EP}). The presupposition is noted in the second line of (48a) and (48b), respectively. If needed, a conditional reading is brought about by a special semantic template (Zimmermann 2013: 225). Note that since the meaning of conjunctive mood does not specify tense, the only source from which temporal relations can be deduced is the context.

³⁷ *Że* ‘that’ in (49) occupies C° . If C° is filled, the enclitic *by*-UA obligatorily adjoins to it (at PF).

This impersonal variant of the *by*-UA has the LE in (50).³⁸ (It must be noted that Czech lacks this particular variant.)

- (50) /by/ [I,CONJ]^{MAX} $\lambda P_{[V,ASP]^{MAX}} \lambda x \exists t [P x t]$ (Pol)
 $|\neg[\wedge \exists t [P x t] \cap M_{EP} u]$

East Slavic again differs from West Slavic in that its conjunctive UAs have the invariable phonetic form *by*. In other words, they do not overtly inflect for person and number; cf. (51a–c).

- (51) a. ja{_{by}} rabotala{_{by}} (1.SG)
 ‘I would (have) work(ed)’
 b. ty{_{by}} rabotal{_{by}} (2.SG)
 ‘You would (have) work(ed)’
 c. oni{_{by}} rabotali{_{by}} (3.PL)
 ‘They would (have) work(ed)’

Hence, in analogy to the past tense UAs discussed in the preceding section (see (46)), it seems legitimate to propose only one single underspecified LE for the *by*-UA in East Slavic (Russian); cf. (52).

- (52) /by/ [I,CONJ]^{MAX} $\lambda P_{[V,ASP(NUM)_\alpha]^{MAX}} \lambda x_{([PS,NUM)_\alpha]} \exists t [P x t]$ (Rus)
 $|\neg[\wedge \exists t [P x t] \cap M_{EP} u]$

The coindexed bracketed features within the annotations on λP and λx also allow for the impersonal use of this UA (with ‘ α ’ having the value ‘+’). Much like in Polish, impersonal subordinated clauses occur in East Slavic, too. The Russian example in (53) is fully analogous to the Polish one in (49) above.

- (53) ... čto_{by} rabotať (Rus)
 I V
 UA NON-FINITE
 ‘... (in order) to work’

Noticeably, Zimmermann (2013: 224–225) offers an analysis wrt. the Russian conjunctive marker *by* which says that it can either be a verbal suffix or a mood ‘particle’ in syntax. This is quite similar to what Franks & Bański (1999) propose wrt. the Polish person agreement markers (see preceding section). In short, Zimmermann (2013) assumes that there are two LEs for Russian *by* which are cited in (54a) and (54b) (I omit secondary details).

- (54) a. /by/∅/, C/XP__ ; +Mod[...] (Zimmermann 2013: 225, (27))
 b. /by/, V__ ; [...] (ibid., (28))

³⁸ I suppose that λx is eventually bound by default. In syntax, this may correspond either to the presence of PRO or to the complete absence of any subject expression. (I prefer the latter view.) Whatever the case may be, the parametric variable x or PRO must receive some reference, which is to be achieved by semantic or syntactic Control, respectively.

Whereas (54a) represents a syntactic item of the category [+Mod] (corresponding to [I,CONJ] in my model), the LE in (54b) is an inflectional marker to appear directly on some verb form. Note that (54a) has two PF variants: it may either be overt (*by*) or null (\emptyset). Noticeably, Zimmermann supposes that the inflectional marker in (54b) only shows up if the zero variant of (54a) is chosen. If, on the other hand, (54a) is overtly realized as *by*, there is no need for (54b) at all.

Obviously, the latter scenario matches with my view that *by* is an UA in I° that selects an *l*-participle. However, the former proposal would imply the presence of a covert conjunctive OP in I°. This OP would necessarily have to be reflected by some inflectional marker on the verb which would be *by* in this specific case. So, just as in the case of Franks & Bański's (1999) 'schizophrenic' approach discussed in the preceding section (see (40a/b)), Zimmermann's (2013) proposal amounts to two possible variants of realizing conjunctive mood in Russian:

- (55) a. **by**_I rabotala (UA)
 UA_{CONJ}[-PS.NUM] work-LPT-SG.F
- b. \emptyset _I rabotala**by**_V (suffix)
 OP_{CONJ} work-LPT-SG.F-CONJ[-PS.NUM]
 'she would (have) be(en) working'

Since Zimmermann's (2013) analysis is nearly identical to the one of Franks & Bański (1999), I believe that it should be rejected due to the same reasons. Instead of assuming two separate LEs for *by* (and thus expand the lexicon) and proposing distinct syntactic structures as in (55a/b), it is far more economic to confine oneself to the structure in (55a) with *by* being an UA. The variant in (55b) is, then, derived from the latter by adjoining the *l*-participle to the UA; cf. (56).

- (56) rabotala_Vby_I t_V

To sum up, I claim that a 'schizophrenic' approach to North Slavic past tense and conjunctive mood markers is dispensable. Both can be given a uniform analysis by treating them as (finite) UAs located in I° selecting *l*-participles. This view is not merely compatible with my basic theoretical assumptions as regards the relation between syntax, morphology and semantics, but is also minimalist in the sense that it allows not to expand the mental lexicon.

The next section will focus on the relation of perfective aspect marking and the expression of semantic future tense in North Slavic. For that, we need to return to finite verb forms inflected for person and number.

5 Morphological Aspect and Semantic Tense

The following example and analysis is repeated from (19a)/(34).

- (57) Ø Jan pracuje (Cze)
 I V = (34)
 OP FINITE
 ‘Jan is working’

As discussed above, the semantics of *indicative mood* and *present tense* are encoded in the OP located in I°, while the finite verb is void of grammatical meaning. Thus, the lower VP contains the descriptive meaning and verbal arguments only.

In order to express the situation in (57) as something to occur in the future, a finite form of a lower auxiliary (LA) is needed. In (58), this LA is *bude* ‘will’.

- (58) Jan bude pracovat. (Cze)
 Jan-NOM LA_{FUT}-3.SG work-INF
 ‘Jan **will** be working.’

The same holds wrt. Russian and Polish as demonstrated in (59) and (60).

- (59) a. Ivan rabotaet. (Rus)
 Ivan-NOM work-3.SG
 ‘Ivan is working.’
 b. Ivan budet rabotať.
 Ivan-NOM LA_{FUT}-3.SG work-INF
 ‘Ivan **will** be working.’
- (60) a. Jan pracuje. (Pol)
 Jan-NOM work-3.SG
 ‘Jan is working.’
 b. Jan będzie {pracować/pracował}.
 Jan-NOM LA_{FUT}-3.SG work-INF work-LPT-SG.M
 ‘Jan **will** be working.’

As (60b) shows, imperfective future tense in Polish has two variants which are freely interchangeable as regards interpretation. It may either contain an infinitive or an *l*-participle.³⁹ Czech and Russian, on the other hand, admit infinitives only.

But to explain the mechanism on which the future tense LA works, we must turn to examples with telic verbs, since atelic lexemes such as WORK (a Vendlerian *activity*) can only be marked with imperfective aspect in North Slavic (cf.

³⁹ As a rule, if a modal verb intervenes between the future tense LA and the infinitival predicate, it assumes the form of an *l*-participle in order to avoid serial infinitives; cf. (i).

(i) Jan będzie musiał pracować. (Pol)
 Jan-NOM LA_{FUT}-3.SG must-LPT-SG.M work-INF
 ‘Jan will have to work.’

Panzer 1975: 137). The telic examples in (61a–c) are more insightful as they can have both aspect forms.

- (61)
- | | | | | | |
|----|---------|--------------------------------------|----------|----------|----------------------|
| a. | Jan | čte | | knihu. | (Cze) |
| | Jan-NOM | read-3.SG | | book-ACC | |
| | | ‘Jan is reading a book.’ | | | PRESENT TENSE |
| b. | Jan | bude | číst | knihu. | |
| | Jan-NOM | LA _{FUT} -3.SG | read-INF | book-ACC | |
| | | ‘Jan will be reading a book.’ | | | FUTURE TENSE (IMPF.) |
| c. | Jan | přečte | | knihu. | |
| | Jan-NOM | PERF-read-3.SG | | book-ACC | |
| | | ‘Jan will read the book.’ | | | FUTURE TENSE (PERF.) |

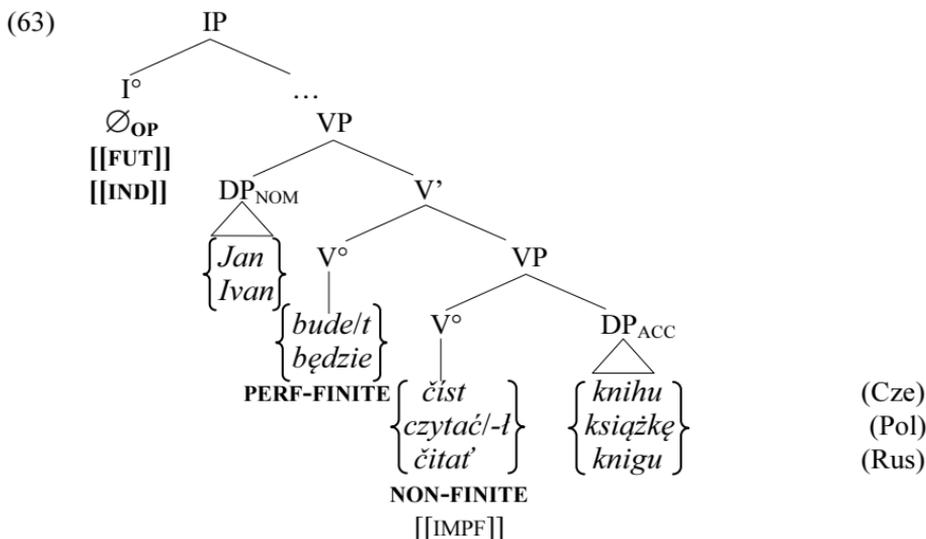
While the imperfective future tense with the LA *bude* in (61b) is similar to the one in (58), the example in (61c) shows how a finite verb form marked for perfective aspect is used to express future tense in North Slavic. My hypothesis is that morphological aspect on finite North Slavic verbs ‘reflects’ the presence of semantic tense in a higher syntactic position (cf. Paslawska & Stechow 2003). From the preceding argumentation it follows that this position is I°. By analogy to present tense sentences as in (61a), perfective future tense examples as in (61c) involve a functional element in I° that bears the semantics of *indicative mood* and *future tense*. In (62), this proposal is schematized for Czech, Polish and Russian.

- (62)
-
- IP
- I°
- ∅_{OP}
- [[FUT]]
- [[IND]]
- VP
- DP_{NOM}
- {Jan, Ivan}
- V°
- {pře-čte, prze-czyta, pro-čtět}
- PERF-FINITE
- [[PERF]]
- DP_{ACC}
- {knihu, książkę, knigu}
- (Cze)
- (Pol)
- (Rus)

The FUTURE-OP in I° selects finite forms marked for perfective aspect. That this selection relies both on the GF and on the arity of the basic VP has been shown in the preceding sections. It is easy to see that the FUTURE-OP differs from the PRESENT-OP only in that it requires perfective verbs. Eventually, the sentence in (62) expresses *indicative mood*, *future tense* and *perfective aspect*.

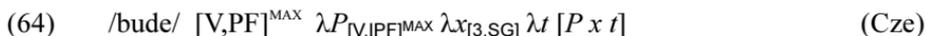
Now we can return to the imperfective future tense in (61b). As mentioned, it involves a LA with the stem *bud-* (Czech, Russian) or *będ-* (Polish). This LA

selects a non-finite form (infinitive in Czech and Russian; infinitive or *l*-participle in Polish). Since the emerging analytic structure receives a future interpretation just as the synthetic structure in (62), I claim that it contains the same FUTURE-OP. Since the latter selects perfective finite verb forms, the straightforward conclusion is that the LA is equipped with a perfective aspect feature ([PF]); cf. (63).



Thus, the task of the intervening LA is to add a perfective aspect feature.⁴⁰ Note that the sentence is semantically imperfective as the infinitive (*číst* ‘read’) is the only verb form that has *semantic* aspect. Thus, the FUTURE-OP in I° is part of this derivation thanks to the presence of the LA and its feature [PF], while the semantic aspect of the basic VP is left unchanged. As a result, such a sentence expresses *indicative mood, future tense and imperfective aspect*.⁴¹

Following these observations, it is possible to formulate a LE for the future LA. The Czech example *bude* in (61b) has the derived LE in (64).



Note that apart from PF, all components of this LE are also valid for the Russian counterpart *budet* occurring in example (59b). As can be seen from the annota-

⁴⁰ Migdalski (2012), a. o., proposes that the Polish *będ*-AUX is also semantically perfective. While this might have been the case in earlier times, it cannot be true wrt. modern North Slavic languages. Effectively, this would mean that any future tense is perfective.

⁴¹ This view is supported by Franks (1995: 283, fn. 24) as he calls for a “proper understanding of the relationship between grammatical aspect and extensional aspect. Roughly speaking, the imperfective extensional properties of *był* derive from its intensional stativity, despite the fact that it is grammatically perfective.” The position is taken up by Błaszczak (2014: 12) who claims that Polish “*być* has semantic properties characteristic of an imperfective verb, but from the grammatical/morphological point of view it behaves as a perfective verb.” It should be noted, however, that I do not claim all the forms of *był/być* to be grammatically perfective but only the *budł/będ*-forms. Moreover, I propose them to be mere auxiliaries without any lexical content at all.

tion on λP , *bude(t)* selects infinitival imperfective VPs. On the other hand, the GF mark *bude(t)* as perfective. Furthermore, *bude(t)* is finite. The latter two properties mean that *bude(t)* can be selected by the FUTURE-OP in I° . Finally, (64) shows that *bude(t)* does not alter the content of the selected VP, i. e., it does not add temporal or aspectual specifications. Importantly, though, this finite LA φ -annotates the highest argument position from which it follows that a subject DP can be realized in the Spec position of the *bude(t)*-VP.

As indicated above, the ‘same’ future tense LA can select both infinitives and *l*-participles in Polish. Hence, the Polish future LA *będzie* from (60b) must have the slightly differing LE shown in (65).

(65) /bēde/ [V,PF]^{MAX} $\lambda P_{[V,IPF(SG)]^{MAX}}$ $\lambda x_{[3,SG]}$ λt [*P x t*] (Pol)

The bracketed φ -features on λP allow to choose an infinitive or an *l*-participle. If the latter is chosen, its number feature must agree with the one of the subject DP.

6 Summary

The present investigation confirms the ‘classical’ split between a lexical and a functional domain within sentence structure. This split is reflected in the view that grammatical meanings are located in IP and CP. Anything below this level (VPs) represents descriptive meaning only; cf. (66).⁴²

(66) [CP [IP [VP*]]]
 GRAMMATICAL MEANING *descriptive meaning*
 (MOOD–TENSE) [incl. ASPECT]

This general split also shows in the existence of two distinct types of auxiliaries in North Slavic: While *upper auxiliaries* in I° have mood and tense semantics, *lower auxiliaries* are void of grammatical meaning. They spell out morphosyntactic features and may add finiteness.⁴³ Equally, inflectional morphology on verb forms in the lexical domain is void of grammatical meaning. Much like *lower auxiliaries*, it should be regarded as a mere reflex of the presence of items that really have grammatical meaning. Such items are part of the functional domain.

Furthermore, the present investigation, which has been conducted on the basis of data from Czech, Polish and Russian, has lead to the following insights:

⁴² It should be noted that modality is the lexical meaning of modal verbs which is reflected here by their representation as verbal heads. As regards verbal aspect, North Slavic verbs are specified for it when entering syntax. Hence, aspect, even if seen as a ‘grammatical’ category, originates in the lexicon, not in syntax.

⁴³ Stechow’s *Auxiliarprinzip* says effectively the same, although its validity is restricted to LAs: “Jedes Auxiliar (Hilfsverb) ist semantisch leer, hat aber ein Merkmal, das einen koverten Operator [...], der in seinem Spezifikator steht, sichtbar macht.” (Stechow 2007b: 41) [‘Any auxiliary is semantically vacuous, but has a feature reflecting a covert operator in its specifier’].

'Finiteness' amounts to the capability of verb forms to assign their highest participant argument position ϕ -features. This capability follows from the attachment of a person–number suffix. As a consequence of such a ϕ -annotation, a subject DP can be realized in syntax.

Φ -features may comprise person, number and gender. The difference between finite verbal forms, on the one hand, and non-finite verbal forms, on the other hand, is that the former spell out person and number, while the latter do not specify person, but spell out number and gender.⁴⁴

Apart from that, North Slavic present, future and past tenses as well as conjunctive mood have been given precise morphosyntactic analyses. Thus, it was shown that present tense and the (imperfective and perfective) future tense are equally based on *operators* located in I° , the presence of which is reflected by appropriate inflectional markers (including aspect morphology) on the inflected verb form in V° (which is a *lower auxiliary* in the case of imperfective future tense). On the other hand, both past tense and conjunctive mood involve (finite) *upper auxiliaries* in I° which require the form in V° to be an *l*-participle (or an infinitive).

I suggest that the traditional distinction between 'synthetic' (one verb form) and 'analytic' (more than one verb form) structures should be reformulated against the background of these insights. While 'synthetic' structures involve an *operator* in I° , 'analytic' structures have an *upper auxiliary* in the same position. Importantly, mood–tense semantics is encoded in I° in both cases, such that they differ only as regards their 'form' (morphosyntax), but not (the location of) their 'meaning' (semantics). It must be noted that structures involving *lower auxiliaries* assume an intermediate position insofar as they are based on *operators* in I° (hence being 'synthetic' in the above sense), while consisting of more than one verb form (traditional grammars would call them 'analytic'). Within the present model, these differences turn out to be merely superficial following from the point at which 'finiteness' comes into play thanks to the addition of a ϕ -annotation. The latter process can take place in the lexical or in the functional domain of the syntactic tree, hence either within some VP or in IP.

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⁴⁴ Personal pronouns of the 1st and 2nd person are an interesting exception as they pattern with finite verbs in spelling out person and number. Thus, they could be viewed as 'externalized' person–number suffixes.

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