Verb prefixation of the Slavic type in terms of concord and relativization

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1. Introduction

The empirical base of this paper is the system of verb prefixes in Slavic languages, with a focus on Serbo-Croatian (S-C). The paper especially targets the asymmetries between the so-called external and internal (or superlexical and lexical) prefixes, but it eventually proposes a general analysis for the verbal prefixation in S-C.

Analyses offered in the literature so far form two groups: 1) one in which the two classes of prefixes are generated in two distinct functional projections, and where the asymmetries among the two classes of prefixes are derived from this structural and categorial difference (e.g. Svenonius 2004, Di Sciullo & Slabakova 2005) and 2) a group of accounts in which all prefixes are generated in the same functional (or lexical) projection, and their interpretive and (morpho-)syntactic differences stem from the syntactic context in which they appear, especially from the type of complement they take (e.g. Arsenijević 2007a, Žaucer 2009, 2010a). I present a novel analysis with a broader empirical coverage and fewer theoretical assumptions, in particular with a lower number of functional projections involved. The analysis employs an existing mechanism: that of relativization, fed with functional categories from the verbal domain. At the theoretical side, the paper makes three fundamental contributions. One relates to the notion of relativization. It has been argued that a number of constituents next to the traditional relative clauses of the nominal domain should also be analyzed as relative clauses. Such arguments have been put forth in respect of temporal and spatial modification clauses (Geis 1970, 1975, Larson 1987, Demirdache and Uribe Etchebarria 2004, Dubinsky and Williams 1995), conditional clauses (Geis 1985, Lycan 2001, Bhatt and Pancheva 2006, Arsenijević 2009a, Tomaszewicz 2009, Haegeman 2010b), complement clauses (Arsenijević 2009b, Manzini and Savoia 2003 and their subsequent work, Polinsky and Caponigro 2008, Haegeman and Urögdi 2010a,b, 1994 and Aboh 2005, Krapova 2010) and DPs (among others, Campbel 1996, Koopman 2003, 2005). While temporal and conditional clauses are relative clauses of the CP domain, and complement clauses appear in domains of different categories, this paper is the first, to the best of my knowledge, to introduce relativization to the domain of the verb (i.e. VP, or AspP). The second theoretical contribution takes Kayne's (2009) argument that lexical nouns do not take complements one step further, establishing a view in which none of the cross-linguistically core content words: nouns and verbs can have a complement. This is done by offering an analysis in which the lexical verb bottoms its entire syntactic domain (and projects the entire *v*P). The third contribution is in formulating a hypothesis that relativization is the process that facilitates all the instances of type recursion in grammar. This hypothesis is obviously confirmed by regular relative clauses, and also finds support in the works cited above in respect of categorial domains of relativization for other type-recursive configurations such as complement clauses, conditional clauses, temporal and spatial modification clauses. It is also backed by the works such as de Vries (2002: 305-346) for possessives and the likes. This paper advances a view in which even domains of type recursion which at the first sight do not resemble relativization – such as verb prefixation – plausibly involve exactly the same strategy.

In Section 2, I present major syntactic and semantic asymmetries between the so-called internal and external prefixes, and a class of analyses that has been taken as standard: the one using two distinct syntactic positions for the two classes of prefixes. Section 3 points at some serious problems for such an analysis, and presents an alternative class of analyses, in which both types of prefixes are generated in the projection of the predicate of result, the difference being that internal prefixes take nominal complements, while external prefixes take complements headed by a verb; the section ends with a discussion of some advantages, but also of some problems for this class of accounts. Section 4 presents a novel analysis in terms of concord and relativization, in which prefixes are markers of agreement

between the verb and the element providing a bounding predicate (i.e. the result predicate), triggered by the local aspectual operator, which moves higher up to take the right scope and establish the relevant relation with the variables that it binds. Section 5 concludes.

2. External vs. internal: asymmetries and some common traits

Slavic verbs are characterized by a rich system of prefixes, and by systematic aspectual effects correlating with prefixation. With a few exceptions, each of these prefixes corresponds, both semantically and morphologically, to a preposition.[1] Slavic verbs form two aspectual classes: the imperfective and the perfective class. Membership in these classes determines a number of semantic, morphological and syntactic properties of the verb, such as the verb forms (tenses and moods) that can be made of it, or the tense related interpretations that eventualities described by them can receive. Although there are exceptions to this rule (see e.g. Borik 2011), in principle, if an imperfective verb is added a prefix, it becomes perfective.

Over the last ten years, a lot of theoretical work in the field of aspect has addressed the issue of internal vs. external Slavic verb prefixes (the terms, to my knowledge, originate from Slabakova & Di Sciullo 2005), which are also referred to as lexical and superlexical prefixes (Svenonius 2004); for more on the issue, see among others Romanova 2004, 2007, Gehrke 2005; also see Verkuyl 1972, Travis 1991, Smith 1991 for more general outlines of the syntax of aspect. Main characteristics of the two classes of prefixes have been argued to include the following (see Svenonius 2004, Romanova 2004, 2007, Žaucer 2009, 2010a):

A) internal prefixes contribute a resultative component to the interpretation of the verb – when there is a goal phrase in the VP, the preposition heading it will (tend to) be the one corresponding to the internal prefix, as illustrated in (1b);[2] the contribution of the external prefixes is rather related to the quantity of the eventuality (and of its incremental theme), as in (1c).

B) external prefixes can stack, unlike the internal ones (i.e. at most one prefix of a verb can be internal, and then there can be more than one external prefix), as in (1c).

C) internal prefix tends to take the position closest to the lexical verb (i.e. if there are more then one prefixes on a verb, one of which is internal, then the internal one must be the last one in the series of prefixes: the one left-adjacent to the verb).

D) internal prefixes may add an argument to the argument structure of a bare lexical verb, while the external prefixes cannot have this effect.

E) Svenonius (2004) generalizes that internally prefixed verbs derive both root nominalizations and gerunds, while externally prefixed ones derive only the latter, as in (1d).

(1) a. Jovan je trčao.
J Aux run
'Jovan ran'

b. Jovan je u^{INT}-trčao u sobu.
J Aux in-run in room.Acc
'Jovan ran into the room.'

[1] In order to keep this relation transparent, I gloss prefixes in S-C examples using English counterparts of the prepositions in S-C corresponding to the respective prefixes.

[2] For a discussion ruling out seeming exceptions to this regularity, see Arsenijević (2006).

c. Jovan je iz^{EXT}-na^{EXT}-u^{INT}-trča-va-o u sobu.
J Aux out-on-in-run in room.Acc
'Jovan did a lot of running into the room, to the exhaustion of some contextually given amount of running into the room.'

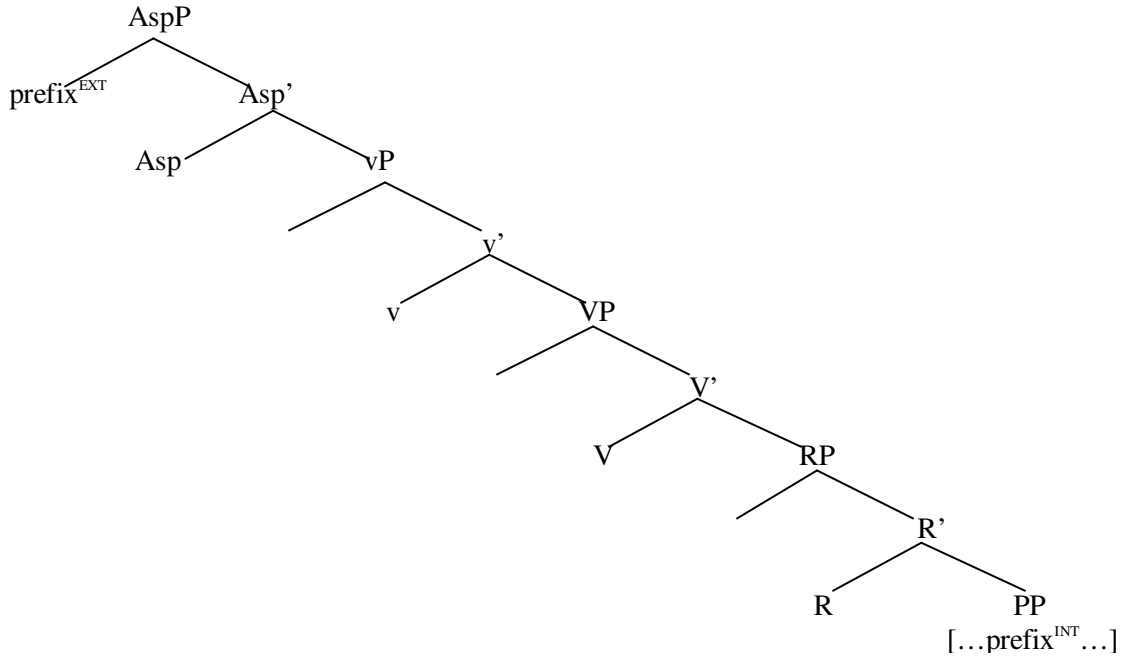
d. pro^{INT}-laz vs. *na^{EXT}-pek
through-go on-bake
'passage' /

Some among the prefixes can appear both as internal and as external. When appearing adjacent to the verb, such prefixes can be ambiguous, between the internal and the external interpretation.

(2) a. Jovan je na$^{INT/EXT}$-vukao drva na terasu.
J Aux on-pulled woods on terrace
'Jovan pulled the trees/wood onto the terrace' / 'Jovan did a lot of pulling wood onto the terrace.'

Most syntactic analyses of Slavic verb prefixes (including, among others, Schoorlemer 1995, Di Sciullo & Slabakova 2005, Svenonius 2004) assume (at least) two different syntactic projections relevant for their generation, one below the verb, in which internal prefixes are generated, and one higher than the verb, for the external prefixes – see the structure from Svenonius 2004 in (3).

(3) Syntactic generation of external and internal prefixes according to Svenonius (2004)



In a structure like this, most properties of the external prefixes are straightforwardly captured by their high position of base generation, and by its different categorial nature, compared to the position in which the internal prefix is generated. Internal prefixes are generated in the lexical domain, together with the lexical verb, in a position that cannot recur. This is the domain where the argument structure is formed, and more precisely, the prefix is generated within the syntactic sequence that expresses the result component of the eventuality, hence it may introduce a result argument, and it also shows a property typical of resultative predicates – it can alter the argument structure of the verb.

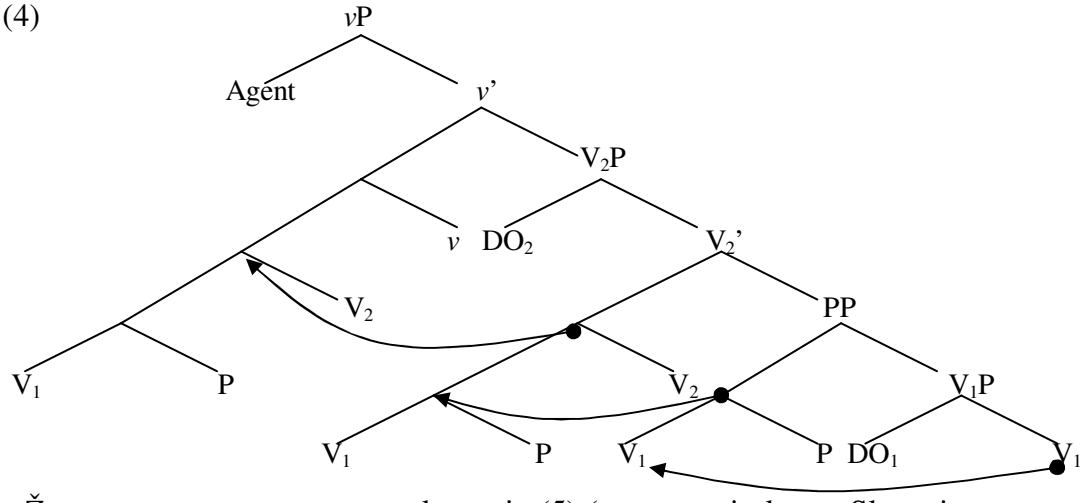
3. Žaucer: Slavic external verb prefixes via verb incorporation

Arsenijević (2006, 2007a, 2007b) criticizes this view based on the following arguments. First, it does not explain the fact that the same set of elements (i.e. morphologically dependent counterparts of prepositions surfacing as prefixes of the verb) appear in both positions. Second, the quantitative

semantic effect of the external prefix is closely related to the meaning of the corresponding preposition (*iz* 'from' for exhaustivity, *na* 'on' for accumulation, *po* 'over' for overlap/coverage etc.). Moreover, the quantitative effect affects not just the eventuality denoted by the verbal expression, but also a participant of that eventuality (usually the undergoer). This indicates that the quantitative effect is to be interpreted as a property of one eventuality brought about as a result of some other eventuality, an interpretation that does not follow from analyses assuming two different positions. Finally, the semantic effect of an external prefix is entailed to be controlled by the agent in the eventuality, which requires a *v*P projection higher than the one where the external prefix is generated. Arsenijević (2007b) concludes that both types of prefixes should be analyzed as generated in the same structural position, with differences coming from the syntactic context. More precisely, internal prefixes have nominal complements, while external prefixes take complements that are headed by verbs and represent eventualities.

Žaucer (2010a) argues convincingly that the prefix *na-*, which displays properties typical of external prefixes, also shows properties of a resultative predicate, such as affecting the argument structure of the verb by introducing an argument that is not selected by it, yielding scopal ambiguities for the imperfectivizing suffix, or modifying a property targeted by an overt result state adverbial. Hence, he argues that this prefix should be generated on a par with the internal prefixes. To account for this, he proposes an analysis in the spirit of Hale and Keyser (1993). I give a simplified schematic representation in (9), where the external prefix *na-* is generated in a structure with two VPs, as an internal prefix of the higher verb (which has to be light). Žaucer (2010a) concludes, as he has in part already shown in Žaucer (2009), that the analysis proposed for the prefix *na-* might be the right analysis for all external prefixes.[3] This section presents in more detail the mechanics of Žaucer's (2010a) analysis of the external prefix *na-*, its motivation, and its extension to all external prefixes, as well as some problems it faces.

(4)



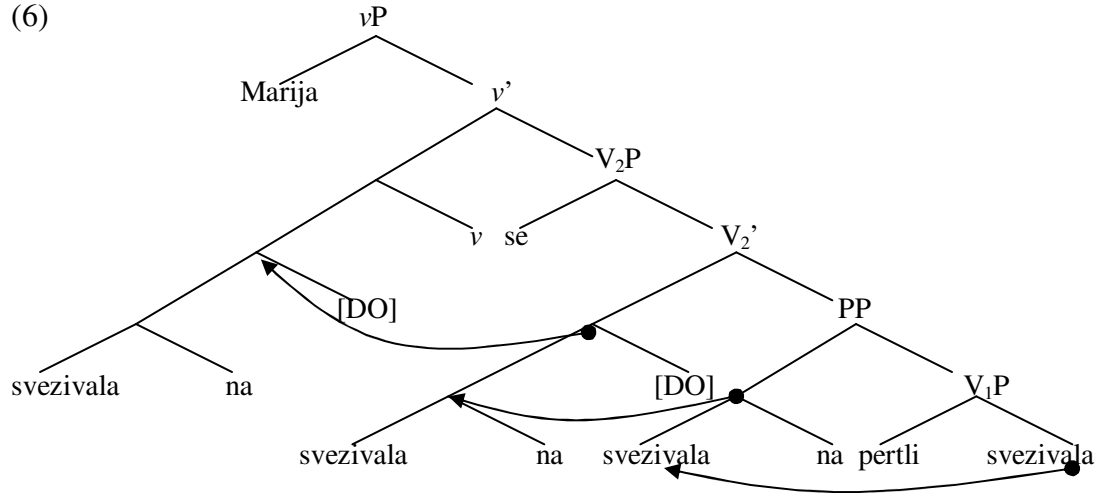
Žaucer concentrates on examples as in (5) (more precisely, on Slovenian counterparts of this type of examples) – with a reflexive direct object, and another argument: the undergoer of the eventuality described by the verbal stem, in genitive.

(5) Marija se na-s-vezivala pertli.
M Refl.Acc on-with-tie shoelaces.Gen
'Marija had her fill of tying shoelaces.'

[3] In a somewhat similar spirit, although in a constructionist approach, is the analysis of Spencer & Zaretskaya 1998, in which a resultative construction stands in the core of all prefixed verbs, with the prefix acting as the primary predicate, and the verb has a rather secondary nature (describing the manner or path).

He proposes to analyze this example in terms of two VPs, one of which acts as the result argument of the other. The result VP (V_1P in the figure) is generated as the complement of a PP, it is headed by a lexical verb, and it introduces one argument – its own direct object – to the aggregate argument structure. The other VP (V_2P in the figure) takes a result predicate realized by the PP with V_1P as its complement. Thus, we have an eventuality as an argument of the result predicate of another eventuality. The higher VP is headed by a light verb (V_2), which opens the possibility of incorporation. The lower verb (V_1) head-moves to the preposition specifying the result predicate, and then the entire complex head-moves higher, and incorporates into the light verb, providing it thus with lexical content, and hence also with a possibility of lexicalization. The result VP itself is a full-fledged VP, which may itself be prefixed, as in the example (5), analyzed as in (6).

(6)



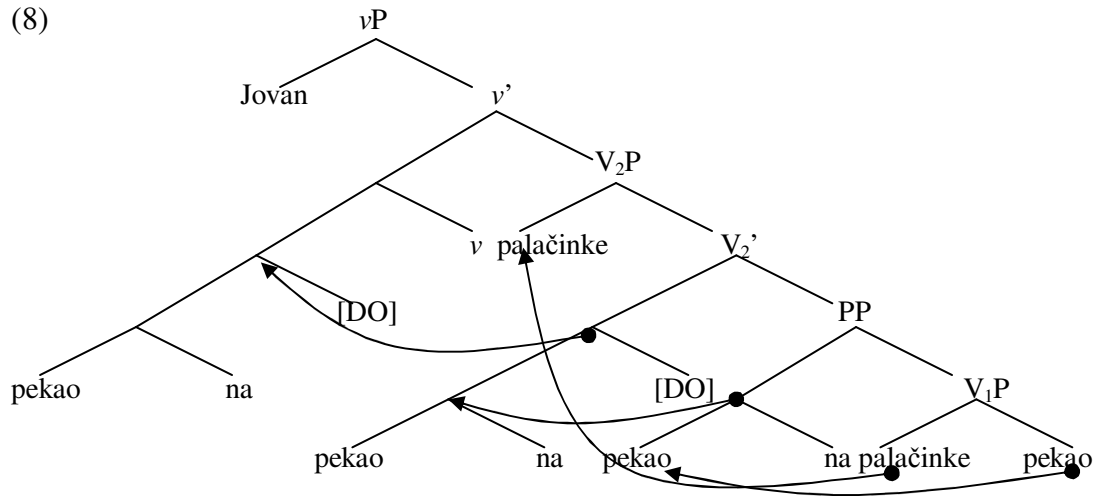
The interpretation is that some underspecified event has a result of there being a lot of shoelace-tying. The quantity comes from the result predicate (the preposition *na* 'on') (see Arsenijević 2006, 2007a,b for a more detailed discussion). The result predicate is interpreted distributively, or reciprocally, with respect to its complement, a homogeneous object of the type of eventualities. Eventualities of shoelace tying are thus interpreted as piled up on each other. For an abstract object (an eventuality in the relevant cases), piling up also has to receive a shifted, abstract interpretation, and Slavic languages (and possibly others too) grammaticalize the dimension of quantity as the one involved.

Arsenijević 2006, 2007a,b gives a more elaborate discussion of the semantic facts, arguing that the direct object of the higher verb, which is the argument closest to the higher projections related to aspect, receives the interpretation of the incremental theme. This participant, i.e. one of the dimensions it introduces, measures out the event, and this derives the effect that Žaucer translates as 'getting one's fill of something'. The amount of the accumulated (piled up) eventuality in the result is measured by some dimension of the subject (which binds the reflexive) – e.g. her desire, or capacity, for taking part in the eventuality in the result.

With a slight additional specification, this analysis applies equally well to examples without reflexives. Take one of the examples typically used to illustrate the effect of external prefixes.

(7) Jovan je na^{EXT}-pekao palačinke.
J Aux on-baked pancakes
'Jovan did a lot of baking pancakes, and as a result there are a lot of pancakes.'

(8)



The additional step is the movement of the object of the result VP (V_1P) into the direct object position of the higher verb. In syntax, the consequence is that now this argument takes accusative case. The semantic effect is that it is interpreted as the incremental theme: the amount of pancakes measures out the entire eventuality, i.e. also the degree to which the eventuality of baking pancakes piles up.

Note that the analysis predicts for a regularity that is not predicted by the analyses with two different positions for the two classes of prefixes: the incremental interpretation of the direct object with respect to the result predicate (*na* 'on'), and a lack thereof for the object of the lexical verb when marked by genitive. Because an entailment of the sentence in (7) is that as a result of the eventuality of baking, there are a lot of pancakes, while there is no such entailment for the shoelaces in (5). Note that the construction without the reflexive would require for shoelace tying as well that as a result there are a lot of tied shoe-laces, while the structure with a reflexive would allow for there being just a few pancakes, but that e.g. they were baked very long and with a lot of effort, or that the subject wanted exactly that many pancakes.

In addition to this one, and to the empirical arguments in favor of this analysis presented by Žaucer (2010a), there are also methodological advantages. Once this analysis is generalized for all external prefixes, we do not have to postulate two classes of prefixes (which share most of their members, and a number of properties).[4] Moreover, it involves one syntactic projection fewer, as both classes of prefixes are generated in (categorially) the same structural position. Their differences stem from their syntactic contexts, in particular the type of complement they get (verbal vs. nominal) and the nature of the verb selecting them (lexically rich vs. light). Let me now briefly show how the traditionally observed asymmetries between the two 'classes' of prefixes are dealt with by this analysis.

A) the internal prefixes contribute a resultative component to the interpretation of the verb – when there is a goal phrase in the VP, the preposition heading it will be the one corresponding to the internal prefix; the contribution of the external predicates is rater related to the quantity of the eventuality (and of its incremental theme).

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[4] One possible objection to this move is that na- is a special case, e.g. in participating in the construction with a reflexive. This is not correct, in general, or for the particular issue of the reflexive. The properties of <u>*na-*</u> that are highlighted as relevant for the analysis also hold for other prefixes, including the use with a reflexive, as illustrated in (i) and (ii).

(i) Za-mislio sam se (crnih misli). — Za-slusao sam se muzike.
for[EXT]-thought Aux Refl black thoughts.Gen — for[EXT]-listen Aux Refl music.Gen
'I fell deep in (black) thoughts.' — 'I got absentminded listening to music.'

(ii) Raz-trčao sam igrače.
raz[EXT]-run Aux players
'I made the players run.'

As for the resultative nature of internal prefixes – this analysis unifies all prefixes, arguing that they are all actually resultative, but that the syntactic context determines whether the resultative interpretation will target the spatial dimension (or some other typical resultative dimension) – when the complement of the preposition is nominal, or the quantity dimension as in the prefixes referred to as external – when the complement is verbal.

B) the external prefixes can stack, unlike the internal ones (i.e. at most one prefix on a verb can be internal, and then there can be more than one external prefix).

This follows directly from the present analysis, i.e. from the recursive nature of the VP-PP-VP sequence, enabled by the incorporation mechanism – the possibility for the verb to head-move into another VP. Internal prefixes are those related to a preposition with a nominal complement: since the nominal complement usually does not incorporate, and even when it does (in prototypical result-incorporating verbs, see Arsenijević 2011 for an analysis of the S-C data) – there can be only one round of such incorporation as incorporation can only be into a head of a verbal category.

C) internal prefixes tend to take the position closest to the lexical verb (i.e. if there are more then one prefixes on a verb, one of which is internal, then the internal one must be the last one in the series of prefixes, i.e. the one right before the verb).

There is a problem with this generalization in respect of the incorporation analysis, as Žaucer notes in his (2010a) paper. Incorporation analyses predict that the internal prefix will surface to the left, and all the external suffixes to the right of the verb, assuming a left-adjunction mechanism for head movement. This can be taken care of by an additional assumption: by treating the prefixes post-syntactically, in terms of a lexical specification for prefixed linearization. Reluctant to add such new assumptions, Žaucer (2010b) abandons the incorporating type of analyses.

D) internal prefixes may add an argument to the argument structure of a bare lexical verb, while external prefixes cannot have this effect.

This empirical generalization is rejected by Žaucer (2010a), who gives examples where the external prefix *na-* has the same effect, both in adding a new undergoer for the VP headed by the lexical verb (V_1P) and in adding a new argument in the one headed by the light verb (V_2P).

E) Svenonius (2004) generalizes that internally prefixed verbs derive both root nominalizations and gerunds, while externally prefixed ones derive only the latter.

Assuming that nominalization targets the VP, this analysis gives a clear explanation for root nominalizations. The only VP that involves no functional material, and is headed by a lexical verb, is the most deeply embedded one – the one that generates the internal prefix.

Let me outline some problems for this type of analysis, some of which Žaucer discusses in his paper. One of these problems is more general, and extends to other analyses as well. This general problem concerns the referential aspects of the eventualities involved. In semantics, culminative eventualities are assumed to involve between two and four (sub-)eventualities. Minimally, they involve the result eventuality, and the aggregate eventuality which involves the respective result (see Arsenijević 2006, for an analysis of this type). Some authors, such as Ramchand (2002), argue that there are actually the result subevent, the process subevent, the initiating subevent and the aggregate event. The incorporation analysis entails that there are two eventualities: a result eventuality (V_1P) and the aggregate eventuality (V_2P). The expression denoting the former is syntactically embedded in the one denoting the latter. But how does this give us the semantic relation of being a resultative part?

A straightforward answer, presumably implicit to most or all the syntactic accounts, is that this is the contribution of the preposition. Since the same prepositions can also be used to introduce adjuncts and other participants, such as instruments, the preposition alone is not enough. The solution of approaches with two different projections for the two classes of prefixes have a better solution: a projection encoding the result. It has been argued that the accusative on the complement of PP marks

this aspectual relation (Svenonius 2002). However, such approaches cannot derive the same for the resultative interpretation of external prefixes, due to their generation in a non-resultative projection.

A problem already mentioned relates to the linearization. As Žaucer (2010a:19-20) observes, the linearization of the incorporation structure would have the internal prefix to the left, and all the other prefixes to the right of the verb (even assuming a head-final structure, which has never been indicated by any other type of data for Slavic languages, we only get the inverse: the internal prefix ends up at the wrong side of the verb). Again, an easy solution is available, but not really theoretically desirable. It is possible to specify that prepositions linearize to the left of the structure they attach to.[5] Again, the question is: can we achieve the right linear order without additional rules?

A final problem is that under the incorporation analysis, internal and external prefixes are derived in the same way: they head-move (together with the verb for external prefixes, and alone for the internal ones) to adjoin the (higher) verb. But in internal prefixation, the preposition is still visible in its base-generated position. Note that this problem extends to the accounts assuming two distinct positions, as in order to encode the fact that the result is part of the aggregate event, they are forced to consider RP and VP members of the same projection line, and hence also to expect the incorporation of the R head into the head of V (or to offer a different analysis for the prefix).

(9) Jovan je pod-vukao stolicu pod sto.
J Aux under^{INT}-pulled chair under table
'Jovan pulled the chair under the table.' (resultative! – the chairs end up under the table)

In the next section, I propose an alternative analysis, which preserves all the advantages of Žaucer's (2010a) incorporation analysis, but does not suffer from the problems outlined in this section. It keeps the recursive structure component, as well as a role for head-movement and incorporation, adding one crucial new aspect: a relativization mechanism that is triggered by an agree relation between two aspectual projections, one of which embeds the other.

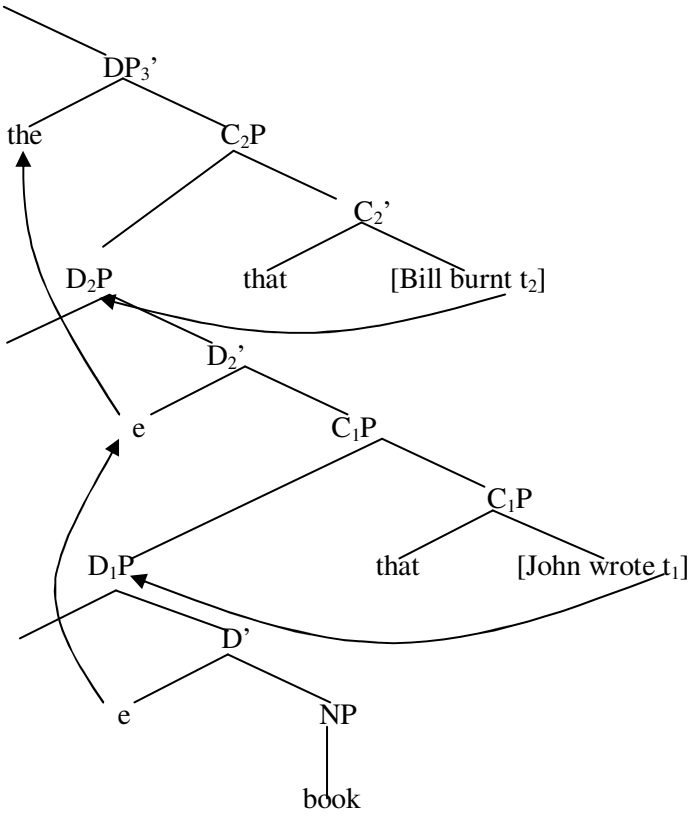
4. Relative aspectual clauses

In this section I propose a novel analysis of Slavic verb prefixes, different from both types of analyses outlined in the previous sections, but with some common traits with the incorporation analysis. I argue that the prefix is best analyzed as an instance of concord, similar to the negative concord. Consequently, the prefix is not an incorporated preposition, but a marker of agreement with a local item that carries an uninterpretable aspect feature – the preposition. The agree operation involves the verb, the preposition and the aspectual head, containing an aspectual operator. The aspectual operator needs to take scope over both uninterpretable features, that on the preposition and that on the verb. Once agree is established among the three features, it triggers the movement of AspP over PP. The aspectual operator is valued by the preposition (because it specifies the boundedness of the eventuality), and the combination of agree and valuation triggers the respective marking on the verb: the prefix corresponding to the bounding preposition.

Before presenting the analysis itself, let me briefly sketch the partixcular analysis of relativization in the nominal domain which I replicate to analyze verbal prefixation in S-C. Since (external) prefixation seems to be recursive, i.e. more than one prefix can appear on the same verb, I need to consider the structure for multiple relatives. I take Bianhci's (2000) analysis, based on Kayne's general model involving raising. Bianchi proposes to analyze multiple relatives in the following way.

[5] Note that one should not relate this issue to the fact that all adpositions in Slavic languages are prepositive with respect to the noun, as the prediction would then be that in languages with postpositions, these relate to suffixes only.

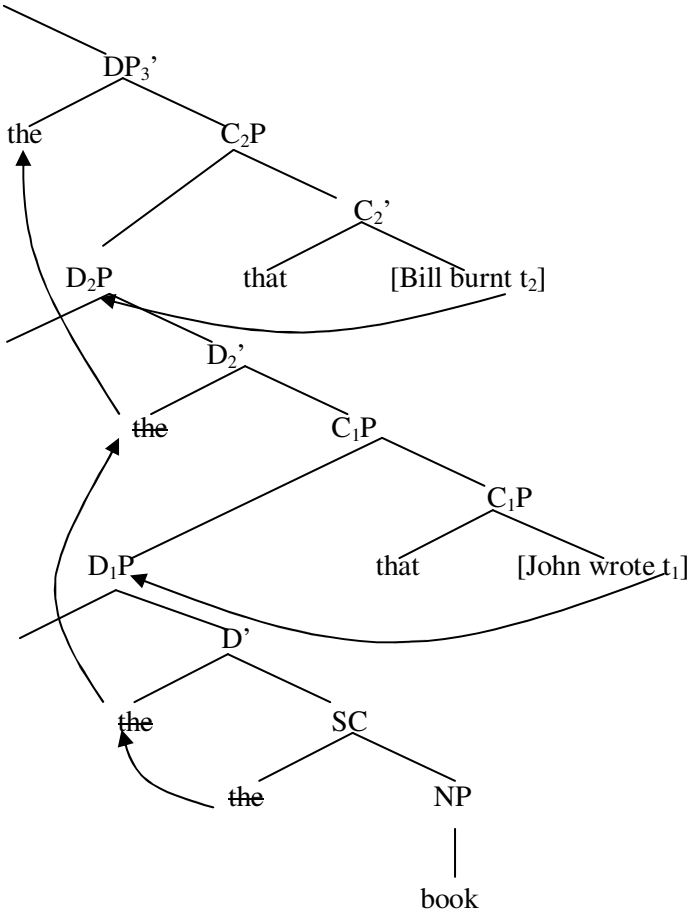
(10) the book that John wrote that Bill burnt



The DP in the relativization site recursively moves to CP, achieving thus a local relation with another D, projected on top of CP. The local relation enables the interpretive relation between the two Ds and each D head-incorporates into the next higher one, until it reaches the top DP projection.

I combine this analysis with an insight made in Campbell (1996), that even in a DP headed by a noun, there is an operator that moves from a lower position of the subject of a small clause into DP, establishing thus a relativization structure even within the DP itself. With a slightly different formulation, and motivation, Koopman (2003, 2005) also argues that DP is a relative clause. For both authors, and those adopting such an analysis, the relative clause of this kind is special, mostly because the expression targeted by relativization is simple, and the relevant relations are thus very local. The other side of the coin is that such relativization, of very simple structures, can only take place if the relations are indeed extremely local. The structure in (11) presents a modification of (10) along the lines of the hypothesis that each DP is a relative clause.

(11) the book that John wrote that Bill burnt



Observe that in this type of analysis, the first round of relativization, that with a relativization site in the subject of a small clause, differs significantly from the following rounds. Most importantly, all the other rounds can be permuted among each other, because they receive a conjunctive interpretation, while the first round is fixed in this sense due to the fact that they involve a lexical item, i.e. that they contain the bottom of the projection.[6]

Let me now present the application of a structure as in (11) in the verbal domain, to analyze Slavic verbal prefixes. Initially, thinking of the verbal structure as a relative clause may be demanding and confusing. Therefore, I decided to present the analysis in three steps, highlighting the major aspects of its mechanics, and then discuss some possibly problematic details. The three steps in the presentation of the relevant structures do not correspond to three stages in the derivation, as I represent the entire structure in each of the figures in order to have a complete picture of the syntactic context. In a derivational view, the first stage in figure (13) would have no reality whatsoever, and the second and the third would have to be presented with the structure generated only up to the position immediately dominating the landing site of the respective movement. The analysis involves four major ingredients: the multiple relativization analysis by Bianchi (2000), which refines Kayne's (1994) analysis of relativization and discusses multiple relatives, the multiple agree operation as in Zeijlstra (2004), or alternatively a modified definition of agree by Haegeman and Lohndal (2010), the agreement and feature-valuation system by Pesetsky & Torrego (2007) and the hypothesis that DP is a relative clause

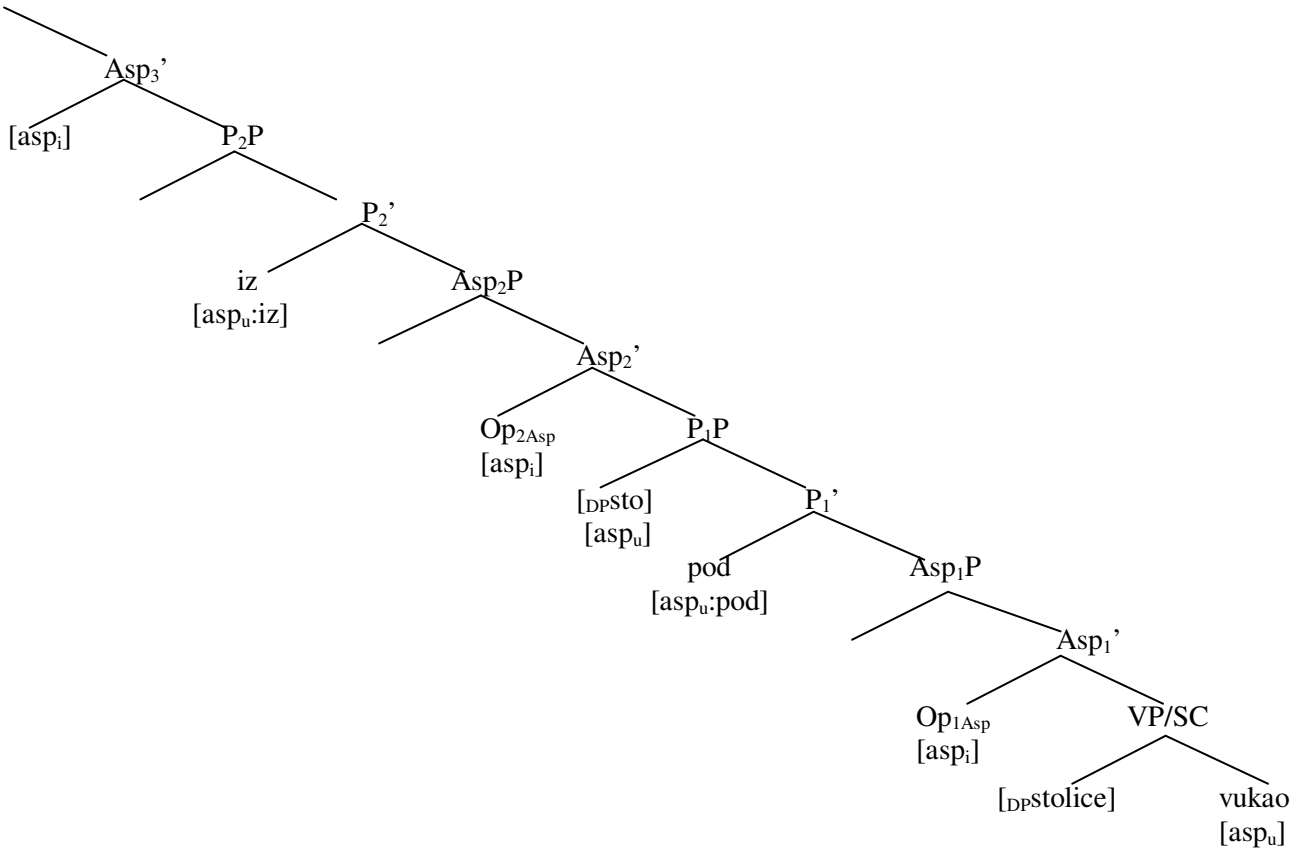
[6] I am grateful to Orin Percus (p.c.) for drawing my attention to this aspect of multiple relativization.

(Campbel 1996, Koopman 2003, 2005). I analyze verb prefixation of the Slavic type as concord triggered by the operators that also drive the generation of a relativization configuration, assuming that the operator functions along the lines of the range restriction/assignment of Borer (2005).

(12) Jovan je iz-pod-vukao stolice pod sto.
J Aux from^{EXT}-under^{INT}-pulled chairs under table
'Jovan pulled all the available chairs under the table.' (resultative!)

The first tree presents the way the structure would have looked look after the derivation completes, if no movement or agreement took place, and the operation agree was carried out without any effects such as movement or agreement marking. Only the relevant features are marked, all being instances of the feature [asp], uninterpretable in some positions and interpretable in the others, and unvalued in some positions and valued in the others.

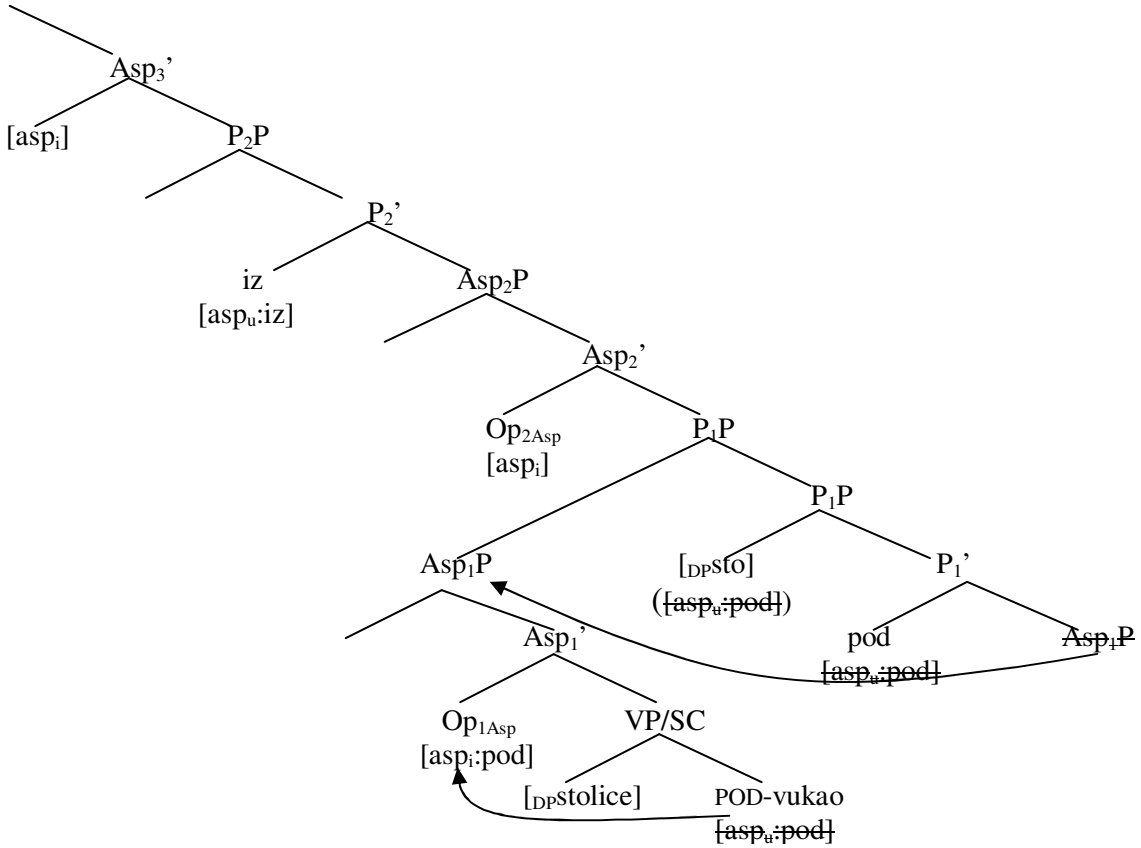
(13) The configuration, if nothing moved



In the bottom-up orientation, first the verb incorporates into the head of its aspectual projection, via head movement. Next, the lowest preposition that carries an aspectual feature probes into the structure, and finds the aspectual operator with which it checks its uninterpretable aspect feature and evaluates the feature of the operator (yielding [asp:pod]). As a result of the established relation, AspP moves up to PP in order to establish the right scope for the operator it carries. Then the operator establishes an agreement relation with the verb, assigning it a valued feature (in the first round, this is [asp:pod]). This agreement relation triggers an overt marking in the form of the corresponding prefix.

The structure with the first step of movement (plus one step of incorporation) having taken place is presented in (14). Observe that this structure fully complies with a Kaynean relativization structure such as the one in Bianchi (2000): P_1P can be seen as a relative clause modifying the denotation of the Asp_1P. The movement triggered by an operator belongs to a large family of similar movements (Haegeman 2007, 2009, 2010ab, Haegeman & Ürögdi 2010a,b).

(14) The configuration with only the first relevant movement (the first relative clause derived)

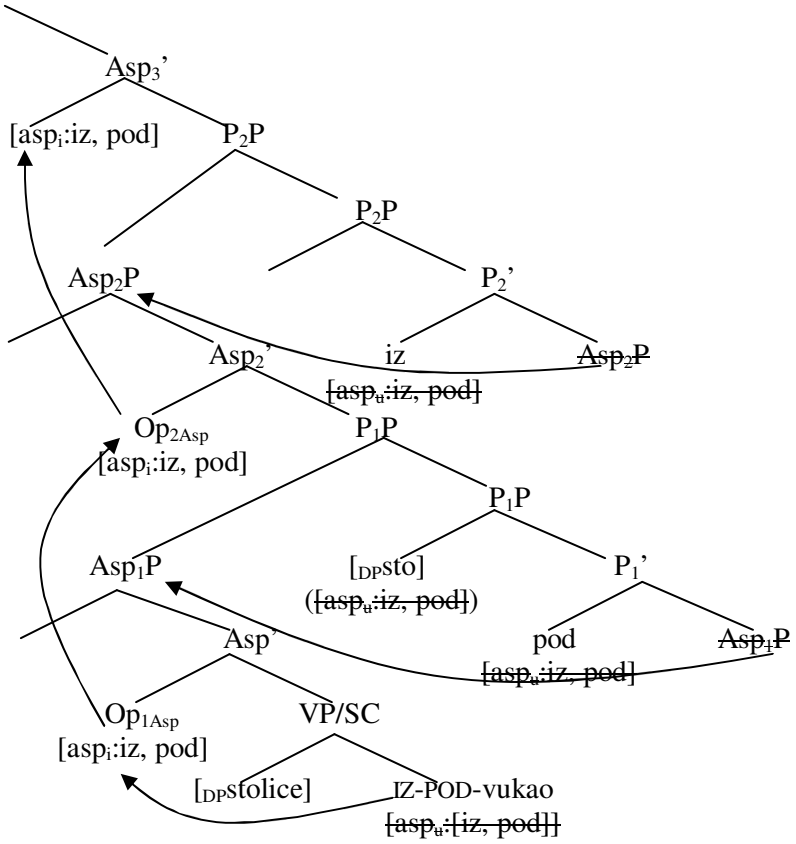


This schematic representation shows two steps of movement. One involves an exact counterpart of the first round of relativization in the analysis of the DP incorporating the insights of Campbel(1996) and Koopman (2003, 2005), as presented in (11): the movement of the verb into the head of Asp_1P. This is a relativization of the sequence that directly includes the bottom of the structure. While D triggers the raising of a nominal (i.e. subject) part of the small clause, AspP targets its verbal member – because it carries an uninterpretable aspect feature. The second step of movement presented is the counterpart of the first round of overt relativization: the movement of AspP to $SpecP_1P$.

The same procedure now recursively repeats: the higher preposition with an uninterpretable feature probes and finds an interpretable aspectual feature in Asp_2. Agree, valuation and movement take place again, resulting in the structure in (15). Following Bianchi's suggestion, the aspectual heads incorporate in one another (V into Asp_1, Asp_1 into Asp_2, and then Asp_2 into Asp_3), leading to a shared valuation, reflected on the verb as concord, in the form of the two prefixes.[7] In the present case, the incorporation is triggered by the need for valuation of the highest aspectual head Asp_3. We derive a multiple relativization structure: the aggregate interpretation is that the highest aspectual head is modified by two 'relative' aspectual clauses (an *iz* 'from' phrase and a *pod* 'under' phrase).

[7] Note that there is an important asymmetry between the present analysis of prefixation and Kayne's and Bianchi's analyses of nominal relative clauses. Let me illustrate it using Bianchi's terms. In her analysis, only the highest D has any material: all the lower instances are null. A corresponding picture in the verbal domain would be that only the highest aspectual head has any material, and the lower ones are empty. On the present account, however, all the aspectual heads have some material. Incorporation takes care of their unified expression, and their scopal relations handle the interpretive aspects: the highest aspectual operator overwrites all the lower instances, which keep their compositional contribution in their local domains, but do not bear on the final aspectual value of the root structure. Perhaps an analogous modification of Bianchi's analysis would better answer Borsley's (1997) criticism about the requirement for empty D heads for all but the root DP.

(15) The final configuration, after the second step of movement (the second relative clause derived)



Unlike in Žaucer (2010a), there is only one VP: the one built by the first round of relativization (just like only one lexically projected DP exists in the nominal relativization). There are, however, more than one AspPs, and they are targeted by incorporation, yielding similar semantic effects as Žaucer's incorporation. Each 'relative clause' is formed over one predicate; these predicates are of the verbal category in the most deeply embedded relative clause (also lexicalized as a verb), and prepositional in all the others (without lexicalization – their visibility is guaranteed by the prefixes, i.e. by agreement).

Internal prefixes thus emerge in the first round of aspectual relativization – they correspond to narrow DPs, projected by lexical nouns. External prefixes are effects of real multiple relativization. This analysis correctly predicts that external prefixes will not have a fixed ordering – they are interpreted conjunctively (just like multiple relative clauses), so they can permute. The internal prefix is the only one with a fixed position, and this is a consequence of the special nature of the first round of relativization, due to the fact that it involves the lexically filled bottom of the structure.

(16) a. po^{EXT}-iz^{EXT}-za^{INT}-tvarati
over-from-for-do
'close exhaustively all of X'

b. iz^{EXT}-po^{EXT}-za^{INT}-tvarati
from- over-for-do
'close exhaustively all of X'

c. *za^{INT}-po^{EXT}-iz^{EXT}-tvarati
for-over-from- do

d. *po^{EXT}-za^{INT}-iz^{EXT}-tvarati
over- for-from- do

Aspectual relativization is, in this view, very similar to DP relativization: it enables one lexical item to be modified by more than one instance of a certain functional sequence (in DP relativization that is

CP, and in aspectual relativization – a PP-aspectual clause as the contributor of modification). Just like in DP relativization, the crucial effects of the movement are to a) bring the lexical domain, i.e. the VP, within the reach of a higher aspectual head[8] and b) bring the different aspectual heads in a local configuration which enables their incorporation (see Bianchi for more details on this process). The benefit is enabling a multiple (recursive) modification over only one lexical head. A multiply prefixed verb thus stands for a configuration in which the aspectual value is specified by more than one aspectual relative (here categorized as PPs). Let me now clarify some aspects of the proposed analysis, and point to some more general theoretical consequence.

The semantics of this process can be described in terms of range assignment to the respective aspectual head, in the spirit of Borer (2005). Borer takes an aspectual head to introduce an unrestricted range of aspectual values, and it can be restricted by any predicate that has the restricting capacity and establishes a c-command relation with it (possibly mediated by movement). Such are all goal and result phrases (here treated as one and the same type of constituent), certain direct objects and some types of adjuncts. As these syntactic items enter the range-restricting relation, they clearly share certain features, i.e. they are expected to show parametrically distributed agreement effects. The current analysis enriches the list of aspectual range restrictors by one additional member: relativized embedded AspPs .

Relativization thus enables range assignment to one aspectual head in terms of a specification that is formulated relative to another aspectual phrase. In the schematic representation in (15), Asp_2^0 is assigned a range that is specified in terms of Asp_1^0: Asp_2^0 is bounded by the exhaustion of the denotation of Asp_1^0 (i.e. it denotes a scale corresponding to the decreasing quantity of pulling chairs under the table denoted by Asp_1^0, which is bounded by its total exhaustion). Another, stacked, external prefix would add a further specification of this boundary (e.g. that it is also a point of full overlap of the quantity of the same decrease above with the quantity of the pulling_under event, in case this prefix was *po-* 'over'). Just like in nominal relativization, multiple prefixes (to the exclusion of the one with access to the lexical domain) have a conjunctive interpretation.

In the analysis as presented above, the verb first checks its aspect feature with its local aspectual head, gets it valuated by the local preposition *pod* 'under', but then this checked feature gets valued by an additional aspectual feature – that of the higher preposition *iz* 'from'. This may seem problematic, since a feature that is checked should be inert for all syntactic processes including valuation. While I do not necessarily commit to the inertness with respect to valuation view, my analysis crucially does not depend on this issue. The verb incorporates into its local aspectual head, which further incorporates into the next higher one, and this one again into the one on top. In this way, the lexical verb incorporates into the highest aspectual head, and hosts agreement markers not only of its own, but also of the aspectual heads it is left-adjoined to (assuming agreement markers also left-adjoin to the respective head). Hence, it is sufficient that at the point of agreement, the currently unchecked interpretable aspectual feature undergoes valuation and shows a marking of this agreement to get the desired result of a multiply prefixed verb.

A second issue in need of clarification is the generation of the goal (result argument) in the specifier, rather than the complement of the preposition, and of the entire relevant phrase (marked still as PP in the schematic representations above) in the extended projection of the verb, rather than in its complement. This is move is not *ad hoc*, but has both independent theoretic and empirical motivation. Theoretically, this analysis makes sense because if this participant is the argument of result, and the

[8] In this way, the projection of multiple AspPs over one lexical verb is syntactically licensed, and the possibility of external prefixes to stack is fully explained. Note that in approaches assuming two projections, there is a problem in this respect: stacked external profixes clearly have different scope, which would imply the projection of one external AspP over another without ever bringing the lexical verb in a local relation with these recursive AspPs – a configuration that is at the very least odd in the context of the contemporary syntactic theory.

preposition introduces the predicate of result, all in respect of a phrase headed and labeled by the verb, then in the spirit of cartographic views such as Rizzi (1997), Cinque (1999), or Haegeman (2003), this argument should be the specifier of the respective functional projection. Moreover, this eliminates the paradox present in the views with a result phrase (RP) at the bottom of the structure, in which the undergoer of change must appear in two positions: in the one specifying the process component and in RP (see Ramchand 2002 and the discussion in Arsenijević 2006: 86-90). Finally, this analysis accounts for the facts of case assignment and word order variations related to the use of PPs to realize the goal/result argument of the verb, versus their use in the more adjunct-like expressions (such as place, time, manner or company). As discussed in Arsenijević & Gehrke (2009), in a number of languages, the goal argument selected by a certain preposition receives the accusative case, as in the S-C example in (17a), while with the same preposition, in other types of uses, it appears with an inherent case, such as locative or instrumental. Similarly, in languages like Dutch, the case is not marked, but adpositions in expressions lexicalizing goals may, or have to appear postpositively, as in (17b).

(17) a. u sobi vs. u sobu
in room.Loc in room.Acc
'in the room' 'into the room'

b. op de berg vs. de berg op
on the mountain the mountain on
'on the mountain' 'onto the mountain'

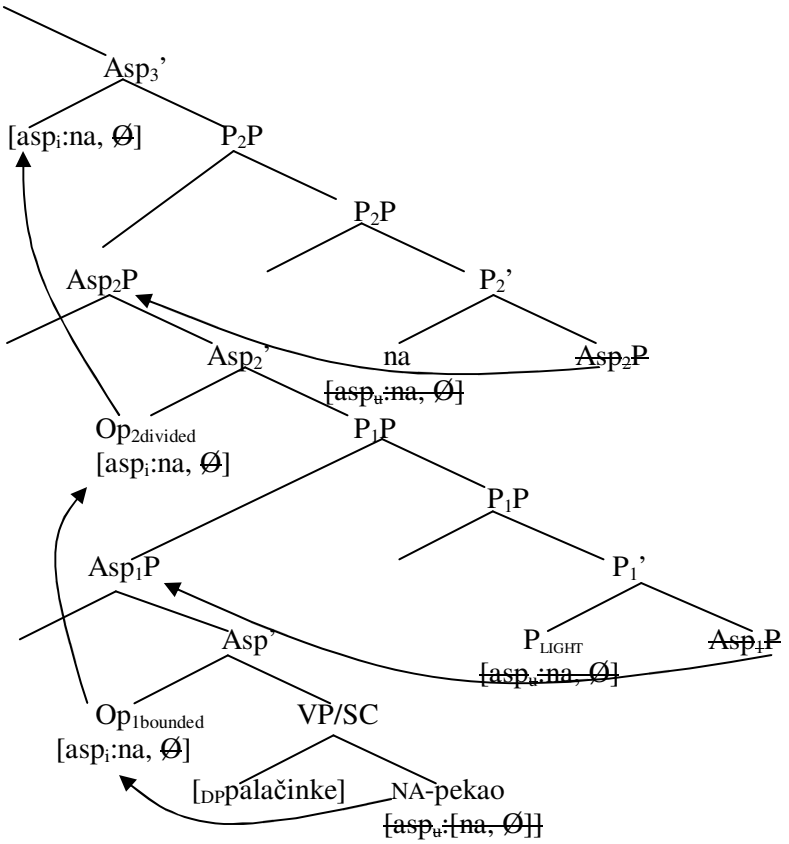
The present analysis accounts for the assignment of the accusative case by having the relevant argument locally c-commanded by the aspectual head which appears as the assigner of the accusative case both to the direct object and to the goal (see Svenonius 2002 for arguments that accusative is assigned by the aspect head). As for the word order in Dutch, it is quite straightforward: the word order in the Dutch example is exactly as predicted by the present analysis.

The question is, however, how come most other languages still have the adposition preposed? I can offer two solutions. One is that in certain languages, prepositions are lexically specified to procliticize (or in some other to encliticize, or to take the syntactically derived position as in Dutch), or that possibly this restriction follows from some other parameter. Note that the direction of clicicization is a general parametric feature of a language irrespective of the present discussion. On this view, the higher preposition (*iz* 'from' in the example in (13)-(15)) is deleted exactly because it has no local host to procliticize on, and deletion is a last resort strategy saving the structure. An alternative, which I prefer, and which is marked by the features in brackets in the schematic representations above, is that the argument of the preposition is also marked by the aspect feature, and that the surfacing preposition is another marker of agreement (i.e. concord), not the actual head. The head of PP is just a bundle of features in the extended projection of the verb, which do not get lexicalized anyway. This pattern is familiar from other types of concord, in particular negative concord, where the operator triggering, or valuating concord, is not lexicalized because it is made visible by the marking of concord (see Zeijlstra 2004 for a detailed analysis). On this view, no additional explanation is needed for the lack of lexicalization of the higher preposition triggering the appearance of the external prefix.

Finally, if external prefixes emerge in multiple aspectual relativization, then how can a single prefix on a verb be interpreted as external? The present analysis predicts that even in cases of this kind, there will be a round of relativization preceding the one of the external prefix, and not showing any morphological marking (no prefix, i.e. no concord) – e.g. because of a too abstract or unspecified bounding predicate at this level. The semantic equivalent of this prediction is that what the aspectual operator that triggers the external prefix operates over already involves one deeper round of aspectual bounding – it is expected to be perfective already. This prediction is actually confirmed: although *pekao* 'baked' without the prefix figures as a word, and may receive a progressive, durative, iterative or future interpretation, with the prefix it must be interpreted as iterative: a plurality of baking events

resulted in there being a large amount of pancakes. An interpretation with a single durative event of baking, and its counterparts in other similar examples, are systematically out.

(18) Jovan je na^{EXT}-pekao palačinke.
J Aux on-baked pancakes
'Jovan did a lot of baking pancakes, and as a result there are a lot of pancakes.'



This is exactly what we expect, assuming that the iterative interpretation involves one round of relativization, deriving a bounded unit of iteration (where the bounding itself is unspecified for any additional information such as what bounds the eventuality and how). I capture this in (18) by a light preposition heading the most deeply embedded PP, and a contextual variable in its specifier: the eventuality at this level is bounded in some contextually provided point. The imperfectivization is contributed by the aspectual operator Op_{2Asp}, specified as plural (i.e. divided), and it is eventually bounded by the contribution of the preposition *na* 'on'.

From a more general theoretical perspective, this paper extends the domain of relativization structures to a domain of lexical and functional categories it has not been associated with before. Next to the clausal and the nominal domain, the verbal domain is also shown to display patterns of relativization.

A more general theoretical consequence of the present analysis is that the lexical verb never takes any complement whatsoever, i.e. it is at the bottom of the structure. This is a conclusion in line with recent arguments of Kayne (2008), that lexical items should take no complements. He makes a simple conceptual argument: open class elements, i.e. core lexical elements, have the singleton set formation property: they can form an expression alone, they can be pronounced in language without a strong intuition of being incomplete, even uninterpetable. From here, he draws a conclusion that open class elements come without any uninterpretable, or unvalued features, and that such features are provided in their extended projections. Consequently, wherever an open class element comes with a certain syntactic structure, such as in nouns taking sentential complements or in derived nouns, a relativization

structure must be involved, where the noun starts out in the derivation as a bottom of some projection line. The present analysis infers that verbs, which are also open class elements, comply with the rather deductive conclusion from Kayne (2008). As this issue is a side effect of the analysis, and goes far beyond the aims of the paper, I do not go into a deeper discussion, but rather leave it for future work.[9]

Moreover, this analysis goes one step further in the direction of deriving all type-recursive configurations in natural language in terms of relativization. So far, in addition to traditional relative clauses, such explanations have been proposed for temporal and spatial modification clauses (Geis 1970, 1975, Larson 1987, Demirdache and Uribe Etchebarria 2004, Dubinsky and Williams 1995), conditional clauses (Geis 1985, Lycan 2001, Bhatt and Pancheva 2006, Arsenijević 2009a, Tomaszewicz 2009, Haegeman 2010b), complement clauses (Arsenijević 2009b, Manzini and Savoia 2003 and their subsequent work, Polinsky and Caponigro 2008, Haegeman and Urögdi 2010a,b, 1994 and Aboh 2005, Krapova 2010) and possessives and certain PPs (among others, de Vries 2002). This paper extends it to a kind of type-recursion that is marked morphologically, but that nevertheless diplays the semantic effects of recursion – in the way aspectual values are specified by multiple layers.

Let me show now how the proposed analysis accounts for the asymmetries between external and internal prefixes, as outlined in sections 2 and 3.

A) the internal prefixes contribute a resultative component to the interpretation of the verb – when there is a goal phrase in the VP, the preposition heading it will be the one corresponding to the internal prefix; the contribution of the external predicates is rater related to the quantity of the eventuality (and of its incremental theme).

Only the most deeply embedded PP semantically modifies the lexical VP – higher PPs do so only indirectly. This is parallel to the views like those of Campbell (1996) and Koopman (2003, 2005), where the DP projected by a lexical noun is also a relative clause, but a special one due to the lexical nature of its projecting head, and there are several consequences of this fact. One is that only the lowest prepositional element directly modifies the eventuality described by the verb, by modifying its aspectual value. The aspectual head specifies an aspectual value (i.e. bounded in this case), and PP specifies a predicate that describes the type of boundary specifying this value. Higher PPs specify aspectual values imposed over other AspPs, and hence only reach the quantity at levels higher than the lexical description, even though they are brought into a local relation with respect to the VP by the mechanism of relativization.

In the schematic representations in (15) and (18), specifier of the external PP (i.e. PP triggering the external prefix) is left empty. I assume that this position is filled either by the direct object of the core event, or by an externally merged direct object such as the reflexive in (19).

The direct object of the VP (stolice ‘chairs’ and palačinke ‘pancakes’ in the examples discussed) may move to the highest AspP (via the intermediate SpecAspPs), in which case it will be assigned accusative, and measure out the eventuality in the aggregate interpretation. Thus, in (15) the quantity of chairs measures the exhausting of the eventuality of puling them under the table, and in (18) the quantity of pancakes measures out the accumulation of the eventuality of baking them. Consequently, an exhaustion of chairs and an accumulation of pancakes is entailed by the respective expressions. Movement of the direct object is triggered by the need of the higher AspPs to have a measuring out argument.

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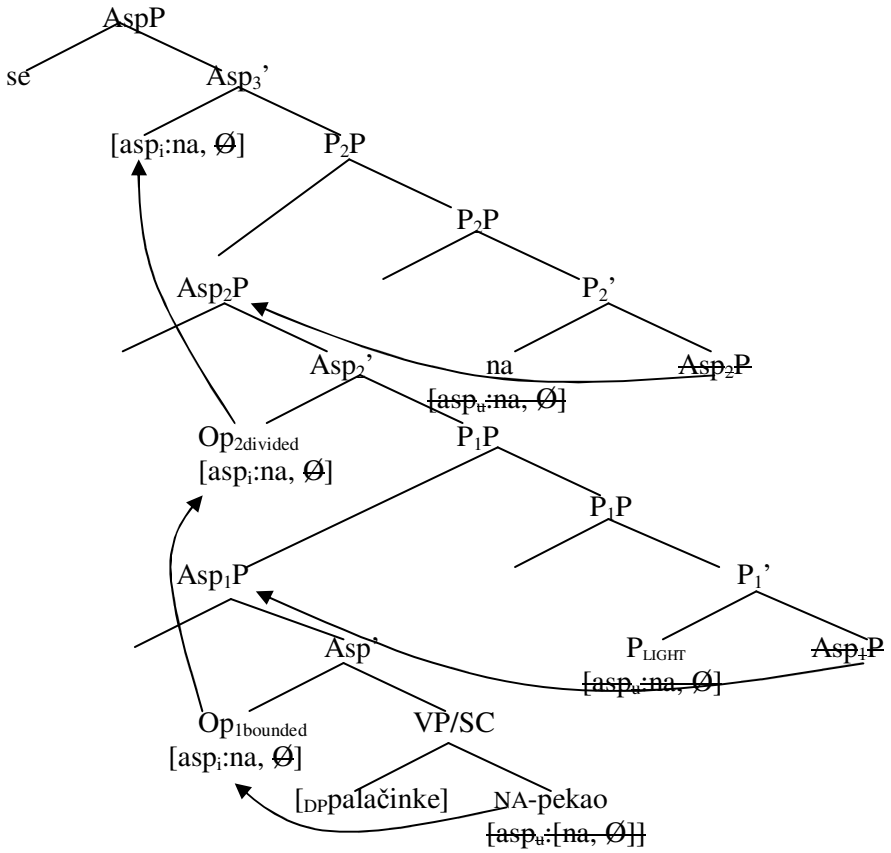
[9] Note, however, that while Kayne (2008) argues that lexical items carry no uninterpretable features, in the present analysis lexical verbs come with an uninterpretable aspectual feature. There are two ways out of this incongruency, neither of which would endanger the present analysis. One is that the aspectual feature on the verb is actually interpretable, part of its lexical specification. The other is that this feature does not come from the lexical verb itself, but from whatever gives this lexical item its verbal category.

It is also possible that the specifier of the highest AspP be filled by an independently generated element, in which case the direct object of the lexical verb does not move, and does not get assigned accusative. This happens in a restricted set of cases, including certain argument alternations, which I do not discuss here for reasons of space. Just for illustration, one special case discussed by Žaucer (2010a), is presented in (19). The construction is characterized by an external prefix and a reflexive in accusative, which in combination give the interpretation that Žaucer describes as 'get ones fill of doing something'.

(19) Jovan se na-pekao palačinki.
J Refl on-baked pancakes
'Jovan had his fill of baking cakes' (translation borrowed from Žaucer 2010a)



On the present account, the interpretation of this structure is straightforward. Due to the subject-bound reflexive in the specifier of the highest AspP prefix, the subject measures out the root eventuality, i.e. the quantity effect specified by the external prefix, in this case accumulation. Hence, the accumulation (or exhaustion, overlap etc. in other such examples) of the eventuality is measured by the subject – or more precisely, by one dimension of the subject. The dimension is pragmatically determined, and may be some physical or other capacity, desire, some inalienably possessed container etc. Since the reflexive is assigned accusatiove, the direct object of the lexical verb cannot be assigned accusative, and is assigned genitive as a default case of the lexical domain.

B) the external prefixes can stack, unlike the internal ones (i.e. at most one prefix on a verb can be internal, and then there can be more than one external prefix).

C) the internal prefixes tend to take the position closest to the lexical verb (i.e. if there are more then one prefixes on a verb, one of which is internal, then the internal one must be the last one in the series of prefixes, i.e. the one right before the verb).

These two asymmetries are straightforwardly captured by the relativization aspect of the analysis: relativization is recursive, and principally unbounded, and so is prefixation. The first round of

prefixation, due to its access to the lexical domain, gives the internal prefix (i.e. the internal nature of the prefix comes from its access to the lexical domain), and all the others result in external prefixation.

D) the internal prefixes may add an argument to the argument structure of a bare lexical verb, while the external prefixes cannot have this effect.

This is not correct. The external prefix actually adds an argument by a rule, and this argument can be internally merged, yielding an effect of a preserved argument structure. The introduction of the reflexive is an illustration of external merge, which indeed expands the argument structure of the verb by one argument. Žaucer (2010a) further relativizes this generalization. Still, there is a tendency for internal merge, but it is probably pragmatic in nature. The relevant position specifies an argument that measures out the (accumulated, exhausted, overlapping) quantity of an eventuality. It is hard that a participant other than that affected by the core eventuality or that contributing the action can enter a relation of this kind.

E) Svenonius (2004) generalizes that internally prefixed verbs derive both root nominalizations and gerunds, while externally prefixed ones derive only the latter.

This is again attributed to the low structural position of the internal prefix, with an access to the lexical domain of the expression, similar like Svenonius does. The only difference is that this low position on the present account is not below but above the verb.

Present analysis also provides better answers to the questions which were presented as problematic for the alternative approaches. The doubling of the preposition (as an internal prefix and a preposition) is explained in terms of concord, i.e. agreement, the main source of doubling phenomena in syntax. The resultative interpretation of the prefix is accounted for by the relation of valuation it establishes with the aspectual operator (in this respect the present analysis is very similar to Borer 2005). The unity of the result subevent and the description of the remaining part of the root event predicate is established in terms of a prototypical source of coreferential relations in syntax: relativization. The root eventuality is specified as that which has its aspect valuated by another eventuality, via the relativization structure, and valuating aspect equals to assigning it a bounded interpretation. The default way of interpreting one eventuality as a bounder of another is by interpreting it as its result (as a predicate of a subset of final subintervals of the macroeventuality).

As a closing remark, one may wonder why this type of relativization has such poor relative clauses, consisting of only one predicate, as well as how come it is not more widespread cross-linguistically (a vast majority of languages has nominal relativization, similar holds of temporal and conditional clauses, but phenomena that can be captured in terms of verbal relativization are relatively scarce in a typological perspective). I believe the latter question has the former as its answer: the expressive power of this type of relativization is relatively small; all it can do is introduce one additional eventuality taking the one specified by the pre-prefixation form of the verb as its result. The reason why these configurations have such a low expressive power may have to do with the fact that there is a relatively small number of relations that typically hold between eventualities: there are the relation *cause of* (pointing to the possibility of analyzing causatives in terms of relativization too), *result of*, perhaps also *co-event of* (an event that shares the temporal trace and the participants of another), and not many other relations. But this is not a proper answer, as the immediate question is why there are so few relations between eventualities that receive expression strategies in natural language.

An answer to this deeper question could be that verbs are not a proper lexical category. If it is indeed the case that all lexical verbs apart from light verbs are derived by some kind of incorporation, possibly combined with concord, then the class of real verbs is a relatively small closed class. This class includes copulas (arguably realizations of the functional head Pred), aspectual verbs (lexicalizations of the aspectual functional head), and a few other light verbs such as *do* , standing for thematic roles or other functional specifications (see Dowty 1979 and Parsons 1990 for elaborated views along these lines). All the other verbs owe part of their semantics to functional features and items

of other categories, usually nouns. Real verbal meanings thus relate only to the thematic roles, aspectual values, predication and perhaps a few other types of meaning typical of the verbal extended projection. Consequently, verbal relative clauses can contribute meanings of these few types.

5. Conclusion

An analysis has been presented of verb prefixation in S-C, which, mutatis mutandis, applies to other Slavic languages, with possible slight modifications. The analysis is an extension of the raising structure for relativization into the verbal domain. The head driving the process of relativization is the one specifying the aspectual value of the predicate, in place of the determiner head in regular nominal relativization. This analysis uses a minimal inventory of tools: one relevant functional projection (Asp), agreement triggered by an operator, the raising of the relevant material in order to enable the required locality, and head incorporation. The analysis is shown to have a broader empirical coverage, and to provide better explanations for the observed regularities than the previously proposed analyses. It also has interesting implications with respect some more general issues such as the structural position of open class elements, the categorial domain of relativization, and the structural nature of type recursion in natural language grammar.

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