TENSE, ASPECT AND ASPECTUAL COMPOSITION

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1.   *Introduction*

The idea of a compositional treatment of aspect in Slavic languages has recently been defended by several authors investigating aspectuality in these languages: e.g. Schoorlemmer (1995), Dimitrova-Vulchanova (1996) and Schmitt (1996). For Germanic languages a compositional approach was advocated in Verkuyl (1972). Compositionality turns out to work quite well, so the question arises how the two families can be united, the evident problem being that for Slavic languages it seems necessary to distinguish between aspect and Aktionsart, whereas this distinction has no clear formal correlate in Germanic languages. In Verkuyl (1993:318–327) attention was paid to a formal machinery relating a tenseless terminative or durative S to tense and in this way the Progressive Form in English could be dealt with in a compositional framework as one of the ways in which aspect may be distinguished from Aktionsart. Schoorlemmer, Dimitrova-Vulchanova and others provide evidence that such a distinction is justified in Slavic langues, but also that it differs from the traditional distinction based on aspectuality as a verbal matter, still found in modern Slavist work, e.g. in most papers of Flier and Brecht (1985) and Flier and Timberlake (1985).

The present paper aims at bridging the gap between Slavic and non-Slavic languages by adopting the strategy to assume that Aktionsart and aspect are the same until there is evidence to the contrary, *aspectuality* being the term to cover the two traditional terms without any a priori commitment to the use of the two terms just mentioned. It will be shown that in Slavic but also Romance languages between the compositionally formed aspectual structure and tense there is room for an intermediate

operator called ASP_α, possibly occurring at two different positions, where α ranges over some set-theoretical possibilities. On this assumption Slavic, Germanic and Romance languages can be described from a uniform semantic perspective. Aspectuality can be seen as a unified phenomenon concerning certain properties of temporal structuring by natural language, for which languages have developed different strategies to encode it in their morphology or syntax. It is the aim of this paper to focus on perfectivity and on primary and secondary imperfectivization in Slavic languages and to relate their description to the description of the Progressive Form in English, its counterpart in Dutch, and the Imparfait as distinct from the Passé Simple in French. In this way, a unified formalism can be developed within a compositional framework.

2.   *Perfectivity and Imperfectivity in Slavic languages*

The traditional position of linguists with respect to aspectuality in Slavic languages, in particular Russian, may be characterized in terms of scheme (1).

(1) $[_V \pm\text{P}](a_1, \ldots, a_n)$

This is a predication scheme: the verb has a number of arguments. For $n = 2$, it holds for Russian sentences such as (2):

(2)   a.   *Ivan pil pivo*
             Ivan Imp-drank beer
             'Ivan was drinking/drank beer'
         b.   *Ivan vypil dva piva*
             Ivan Perf-drank two beer
             'Ivan drank two beers'

[$\pm$P] expresses here an opposition between the imperfective verbal form *pil* and its perfective counterpart *vypil*. In the Slavist literature on aspect it is customary to speak about perfective verbs and imperfective verbs.[1] This usage is misleading. It leads astray as it ignores the idea that a morpheme added to a stem may be part of the syntactic organization of the sentence as a whole, and so of its interpretation. In spite of the fact that there are perfective verbs without a prefix, in Russian e.g. *kupýt'* (buy), *dat'* (give), the general idea is that semantically the perfective prefix works as an operator on a verbal stem providing some sense of total indivisibility, completion, delimitation, resultativity or situation change, among others.[2] I tend to generalize over these defini-

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[1] Not only in didactic grammars of Slavic languages such as the Russian Kolni-Balozky (1960) or Bulgarian Walter and Karvanbasieva (1987), but also in the scientific literature on Slavic aspectuality.

[2] There is a tradition of 'total indivisibility' originated by J. Maslov cited in Guentcheva (1990) and Brecht (1985), cf. also Comrie (1976), Barentsen (1985); of completeness in the sense of completion

tions in terms of the notion of discreteness within a certain continuous structure.[3] This characterization is compatible with most of the notions just mentioned. The perfective prefix *vy-* may be seen as being added to a neutral verb stem.[4] It gives (2b) its sense of completedness. Likewise *pil* may be taken as a combination of a neutral verb stem and an Imp-operator, giving (2a) its sense of *medias in res*.

Scheme (1) also holds for the other Slavic languages albeit in different ways and forms, because each of these languages has developed different options on a common aspectual ground. Bulgarian is often considered the Slavic language with the most developed aspectual system, having all the important distinctions such as primary and secondary imperfectivization as well as a more complex tense system than any of the other Slavic languages. Moreover, Bulgarian has a definite article lacking in Russian as shown in (3).

(3)   a. *Az jam jabulki*
            I Imp-eat apples
            'I am eating apples'
        b. *Az šte izjam jabulkite*
            I will Perf-eat apples-the
            'I will eat the apples'

The absence of a perfective prefix in (3a) encodes an imperfective interpretation, whereas the presence of the prefix *iz-* in (3b) yields a perfective interpretation. But here the definite article in the form of the suffix *-te* is required.

In Bulgarian, secondary imperfectivization plays an important role in the construction of aspectual information at the sentential level and therefore some authors have put more emphasis on the aspectual importance of the opposition between (b) and (c) than of the opposition between (a) and (b).

(4)   a. *Ivan pieše dve biri*
            Ivan Imp-drank two beers
            'Ivan was drinking two beers'
        b. *Ivan izpi dve biri*
            Ivan Perf-drank-Aor. two beers'
            'Ivan drank two beers

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or completedness as in Leskien (1919), Jacobsohn (1933), Kolni-Balozky (1960), Jakobson (1971), Kabakčiev (1984), among many others; of delimitation as in Paillard (1989), Lindstedt (1984) and Guentcheva (1990), of resultativity as in Seljakin (1984), of situation change as in Barentsen (1985), Stambolieva (1995), etc., etc. It is obvious that some of the semantic definitions imply other ones.

[3] The appropriate metaphor in which this term has the proper effect may be described in terms of some object—a whale or some other fish—perceived in the sea (of time), only temporarily distinguishable as a discrete object in the mass surrounding it.

[4] This might be rephrased as saying that Perf is an operator on an imperfective stem as e.g. in Barentsen (1985), but I think that the formulation chosen does more justice to the idea that a choice between two ways of structuring information is crucially involved.

    c. *Ivan izpivaše po dve biri (vseki den)*
       Ivan Perf-drank-Imp times two beers (every day)
       'Ivan used to drink/was drinking two beers (every day)'

In some Slavic languages this triple system has not been developed as completely as in Bulgarian, so it seems fair to test the compositional machinery at least on that language by providing an account for the system of oppositions underlying sentences like ().[5]

    It should be observed that those defending the position that Slavic aspect is a matter of verb morphology only, are bound to defend the view that the arguments of the verb do not relate to the information expressed by $[_V+\mathrm{P}]$ or $[_V-\mathrm{P}]$ in (1). This cannot be true. As noted e.g. in Dimitrova-Vulchanova (1996:19) the presence of the definite article *-te* in Bulgarian may be explained in terms of the presence of *iz-*. Likewise a Russian sentence like (5) shows a dependency between the presence of the perfective prefix and the interpretation of the indefinite mass NP: it must be taken as pertaining to a contextually identified quantity of beer.[6]

(5)   *Ivan vypil pivo*
       Ivan Perf-drank beer-Acc
       'Ivan drank the beer'

Of course, one might attribute this to the accusative case of *pivo* rather than to the presence of the perfective prefix *vy-*, the more so because the difference between accusative and genitive/partitive case plays an aspectual role in Russian. But firstly, the difference between (5) and (2a) *Ivan pil pivo* cannot be explained in terms of case difference, and secondly in Russian—as distinct from Finnish—it is rather the partitive/genitive case which expresses imperfective aspect than the accusative (Cf. Jacobsohn 1933, Lindstedt 1984).

    Whatever the role of case, one might say that, in general, even those who stuck or stick to Slavic aspect as only a matter of verb morphology and verb semantics, implicitly assume the correctness of (1) in the sense that the verb is taken as a predicate having a number of arguments. That is, there is a certain domain within which it seems relevant to speak about the formation of aspectuality. The well-known tests establishing perfective or imperfective aspect consist of adverbials operating on schemes of the

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[5] I will do that on the basis of Guentcheva (1990) and Dimitrova-Vulchanova (1996) and on work mentioned in their books.

[6] Cf. Paillard (1989) for a detailed analysis of the relation between the verb and its internal argument. Comrie (1976) observes that (5) also means 'Ivan has drunk the beer', but I will use only one gloss.

form (1).[7]

(6)   a.   *#Ivan*   *vypil*   *dva piva*   *s čas*
           John   Perf-drank   two beer   for about an hour
           #'John   drank two beers   for about an hour'
      b.   *Ivan*   *pil*   *dva piva*   *s čas*
           John   Imp-drank   two beer   for about an hour
           'John   was drinking   two beers   for about an hour'

The single event interpretation in which Ivan drank two beers is excluded in (6a).
Likewise, one may say (7a) whereas (7b) is not acceptable.

(7)   a.   *Ivan*   *vypil*   *dva piva*   *za čas*
           John   Perf-drank   two beer   in an hour
           'John   drank   two beers   in an hour'
      b.   *?Ivan* *pil*   *pivo*   *za čas*
           John   Imp-drank   beer   in an hour

Concluding this brief survey of basic notions involved in the study of Slavic aspectuality, it should be observed that the traditional position on aspectuality is characterized by the tendency to regard perfectivity and imperfectivity as a morphological-semantic phenomenon restricted to Slavic languages. Although case is a factor of some sort, it does not play a decisive role, so that the burden of the account for the aspectual difference is put on a semantic characterization of the morphemes involved in bringing about the opposition between perfectivity and imperfectivity, in a combinatorial fashion. The position in which aspect is seen as exclusively a matter of verb morphology has been dominant in Slavist linguistics ever since the 19th century. Unfortunately, in modern literature on Slavic aspect, the traditional position has been supported by the quite uncritical adoption of Vendler's quadripartition which I consider a setback with respect to the insight in linguistic theory formation slowly emerging in the first half of this century, namely that aspectuality is a sentential matter.[8]

3.   *Terminativity and Durativity in Germanic languages*

Scheme (1) makes it possible to compare the traditional Slavist analysis of the perfective-imperfective partition to an analogous opposition found in Germanic languages, as

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[7] For those who think that history started with one generation before their own entrance into linguistics, it should be observed that these tests were available at the beginning of the 20th century, as mentioned in my 1972-book.

[8] Cf. e.g. papers in Flier and Brecht (1985), Flier and Timberlake (1985). For a semantic knock-down argument on the verb quadripartition: Verkuyl (1996); for an extensive critical analysis of Vendler's classification: Verkuyl (1989).

proposed in Verkuyl (1972), presented here in its feature form (8).[9]

$$(8) \quad [_{\pm T_S} \begin{bmatrix} V \\ [\pm \text{ADDTO}] \end{bmatrix} \begin{pmatrix} NP_1 & NP_n \\ [\pm \text{SQA}], \dots, [\pm \text{SQA}] \end{pmatrix}]$$

This scheme expresses a predication of a [±ADDTO]-verb over one or more [±SQA]-NPs in sentences like (9).

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\begin{array}{llll}
(9) & a. & \text{John} & [_{VP} \text{ drank} & \text{two beers]} \\
 & & [_{+T_S}[+\text{SQA}] & [_{+T_{VP}}[+\text{ADD TO}] & [+\text{SQA}]]] & \Rightarrow terminative \\
 & b. & \text{John} & [_{VP} \text{drank} & \text{beer]} \\
 & & [_{-T_S}[+\text{SQA}] & [_{-T_{VP}}[+\text{ADD TO}] & [-\text{SQA}]]] & \Rightarrow durative \\
 & c. & \text{Adults} & [_{VP} \text{drank} & \text{two beers]} \\
 & & [_{-T_S}[-\text{SQA}] & [_{+T_{VP}}[+\text{ADD TO}] & [+\text{SQA}]]] & \Rightarrow durative \\
 & d. & \text{John} & [_{VP} \text{wanted} & \text{two beers]} \\
 & & [_{-T_S}[+\text{SQA}] & [_{-T_{VP}}[-\text{ADD TO}] & [+\text{SQA}]]] & \Rightarrow durative
\end{array}
$$

Let me first give a short description of how composition proceeds in (9). The terminativity $[+T_S]$ of the sentence (9a) is formed in two steps. The [+ADD TO]-verb—expressing dynamicity, progress in time, non-stativity—first takes its internal argument (in many cases its direct object) to form a VP which receives a compositionally formed aspectual value $[\pm T_{VP}]$ which combines with the value contributed by the external argument (often the subject-NP) to form a $[\pm T_S]$-value at the sentential level.[10] In this way, the terminativity of sentences like (9a) can be explained: the NP *two beers* can be marked as [+SQA] because it pertains to a specified quantity of beers. The Count Noun *beer* denotes in the domain of interpretation the set of all glasses or bottles or comparable measuring units containing beer. The NP *two beers* is a specified subset of this set. The basic idea is that, in English, the determiner *two* restricts the head noun denotation: the intersection of the set of beers and the things drunk by Ivan has a fixed cardinality k.[11] In *Ivan drank a litre of beer* the story is somewhat different but analogous. Here, *beer* denotes the mass of beer in the domain of discourse and *a litre of* separates a specified quantity thereof.[12] The [−SQA]-specification in (9b) concerns

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[9] It is easy to talk about compositionality in terms of features, because it abbreviates information which is semantically quite complex. But it is necessary to keep in mind that features are not only handy but also potentially misleading notations, because they cannot handle very well relations between constituents marked as having features. I will use them here as long as their use does not cause problems because the traditional Slavist position on aspect as a matter of the verb is crucially based on a sort of feature analysis and this provides a natural point of departure for a comparison.

[10] The terminative nature of the VP is quite different from the one at the S-level. When necessary, I will use 'VP-terminative' for the VP and 'terminative' plain for the tenseless S only.

[11] In this case $k = 2$, in *some beers* $k = m$ and $m \geq 2$, in *all beers* $k = |[\![beer]\!]|$, etc.).

[12] For a detailed analysis Verkuyl (1972:73–84); cf. also Krifka (1987) for a mereological approach, but compare Verkuyl (1993:177–180) based on Bunt (1981). See also Mollá-Aliod (1997).

the count noun *beer* in the sense of measuring units discussed above. Due to the bare plural in (9c), the NP *adults* does not delimit a set of counting units in the domain such that its cardinality could in principle be established. In (9d), the verb is stative: whatever the nature of the NPs, the sentence will be durative.

Focussing now on the feature-values, one may observe that the occurrence of only plus-values in (9a) on the one hand and the occurrence of a minus-value in the other cases, display an opposition between a (tenseless) terminative sentence marked $[+T_S]$ on the one hand and (tenseless) durative sentences marked $[-T_S]$ on the other hand. Thus, (9) demonstrates the so-called *Plus-Principle*, which says that terminative sentences need plus-values and that one minus is sufficient to bring about durativity. It should be underscored that features fail to do justice to interdependencies between the verb and its arguments. In other words, only a full fledged semantics in which dependencies can be accounted for formally, may help us to characterize and understand the compositionally formed aspectuality of a sentence. On the other hand, from a presentational point of view, the feature notation is quite handy, so I will use it until it is necessary to go deeper into real semantics. Moreover, for Germanic languages like Dutch and English the features serve their purpose very well, because they predict exactly the three aspectual classes that are relevant in aspectual composition as can be seen from Figure 1.
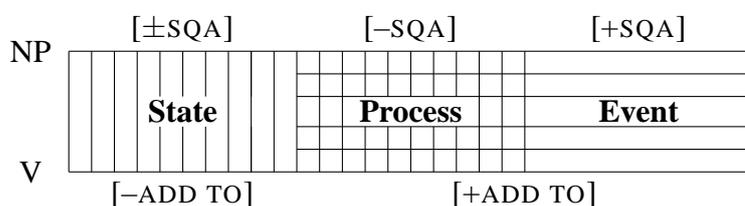

Figure 1: *Construal of three compositionally formed aspectual categories*

Here we see that sentences pertain to states if their verb is stative: the nature of the NP does not play a role. Whenever the verb is non-stative (dynamic), there are two possibilities: if an argument is [–SQA] we speak about processes, as in (9b) or (2a). If the argument is [+SQA], we speak about a terminative event.[13] Note that the tripartition is construed rather than assumed. This is exactly the reason why I reject the view that Aktionsart is something objective and aspect something subjective: if we want to speak about something in the domain in terms of a (terminative) event we choose linguistic means for doing so as an alternative for choosing different means when we want something presented as a process. From this it follows, that I do not assume the independent existence of ontological classes like states, processes or events, so I do

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[13] The situation is more complicated because negation in an otherwise terminative sentence yields a state. For a more detailed analysis of this ontological tripartition Verkuyl (1993:19).

not follow the practice of those who take the ontological classes as "being out there". We speak about events, processes or states not because they are out there, but because we filter them out by our language. If we see John drinking beer we know that we are looking at something bounded (we are mortal after all). Yet by saying *John drank two beers* we talk about what we present as a terminative event, whereas by saying *John drank beer* we talk about the same situation as if it might continue forever (replace *John* by *Zeus*, say), hence as a process. Of course, there is something "out there", but the point is that our language is an important cognitive means of filtering out structure in the domain of interpretation about which we talk.[14]

4.   *Aspectual asymmetry*

The two composite [T]-features in (9) are made up by the features associated with the verb and its argument NPs. The level at which sentential terminativity is formed will be called *inner aspectuality*. It marks a certain restriction of the scheme (8), which will be useful in exploring the aspectuality of a sentence like (7a) *Ivan vypil dva piva za čas*. Its aspectuality taken as a whole (i.e. including the adverbial *za čas*) is a matter of *outer aspectuality*: it involves the interaction between the inner aspectuality of *Ivan vypil dva piva* and the adverbial *za čas*. Outer aspectuality lies outside the scope of the present paper. It is not yet clear whether or not the result of applying tense as an operator INFL on the tenseless S by the rule INFL(S) = S′ yielding a tensed S′, belongs to the realm of outer aspectuality.

Before going into the status of $[\pm T_{VP}]$ and into a more precise interpretation of the two basic semantic features involved, i.e. $[\pm\text{ADD TO}]$ and $[\pm\text{SQA}]$, let me first illustrate the system underlying the features glossed in (9) with the help of Figure 2.
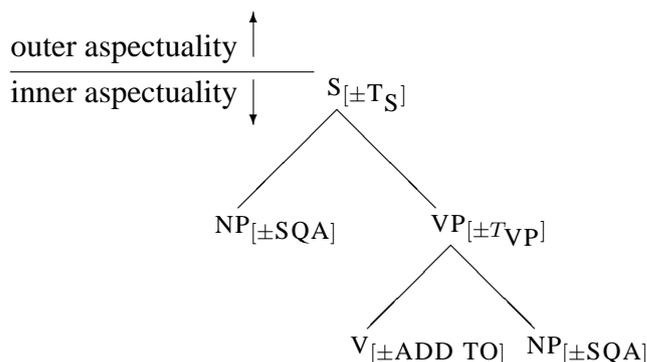

Figure 2:*Aspectual composition*

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[14] So, in modeltheoretical terms, given a model **M** standardly consisting of a domain of interpretation *D* and an interpretation function *I* defined on a language *L*, the present perspective on ontological classes is that *I* filters out structure in *D*; cf. De Swart (1996) for an opposite position.

There are quite a number of arguments that in Dutch and English aspectuality is obtained on the basis of the asymmetry displayed by Figure 2, the semantic object denoted by the VP playing a crucial role in the formation of aspectuality.[15]

The notion of internal argument has been used here along the lines pegged out in the syntactic literature of the seventies and eighties, in particular in the generative literature (e.g. Williams 1980;1981). Those who adhere to syntactic asymmetry in generative syntax tend to dissolve it at the level of Logical Form by using schemes of the form $P(a_1, \ldots, a_n)$ in which the arguments are equipollent, their values being taken as members of n-tuples. The Plus-Principle is based on asymmetric predication of the sort well-known in Montague grammar. Its format is rather $\text{NP}_1(_{VP}[\text{V NP}_2])$. That is, the external argument NP relates to the VP as a whole: the VP denotes a semantic object in which the information expressed by the V and NP_2 has been amalgamated into what we call the VP.

This point can be clarified with the help of the sentences in (10).

(10) a. Judith ate five sandwiches
       b. Three girls ate five sandwiches

Informally, one might describe the predication with respect to Judith in (10a) as her "going through a Path" consisting of eating five sandwiches. Suppose that she is one of the three girls in (10b). In order to provide for the possible interpretation in (10b) that 15 sandwiches were eaten by the three girls, we need a semantics in which the relation between the external NP *Three girls* and the VP is defined in terms of multiplication. That is, (10b) can be understood in terms of the following configuration (formally defined as an injective function):

(11) $g_1 \mapsto [\![\text{VP}_1]\!]$ $g_2 \mapsto [\![\text{VP}_2]\!]$ $g_3 \mapsto [\![\text{VP}_3]\!]$

In other words, each of the three girls receives her own copy of the information provided by the VP *eat five sandwiches* presented in (10a). Internally, the semantic objects denoted in this way may differ structurally. That is, the first girl Judith may have eaten in a 1+1+1+1+1-way, the second girl in a 2+2+1-way and the third one may have managed to eat them all five together. We do not know this from hearing sentences like (10b). In this way, each girl receives her own individual Path "through the predication". By choosing this metaphor, I put myself in the localistic tradition revived by Gruber (1964;1965) which describes nonstativity in terms of a "movement" from a Source position to a Goal-position.

In the formalization of this framework this "movement" by a Theme is taken as computing for each of the members x of the external argument denotation the way in

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[15] For the generative eye: VP = V″, S = VP and NP = DP. Apart from that a fully generative structure would contain functional projections.

which x undergoes the predication expressed by the VP.[16] Suppose that we follow the second girl on her "Path" through the predication in a specific situation exemplified in Figure 3. At index 1 (provided by the nonstative verb) two of the members of the internal argument denotation are counted as being involved in the predication 'being eaten by $girl_2$. At index 2, the third and fourth sandwich are counted, and at index 3, all five have been eaten. At the third index, the function connecting indices and members of the internal argument denotation comes to a stop. This explains the terminative nature of the VP *eat five sandwiches*.
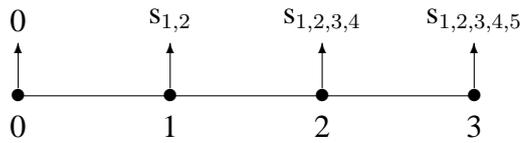
$$0 \qquad s_{1,2} \qquad s_{1,2,3,4} \qquad s_{1,2,3,4,5}$$

$$0 \qquad 1 \qquad 2 \qquad 3$$

Figure 3:*The Path of $girl_2$*

The formal machinery necessary to deal with the fact that sentences like (10b) express a set of combinatorial possibilities requires type logic (cf. for details Verkuyl 1995a or Verkuyl 1993). Formally, the Path of $girl_2$ is essentially a function mapping indices into the internal argument denotation. The representation in Figure 3 should be understood as just illustrating an instantantiation of the sort of information expressed by this function. It represents $[\![VP_2]\!]$ in (11). This VP can be said to be terminative. Note that the distributivity in (11) bears on aspectuality: for each of the three girls there is a terminative event. To account for this we need to assume that the VP forms a semantic unit distributed over each of the girls.

So far I have ignored another interpretation of sentences like (10) which I call *kolkhoz-collective*. In this case, all three girls are mapped (by a constant function) to just one image: $g_1 \mapsto [\![VP]\!], g_2 \mapsto [\![VP]\!], g_3 \mapsto [\![VP]\!]$. None of the girls may say that she ate five sandwiches. On this interpretation the sentence is also terminative.

Distributivity and (kolkhoz-)collectivity in the sense given here form two sides of the interpretive coin available. It is interesting to see that Bulgarian distinguishes between them: it needs two different sentences to express the two interpretations.

(12)   a.   *Tri momičeta izjadoxa (Perf.Aor.) pet sandvica*
             'Three girls ate five sandwiches (together)'

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[16] The function ℓ_x is defined as $\ell_x = \{\langle i, y \rangle | [\![\text{AT}(x,y)]\!]_{M,i} = 1\}$, for each member x of the external argument, i.e. as a set of pairs of indices and parts y of the internal argument denotation such that at each index i the x and y are in the relation expressed by the Verb. Each index can be seen as a point at which the predication is checked as to how the external argument and some part of the internal argument satisfy the predication expressed by the verb: the indices are essentially counting points at which the progress expressed by the verb is computed as to its satisfaction. The function comes to a stop if there is nothing left to count.

b. *Tri momičeta izjadoxa (Perf.Aor.) po pet sandvica (vsjaka)*
   'Three girls ate five sandwiches (each)'

Sentence (a) expresses kolkhoz-collectivity: in a specific situation three girls ate five sandwiches alltogether. None of them may say that she ate five sandwiches: (a) leaves in the dark the contribution of each of the girls to the satisfaction of the predication. Sentence (b) covers (11): the distributing particle *po* is necessary and for some speakers also the presence of *vsjaka* (each) is preferred.[17] I will return to the sentences in () in the last section. Here, again, the rightwardedness of the perfective affix is demonstrated: the difference between (a) and (b) shows up in the VP.

5.   *How terminative is perfectivity?*

Let me now first test the assumption $[\pm P] = [\pm T]$, where $[+T]$ stands for terminative (or telic) and $[-T]$ for durative (or atelic). The least one can say is that $[+T]$ corresponds very closely to the Russian $[+P]$. In fact, the two tests (6) and (7) to mark perfectivity and imperfectivity operate both for Germanic and Slavic languages:

(13)   a.   #John drank two beers for about an hour
       b.   #Ivan vypil dva piva s čas

In both cases the single event interpretation in which John drank two beers is excluded, whereas it is possible in (14).

(14)   a.   John drank two beers in an hour
       b.   Ivan vypil dva piva za čas

In my work on aspectuality in Germanic languages I have been aware of the fact that the claim that $[\pm P] = [\pm T]$ has as a consequence that two oppositions are conflated: the opposition between the so-called Aktionsarten and the opposition between Imp and Perf. Yet it seems to me that the way this difference was dealt with in the literature made it necessary to conflate the two oppositions as a matter of strategy: it is necessary to show that $[\pm P] \neq [\pm T]$ rather than to assume it, in particular if one aims at a universally applicable theory of aspectuality as part of a theory about how languages deal with temporal structure. This strategy made it possible to relate the aspectuality of Slavic languages to that of Germanic and other languages, the idea being that if a common ground can be found for a similar semantic interpretation of sentences, the way is open to see in which ways languages use different ways to express the temporal structure of their sentences, while sharing a lot of common ground.

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[17] I owe this observation to Mila Dimitrova-Vulchanova (email). It enhances the distinction between distributivity and kolkhoz-collectivity as formalized in Verkuyl (1995), although it should be noted that () is used only in contexts expressing contrast.

Assuming for the moment that [±T] = [±P], we can see that (8) predicts correctly for (9a) *John drank two beers* that it expresses perfective aspect. On the assumption that *pivo* is [–SQA], (8) also predicts the imperfectivity of the Russian counterpart of (9b), i.e. (2a) repeated here as (15).

(15)   *Ivan*   *pil*   *pivo*
       [+SQA]   [+ADDTO]   [–SQA]
       John   was drinking/drank   beer

The Bulgarian sentences in (3) are also covered by (8), if both *jam* and *izjam* receive a [+ADDTO]-feature and if the difference between *jabulkite* (the apples) and *jabulki* (apples) is explained in terms of an opposition between [+SQA] and [–SQA], respectively.

However, there is an obvious problem with respect to the thesis that the Germanic scheme in Figure 2 may be seen as a universal format of aspectual composition. As noticed above, the English verb *drink* is a [+ADD TO]-verb providing for a sense of nonstativity, so why should we not assume this feature to be present in its Russian counterpart? Given the [+SQA]-nature of the two arguments, a [+T]-value is predicted at the sentential level, for (2b) repeated here as (16a).

(16)   a.   *Ivan*   *vypil*   *dva piva*
            [+SQA]   [[+ADD TO]   [+SQA]]
       b.   *Ivan*   *vypil*   *pivo*
            [+SQA]   [[+ADD TO]   [–SQA]]

But something is wrong here: both sentences in (16) are [+P], whereas (8) predicts a [–T] for (16b), the perfective counterpart of (2a). One may not simply change the verbal feature [+ADD TO] into [–ADD TO] in the case of (16b), because the imperfective verb form *pil* cannot be put on a par with the imperfective form of verbs which are really stative, such as *khotel* (wanted-3sg-masc). Let us therefore change the assumption that *pivo* be [–SQA]. This is not an unreasonable move: *pivo* is the accusative form and because of that, it expresses quantification of some sort. At any rate, it may be labeled as [+SQA] and that would solve the problem in (16). But now, obviously, (15) would become a problem. Note also that, in cases like (17), [+T] and [+P] do not match.

(17)   a.   *On*   *čital*   *etu knigu*
            He   Imp-read   this book
            [+SQA]   [[+ADD TO]   [+SQA]]
       b.   *On*   *pročital*   *etu knigu*
            He   Perf-read   this book
            [+SQA]   [[+ADD TO]   [+SQA]]

This suggests that the features involved in the aspectual composition of the Germanic cases do not or do not immediately match with those used to fully characterize the

Slavic data. This is confirmed by the sentences in (18).[18]

(18) a. *Ivan*   *pil*   *dva piva*
          [+SQA]   [[+ADD TO] [+SQA]]
      b. *Ivan*   *pil*   *pivo*
          [+SQA]   [[+ADD TO] [+SQA]]

They are not perfective in Russian. Again, the features in (9) are not sufficient to explain the Slavic data, although there is clear evidence that they are necessary.

Even on the assumption that indeed there is a systematic relation between a compositionally formed [+T] at the S-level of Figure 2 and the presence of a perfective prefix in the $S_{+[T_S]}$, we have to keep in mind that the role of aspectual affixes in Slavic languages is quite complex. For the analytically most complex Slavic language, Bulgarian, this has been shown e.g. by Guentcheva (1990) and Dimitrova-Vulchanova (1996). The picture is even more complicated because the Slavic languages differ considerably in their ways of expressing tense and aspectuality. On a compositional approach, one has to solve several severe problems by sorting out very carefully how a mapping between Slavic languages and non-Slavic languages should be defined. Questions arise as to how the English Progressive Form in *John was drinking two beers* can be mapped into, say, a corresponding Bulgarian imperfective (or reversely) and how this translation should take place so as to maintain the idea that there is a common possibly universal ground for aspectuality in all languages. Other questions concern the problem of how the perfective form in Bulgarian, especially when used in an Aorist form, relates to the French Passé Simple. We will come back to questions like these in later sections.

In general, though, the presence of a [+P]-prefix in Slavic languages may be said to correspond to the [+T] of sentences in Germanic languages, whereas a [–T]-specification in the latter corresponds to the absence of [+P] in the former, as argued by Schoorlemmer (1995) and Dimitrova-Vulchanova (1996). I will proceed by adopting this view: in spite of the differences, there is sufficient evidence for a systematic correspondence or overlap between what is expressed via [+T] in Germanic languages and what is expressed by [+P] in Slavic languages.

As a final argument for this position the following Polish example may illustrate the fact that the perfective *na-* should be taken as playing a role in a combinatorial interplay of sentential information in (19) which it to be interpreted as 'For years he did not write a book'.

(19) *Przez*   *lata*   *nie*   *napisał*   *zadnej*   *ksiażki*
      -long/for years   neg   Perf-write-3sg   no   book

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[18] The ungrammaticality of (18a) could be lexically determined, the verbs *pit'* (drink) and *kushat'* (eat) being the notorious two verbs disallowing a [+SQA]-internal argument, but as observed by Paillard (1989:63), following Wierzbicka 1967, *Segodna utrom ja pisal dva pisma* (This morning I was writing two letters) is not acceptable either.

This sentence is even ungrammatical with the imperfective verb form *pisal*. Note that the sentence *Nie napisał zadnej ksiażki* in (19) cannot be called perfective in spite of the presence of a perfective form. Therefore, either the well-known test in (6) does not do what it is supposed to do—to distinguish perfective forms from imperfective forms—, or the test is adequate but then the operation of *nie* cannot be explained. Yet, given a structural account of the distinction between perfective en imperfective forms it is intuitively clear what happens in (19): the negation operator *nie* blocks the perfective power of the VP at the sentential level respecting, however, the information expressed by the VP *napisał zadnej ksiażki*. This enables the speakers to operate at the level of presuppositions and negative expectations, as in:

(20)   *Przez   lata   nie   przeczytał   ani jednej   ksiażki*
       -long/for   years   neg   Perf-write-3sg   not even one   book

By using the sentence *Nie preczytal ani jednej ksiażki* (20) rather than its imperfective counterpart *Nie czytal ksiazek* (he did not read books), speakers express that for years he did even not read one single book. By using the perfective form speakers give away their personal judgment about the situation described by (20), in this case negative. This can only be explained by looking at structural factors which make up the phenomena just described. Which is what [+T] is about.[19]

6.   *The Perfective Prefix as an operator*

Returning to (16b), we have seen that on the basis of the two features making up the VP, a [−SQA]-specification of the internal argument *pivo* is untenable. Russian speakers assign a terminative interpretation to (16b): it means that Ivan drank *the* beer, that is, some quantity of beer already identified in the preceding discourse.

Not all Slavic languages are so liberal as Russian. Guentcheva (1990:36) considers sentences like (21) ungrammatical. In terms of the features used above, this ungrammaticality is due to the [−SQA]-nature of the NP *kafe*.[20]

(21)   a. *Az   izpix   kafe*
           I   Perf-drank   coffee
       b. *Az   izpix   kafeto*
           I   Perf-drank   coffee-the

Obviously the presence of the definite article in the well-formed (21b) sheds some light here: (21a) is out because the perfective prefix requires a definite NP.

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[19]The data discussed in (19) and (20) were brought to my attention by Anna Młynarczyk (pers. comm.).

[20] She notes that there are some exceptions: *Toj obǎrna grǎb* (lit. he turned back; translation: He turned his back) containing a perfective verb form is acceptable.

In most Slavic languages lacking articles, though, there seems to be a rule requiring that the perfective prefix added to a verb stem imposes (or demands) a [+SQA]-internal argument NP, which means that in spite of the absence of quantificational information, the NP will be interpreted as pertaining to a specified quantity in the sense explained above. This appears to be a "rightward bounded" phenomenon: the perfective prefix does not have this sort of restrictive effect on the external argument (cf. Verkuyl 1993: 23–27), although I will discuss apparent counterevidence against this claim later on. In general, the asymmetry of aspectual composition turns out to be crucial for a better understanding of the phenomena at issue, both in Slavic and non-Slavic languages. One could argue that perfectivity encoded in a perfective prefix is essentially a way of encoding VP-terminativity, or requiring it.

As noted above and shown by (18b), in Russian accusative case is not sufficient to bring about terminativity or perfectivity. In Finnish, accusative case is sufficient in sentences like (22).

(22)   a.   *Hän luki kirjan*
            He   read the-book-Acc
            'He read the book'
       b.   *Hän luki kirjaa*
            He   read the-book-Part
            'He read from the book, was reading the book'

So, most Slavic languages need a more complex strategy: given the presence of accusative case, they use perfective prefixes to delimit the Path or to mark a limitation on the Path of the members of the external argument. Sometimes more complexity arises, as suggested by Filip (1993) and Schmitt (1996). A Czech sentence like (23a) expresses that *vy-* is compatible with [+SQA]-information, (23b) that it imposes a [+SQA]-interpretation of the NP *kavu*, whereas (23a) and (23c) show that different perfective prefixes have the same terminative effect, even though the case is not accusative in (23c).

(23)   a.   *Vypil dvě kavu*
            Perf-drank-3sg two coffee-Acc
            He drank two coffees
       b.   *Vypil kavu*
            Perf-drank-3sg coffee-Acc
            He drank up all the coffee
       c.   *Napil se kavy*
            Perf-drank-3sg Refl coffee-Gen
            He drank some coffee

In Verkuyl (1993), it was suggested that the perfective prefix is or acts as the determiner of the internal argument: the prefix may be seen as providing the information

associated with determiners in non-Slavic languages. This suggestion would require some movement from the internal NP to a position preceding the Verb. That is, we would have something like (24).

(24) $[Ivan\ [_{VP}[_V vy_i\ [_{V-stem}\text{-}pil]][_{NP}[_{Det}e_i]\ [pivo]]]]$

However, there are other options, also because it would not work for Bulgarian, as observed above. Dimitrova-Vulchanova (1996:34) takes the prefix as the predicate of a small clause the argument of which is the internal argument of the main verb. That is, (b) *Ivan izpi dve biri* is roughly analyzed as (25), where the small clause predicate *iz* is moved to the prefix position in front of *-pija*.

(25) $[Ivan\ \text{-}pija[_{sc}[dve\ biri][iz]]]$

This analysis tallies with small clause analyses of perfectivizing prefixes in Dutch such as Hoekstra (1988), Hoekstra et al. (1989) and Doetjes (1997).

An analysis along the lines of (25) does not explain why *Az izpix kafe* is ungrammatical in Bulgarian and why the Russian *Ivan vypil pivo* should have a definite internal argument interpretation. Additional machinery is necessary, so Dimitrova-Vulchanova (1996:88ff.) appeals to what she calls Definedness for End Point (DEP), which assigns a [+T]-specification at the level of grammatical function assignment. In other words, for the main verb in (25) to "receive" *iz*, the subject of the small clause should be [+SQA]. This would explain the ungrammaticality of *Az izpix kafe* as well as the definiteness of *pivo* in (16b).

There is another different analytical line: Schmitt (1996), following Filip (1993) for Czech and Piñón (1993) for Polish, makes clear that the well-known distinction between D-quantification and A-quantification may be involved. That is, rather than giving quantificational information about the determiner of the internal argument, the perfective prefix may be considered as encoding information about quantification over occasions in the sense of Lewis (1975), nowadays popular in generative circles. This view is compatible with the multiplication analysis discussed above. In *Three girls ate five sandwiches* one may say that the VP creates an event-unit 'to eat five sandwiches', which applied to each of the girls yields as many five-sandwich-eat-events as there are girls. There is a close interaction between quantification over individuals and quantification over events and there is growing evidence that the VP plays an important role in providing the multiplication factor for event quantification.[21] In order to accommodate A-quantification in the sense described above as interacting with regular D-quantification, one may see a perfective prefix as identifying a $[+T_{VP}]$-domain,

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[21] In Verkuyl (1998), it is argued that this multiplication is essentially the one generally assumed in donkey-sentences. That is, the quantifier of the internal argument is essentially dependent on quantificational information expressed by the external argument.

securing a VP-terminative interpretation.[22]

The above considerations and options strongly suggest that the Germanic asymmetry scheme in Figure 2 underlies the Slavic languages too, provided that some room can be given to an aspectual operator ASP securing a $[+T_{VP}]$-interpretation, if not sufficient information about the internal argument is given. The perfective operator "cuts out" an event and consequently there should be some limit on the otherwise unspecified quantity of coffee in (23b) and beer in (5). If in Slavic languages there is numerical $[+SQA]$-information in the internal argument, verb morphology requires a perfective prefix to obtain a full $[+T_{VP}]$-interpretation.[23]

The idea of having an ASP-node as an operator securing a VP-node at which the Plus-principle can be said to operate, is found in Figure 4.[24]
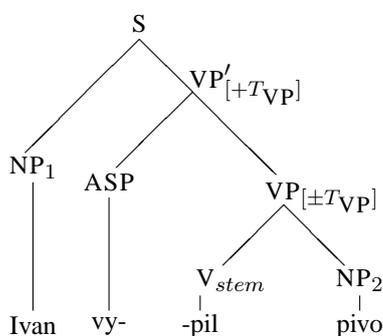

Figure 4:*ASP as an operator on VP*

For sentences like (5) *Ivan vypil pivo* there is no way to assign a minus- or plus-value, both because the verb has not yet been completed by a perfective or imperfective prefix and because the accusative case is not sufficient to bring about a plus-value on itself: after all the full information about the verb is not yet present at that point.[25] Only

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[22] This is also strongly suggested by the situation in Gaelic as described in Ramchand (1997). In this language an overt aspect marker appears outside the tenseless S expressing its aspectuality. If S is [–T] the marker is *ag*, if it is [+T] it is *air*. However, a terminological issue arises. In the generative framework used by Ramchand it has become standard to use the label VP for what I call S. My use of the notion VP is what would be called V′ in the currently standard generative terminology. The aspectual markers in Ramchand (1997) would be located outside the tenseless S in Figure 2.

[23] As observed, this does not apply to forms like the Bulgarian *kupja* (buy), but this enhances the assumption of the perfective prefix as an operator.

[24] I am very grateful to Henriette de Swart for pushing me into Figure 4 rather than sticking to Figure 5 which I had been using in Verkuyl (1993). Given my wish to distinguish VP-terminativity from S-terminativity, a preference for Figure 4 is indeed a logical move. The only reason why I stuck to (26) below—the formula corresponding to Figure 5—is that it enabled me to discuss some proposals in the literature. Kamp and Reyle (1993:575ff.) have proposed a VP-analysis for the Progressive Form.

[25] I do not pay attention to the possibility of "moving" *-pil* to a position in ASP, but obviously such a generative solution in terms of functional nodes is feasible.

when *vy-* is added making up a full verb in a completed VP, can the neutral values be detected: if ASP yields an imperfective prefix, the resulting VP will become durative, if it yields a perfective prefix as in Figure 4 the neutral value can be activated as a plus-value.

However, there is an alternative solution yielding the structure of Figure 5. There are several recent syntactic proposals along this line. For some, among which Schmitt (1996), the natural place to store Perf as an operator would be the AgrO-position, which is roughly the position taken by ASP in Figure 5. That is, right above the S marked $[\pm T_S]$ (= Schmitt's V''), there would be a functional node AgrO actualized as [+Perf] in which the aspectual information of the VP-domain can be computed so as to secure a $[+T_{VP}]$-interpretation, the external argument NP_1 having been moved out the S'-domain. On the other hand, others among which Ramchand 1997, Schoorlemmer (1995) and Dimitrova-Vulchanova (1996), argue for a functional node Asp at that location, which means that they also go along the line of Figure 5.
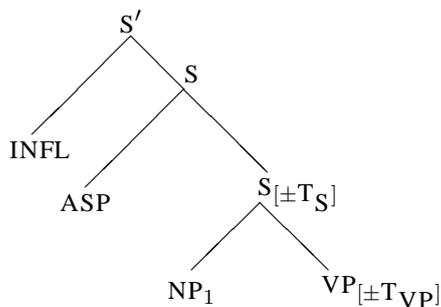

Figure 5:*ASP between Tense and S*

Taken in this way, Figure 5 represents the position of the proposals just mentioned or indicated. In fact, it also represents the position in which for English the Progressive Form has been dealt with in Verkuyl (1993), where I have been using the format in (26), with β ranging over tense values (restricted to $<$ (earlier than) as the only value) and α ranging over appropriate values to be identified below.

(26) $\text{INFL}_\beta(\text{ASP}_\alpha(\text{S}))$

This proposal will now be briefly discussed here in order to see which sort of value of the parameter α PROG represents. After that, it becomes possible to discuss the relevant parameters for Slavic languages and at that point a possible choice between Figure 4 and Figure 5 will be discussed. I take this route because firstly I will discuss some proposals about the French Imparfait and Passé Simple in which the format (26) is assumed and discussed, so proceeding along the lines pegged out by it will contribute to a better understanding of some important issues involved. And secondly, we may even end up with a situation in which we might need both Figure 4 and Figure 5.

7. INFL *and* PROG

Returning to the perfective (16a) *Ivan vypil dva piva*, the English *Ivan was drinking two beers*, the progressive form of its counterpart *John drank two beers*, will be looked at from the point of view of interaction between [+T] and grammatical elements like INFL and PROG. In Verkuyl (1993:318ff.), it was proposed to treat the difference between the sentences in (27) and (28) roughly along the line of their glosses.

(27) Ivan drank two beers
     $\text{INFL}_<([_S\text{Ivan-drink-two-beers}])$

(28) Ivan was drinking two beers
     $\text{INFL}_<(\text{PROG}([_S\text{Ivan-drink-two-beers}]))$

In (27), the past tense directly takes the tenseless S, whereas in (28) the progressive operator takes the position between S and INFL. Under this analysis, the operator PROG is taken to be a modifier of the tenseless $S_{[+T_S]}$ which results from aspectual composition along the lines sketched above. It yields an S of the same categorial type, but it brings about an aspectual change, which will be shown below to depend on tense, because PROG(S) is necessarily taken as the input for the TENSE-operation, which brings about a tensed sentence S′.[26]

The tenseless nature of $S_{[\pm T_S]}$ is crucial to a proper understanding of what events are in the present framework. One cannot say that S denotes an event, in the same way in which one cannot say that a series of notes in a musical score simply *denotes*—in the standard model-theoretic way—a sequence of tones taken as an interval in real time. It just represents it. Take the four notes a-c-a-fis in a score. As such they are discrete entities in a notational system that abbreviates what happens in the analogous mode. Only if the score is performed, do the tones constitute an event corresponding with the numerically different representation.[27] If tonation is the actualization of notes in real time, notes in a score are just "proto-tones". So, if we speak about $S_{[\pm T_S]}$ as related to the notion of event, it would be appropriate to call it a proto-event in the sense that tense provides its actualization in real time. It is INFL which produces a real event by actualization of an abstractly organized pattern underlying the performance.[28]

Another example of the interaction of two representational systems is our way of talking about natural days in terms of positive integers (or ordinals). We go from

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[26] In generative terms, again the tenseless S is VP′ and S′ is IP. The INFL-projection line has not been worked out in detail.

[27] In other words, a spectrogram would be a more suitable representation of a-c-a-fis if it comes to an analogous representation. Note that in spite of our knowledge that notes may be 1/1, 1/2, 1/4, 1/8, etc. and in spite of *legato* notations like ⌒ the score representation makes crucially use of the system of natural numbers: whatever value they have, they appear as discrete units. They round off.

[28] For a detailed analysis along these lines, see Verkuyl (1972:53–73).

October 1 to October 15 and organize our sense of progress in time on the basis of discretely ordered entities like hours, days, weeks, months, years, etc. In all these cases integers represent intervals. The use of 15 in October 15 is short for the interval [1,15] of integers in **N**, which is a subset of an interval [0,31] making up October. This interval corresponds with an interval in the reals **R** in which time is taken densely. This is illustrated in Figure 6.
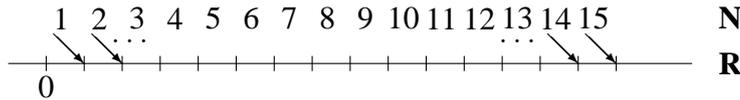

Figure 6:*Two systems*

Metaphorically speaking, the numbers in **N** are extracted from the temporal measuring rod based in **R** and they form a separate numerical system in which we treat structured intervals as discretely organized points.[29]

Basically the relation between the two number systems **N** and **R** can be seen in terms of a rounding off function. We make use of **N** knowing that underlying it, is the system **R**. In our cognitive organization of progress in space or time counting in **N** is the more appropriate way to go by, because the **R**-system is quite complex, too complex to handle the things we talk about. Hence the counting points contributed by the non-stative verb: they contribute **N**-structure in order to provide for a mapping with the members of the internal argument to see how they undergo the predication as participants. That is, verbs expressing nonstativity are semantically interpreted by assigning them a set of indices which is a subset of I, an index system isomorph to **N**.[30] The property of well-orderedness of this set accounts for the sense of progress expressed by the verb: given a point of origin 0, natural counting points computing the way in which the predicate is satified are 1,2, etc. Recall the girls eating five sandwiches, one of them eating one after the other, the others proceeding differently. One may think of this in terms of a set of pairs.[31]

(29) a. $\langle g_1, \{\langle 1, s_1\rangle, \langle 2, s_2\rangle, \langle 3, s_3\rangle, \langle 4, s_4\rangle, \langle 5, s_5\rangle\}\rangle$
      b. $\langle g_2, \{\langle 1, s_{1,2}\rangle, \langle 2, s_{3,4}\rangle, \langle 3, s_5\rangle\}\rangle$
      c. $\langle g_3, \{\langle 1, s_{1,2,3,4,5}\rangle\}\rangle$

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[29] This has far reaching consequences: there is a hole between 1 and 2 in **N**, not between the corresponding intervals in **R**. One of the consequences is that our sense of progress is determined by the naturals rather than by the reals. In the underground we will leave the metro after two stops from now, we leave the autoroute at exit 24, etc. In all these cases we operate in and use **N** on the basis of **R**. This is what should be captured in a theory of aspectuality.

[30] I equals **N** except for the property of equidistance.

[31] The left-hand side indices are not absolute values. For each individual Path, they indicate distinctness, which means that intervals corresponding with the indices may overlap. So, the index 1 in the first Path may or may not coincide with the index 1 in the other Paths, given the restriction that the three Paths are either different or identical.

Another way of writing the information in (29) is (30): here a function $\lambda x.\ell_x$ applied to each of the three girls yields for each girl$_i$ a set ℓ_{g_i} of index/sandwich-pairs verifying the predication in the particular model for that particular girl, as discussed above.[32]

(30) a. $\ell_{g_1} = \{\langle 1, s_1\rangle, \langle 2, s_2\rangle, \langle 3, s_3\rangle, \langle 4, s_4\rangle, \langle 5, s_5\rangle\}\rangle$
    b. $\ell_{g_2} = \{\langle 1, s_{1,2}\rangle, \langle 2, s_{3,4}\rangle, \langle 3, s_5\rangle\}\rangle$
    c. $\ell_{g_3} = \{\langle 1, s_{1,2,3,4,5}\rangle\}\rangle$

Let us now focus on the sets of indices in a Path given in (31).

(31) a. $i_{g_1} = \{1, 2, 3, 4, 5\}$
    b. $i_{g_2} = \{1, 2, 3\}$
    c. $i_{g_3} = \{1\}$

Restricting ourselves to *Judith ate five sandwiches*, which describes the situation given in (29a), (30a) and (31a), we can write a simple i—more precisely, i_{g1}—as denoting the set of indices associated with the predication.

As said above, $\text{INFL}_<$ has the task to map the abstract discretely organized index structure into the actualized dense time structure in the reals. Its semantics (in simplified form) is given in (32).[33]

(32) $[\![\text{INFL}_<]\!] = \lambda\varphi\exists i \subseteq I\exists j \subseteq \mathbf{R}[\varphi(i) \wedge A(i) = j \wedge j < t_0]$

The actualization function A connects the interval i with the interval j. Applied to *Judith ate five sandwiches* it says in (33) that the i-information (31a) is expressed as being associated with the predication 'Judith eat five sandwiches' and that by A the set i is mapped into the interval j in the reals, which is located before the point of speech t_0. The same applies to (27) with $S_{[+T]}$ standing for the tenseless terminative sentence *Ivan drink two beers*.

(33) $\exists i \subseteq I\exists j \subseteq \mathbf{R}[S_{[+T]}(i) \wedge A(i) = j \wedge j < t_0]$

Formula (33) says that there is an index (set) i standing for the index interval $[1, i]$ associated with the tenseless information expressed by 'Ivan drink two beers' which actualized in real time as the corresponding interval in the Reals $j = [0, k]$ with $k \leq i$.[34]

The next step is to explain what PROG does, taken as a possible realization of ASP_α. It may also be taken to operate on $S_{[\pm T_S]}$ and may be defined as follows:

(34) $[\![\text{PROG}]\!] = \lambda\varphi\lambda i_1\exists i_2[\varphi(i_2) \wedge i_1 \subset i_2]$

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[32] Note that each ℓ_x itself is function: it is a set of pairs. It should be observed that both (29) and (30) simplify certains aspects of the Path-formation, in particular its cumulativity; cf. Verkuyl (1993:299f.).

[33] Of course, I am aware of Reichenbach's tense system, but I will keep the tense system here as simple as possible. The A-function in (32) is essentially a rounding off function: $A(i) = j$ may be read as 'j actualizes i in real time'.

[34] Whether $i \leq k$ or $i \geq k$ depends on how the rounding off function underlying A is defined.

Applied to the tenseless part of (28) *Ivan-drink-two-beers* this yields (35).

(35) $\lambda i_1 \exists i_2 [S_{[+T]}(i_2) \wedge i_1 \subset i_2 \wedge j < t_0]$

Applying (32) to (35) gives (36).

(36) $\exists i_1 \exists i_2 \exists j [S_{[+T]}(i_2) \wedge i_1 \subset i_2 \wedge A(i_1) = j \wedge j < t_0]$

This does the right thing: (36) expresses that connected with the tenseless S there is an interval i_2 which is a superset of i_1 which represents the interval actualized in real time as the interval j, where j lies before the point of speech.[35]

The present analysis thus captures the intuition that given the truth of sentence (28), Ivan had not yet finished drinking his two beers. In other words, PROG commits the speaker of (28) to just the actualization j of a proper subinterval i_1 of the abstract interval i_2. The essential feature of this analysis can indeed only be understood in terms of the notion of commitment. Speakers who claim sentence (28) to be true commit themselves to just a proper subset of the interval for which the tenseless sentence would be true if it was actualized in real time.

Note that this analysis does not incorporate modality. The existential quantifier $\exists j$ pertains to the existence in real time (of the model): it warrants the existence of such an interval. The existential quantifiers $\exists i_1$ and $\exists i_2$ find their values in the domain of numerical indices which may be assumed to be accessible. So there is nothing strange about assuming the existence of these numbers just like there is nothing strange about the existence of the number 15 in October 15 if we talk about the corresponding interval in real time. The amodal treatment of the Progressive Form seems to me to be an advantage over modal analyses, which seem to me to be unnecessarily complicated.[36]

Whatever may be said about the modal intuition of English speakers if they reflect upon the use of the Progressive Form, its Dutch counterpart in (37) is far away from it.

(37)   *Judith was vijf boterhammen aan het eten*
        Jan was five sandwiches at the eating
        'Judith was eating five sandwiches'

The Dutch sentence focusses on the activity part of the process making up the terminative proto-event. In view of the discussion below, I give (37) in the present context only in order to provide a genuine example of a construction which is crucially episodic. By no means can sentences like (37) express a habit. In terms of (31), (37) expresses the mapping of an index set i' into the reals where $i' \subset i$. In terms of (30) we may think of the actualization of a set of pairs ℓ'_{g_1}, where $\ell'_{g_1} \subset \ell_{g_1}$.

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[35] I will assume that indices i belong to I and that j is used for intervals in **R**.

[36] In short, there is as much modality in the interpretation (36) as there is modality in a rounding off function. Cf. for modal approaches e.g. Dowty (1977), Lascarides (1988), Asher (1992), and Landman (1992).

Returning now to the Russian (18) *Ivan pil pivo* and assuming the presence of PROG in (34), but now written as an imperfective operator $\text{ASP}_\subset$, one could analyze this sentence as (38) yielding an interpretation as in (36).

(38) $\text{INFL}_< (\text{ASP}_\subset (\text{Ivan-pyt-pivo}))$

The commitment required by tense would concern just a proper subset of the interval corresponding with the index structure associated with the tenseless S. In other words (18) would receive an analysis like (36) based on (38). On this assumption the absence of *vy-* in (38) may be seen as blocking $\text{ASP}_=$. In other words, the presence of *vy-* may be seen as blocking the presence of an $\text{ASP}_\subset$-operator. $\text{ASP}_=$ may be taken as signaling to $\text{INFL}_<$ to proceed directly and to yield an index i which can be fully actualized as j, so as to warrant commitment over the whole real time interval corresponding with S. In some languages (Dutch, English) the equation has an air of redundancy, in other languages such as French it has not.

However, there are some problems with Figure 4: (a) the primary imperfective does not (always) seem to require a proper subset interpretation; (b) secondary imperfectivization is not explained by it; and (c) it is hard to see why the configuration in Figure 5 would be superior to the one in Figure 4 given the task to account for the relation between the absence of $\text{ASP}_\subset$ and the presence of *vy-*. In view of these problems I will explore, in the next section, some other logically possible instances of ASP_α, where $\alpha \in \{\subset, \subseteq, =\}$. I will show that these problems can be solved by taking into account the interaction between tense and aspect in e.g. French. The third problem will be tackled in section .

8. *The French Imparfait and Passé Simple*

As observed by many authors the French Imparfait clearly cannot be analyzed as a Progressive Form.[37] For the description of the difference between the French Imparfait and the Passé Simple, Vet (1994) proposes an aspectual operator ASP interacting with the past tense operator $\text{INFL}_<$ in (39). The ASP-operator has two forms: IPF and PRF.

(39) *a* Imparfait : $[\text{INFL}_< [\text{IPF}[S]]]$
      b. Passé Simple : $[\text{INFL}_< [\text{PRF}[S]]]$

It is clear that Vet uses the general scheme (26), so his proposal fits the present discussion about the Slavic and non-Slavic strategies to encode different aspects of temporal structure in terms of a "lubricant" between Tense and a tenseless S. The interpretation of PRF brings Vet in the aspectual region: the process is presented as completed. The

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[37] E.g. Descles and Guentcheva (1987), Vet (1994), De Swart (1996).

interpretation of IPF gives the sense: 'the process has already started'. This difference is exemplified by the sentences in (40).

(40) a. *Marie descendait l'escalier*   [INFL$_<$[IPF[M. descendre l'escalier]]]
      b. *Marie marcha*   [INFL$_<$[PRF[M. marcher]]]
      c. *Marie était malade*   [INFL$_<$[IPF[M. être malade]]]
      d. *Marie écrivit une lettre*   [INFL$_<$[PRF[M. écrire une lettre]]]

In (40a) the imperfective operator 'undoes' the terminativity expressed by the tenseless S [Marie descended the flight of stairs]; in (40b) the operator helps to get a perfective interpretation because the tenseless S [Marie walk] is durative. In (40c) the imperfective operator is superfluous, because the tenseless [Marie be ill] is durative, whereas in (40d) the terminative tenseless S [Marie write a letter] needs no help from PRF.

According to De Swart (1996) the difference between the two tenses must be described in terms of coercion. Basically, she accepts the format (26) but according to her the ASP operator connected with the Imparfait is defined on taking a durative S and the operator associated with the Passé Simple on taking a terminative S. If there is a wrong match, coercive rules are necessary. De Swart characterises the difference at an ontological level: if a tenseless S describing a state or a process, it pertains to a homogeneous aspectual class C_h. If S describes a terminative event, one has a non-homogeneous class C_{nh}. An aspectual operator brings about a change from one class to another. The tenseless S yields an aspectual class and then the choice of tense coerces this class into another one, if necessary. Let me demonstrate the point with the help of some of De Swart's examples.

(41) a. *Soudain Marie sut la réponse*
          [Past[$_{nh}C_{h \to nh}$([$_h$Marie savoir la réponse])]]
          'Suddenly Mary knew the answer'
      b. *Marie écrivit une lettre*
          [Past[$_{nh}$ [$_{nh}$Marie écrire une lettre]]]
          'Marie wrote a letter'
      c. *Marie écrivait une lettre*
          [Past[$_h C_{nh \to h}$([$_{nh}$Marie écrire une lettre])]]
          'Mary was writing/wrote a letter '

The tenseless S *Marie savoir la réponse* represents a State, but the Passé Simple requires the format [Past[$_{nh}-$]. De Swart presumes there to be rules smoothing [$_h$ into [$_{nh}$; and conversely, as shown by (41c). Note that in the case of (41b) no rule is required.

I think it is possible to have the best of two worlds. De Swart has the problem of coercion rules which are not very well motivated and not necessary, as I shall show shortly. She also looses the point of view expressed by Vet that the Imparfait is tied up with the notion of halfway ("mi-chemin") of an eventuality. On the other hand, as we

have seen, Vet does not address the problem of how to define the operators so that they become sensitive to the aspectual nature of the tenseless S. In fact, he neither gives a precise definition of PRF nor or IPF. The sensitivity of the operator for the aspectual nature of the tenseless S which is a strong point of De Swart can be dealt with in terms of the relation between the interval j corresponding to the tenseless S and the two intervals i which are part of the ASP_α-definition. The set-theoretical possibilities provided by the set α just mentioned opens up the way for two definitions:

(42) a. $[\![\text{ASP}_\subseteq]\!] = \lambda\varphi\lambda i_1 \exists i_2 [\varphi(i_2) \wedge i_1 \subseteq i_2]$
      b. $[\![\text{ASP}_=]\!] = \lambda\varphi\lambda i_1 \exists i_2 [\varphi(i_2) \wedge i_1 = i_2]$

The definition in (42a) can be seen as expressing indeterminacy with respect to how the commitment about the truth of the sentence in question should be taken. The French Imparfait may be analyzed as expressing this indeterminacy. Sentences like (43) show that the French strategy is to express this indeterminacy making the Imparfait distinct from another past tense, the Passé Simple, which is treated on the basis of (42b) in (44).

(43) a. *Marie écrivait une lettre*
      b. $\text{INFL}_< [\text{ASP}_\subseteq [\text{Marie-écrire-une-lettre}]]$
      c. $\exists i_1 \exists i_2 \exists j [\text{S}_{[+T]}(i_2) \wedge i_1 \subseteq i_2 \wedge A(i_1) = j \wedge j < t_0]$

(44) a. *Marie écrivit une lettre*
      b. $\text{INFL}_< [\text{ASP}_= [\text{Marie-écrire-une-lettre}]]$
      c. $\exists i_1 \exists i_2 \exists j [\text{S}_{[+T]}(i_2) \wedge i_1 = i_2 \wedge A(i_1) = j \wedge j < t_0]$
      d. $\exists i \exists j [\text{S}_{[+T]}(i) \wedge A(i) = j \wedge j < t_0]$

The reduction of the $\text{ASP}_=$-structure (44c) to (44d) is what makes the past tense simple in this case. Note that we may now re-analyse *vy-* of (18) in terms of requiring the presence of $\text{ASP}_=$. I will come back to that point below by proposing that the presence of the operator (42b) is not to be taken as creating redundancy but as an instruction about the commitment to the truth of the tense expressed. In this way it will become part of a system and this should be preferred to the way in which Verkuyl (1993) distinguished between (27) and (28). The former would now become (45).

(45) Ivan drank two beers
      $\text{INFL}_< (\text{ASP}_= ([_S \text{Ivan-drink-two-beers}]))$

I will show later on that this can be extended to the Slavic languages: the perfective prefix may be seen as an aspectual operator requiring a full match between the index provided by the tenseless S and the interval in the reals provided by tense.

As to De Swart's (41a) the following analysis can be proposed:

(46) a. *(Soudain) Marie sut la réponse*
      b. $\exists i_1 \exists i_2 \exists j [\text{MSlR}(i_2) \wedge i_1 = i_2 \wedge A(i_1) = j \wedge j < t_0]$
      c. $= \exists i \exists j [\text{MSlR}(i) \wedge A(i) = j \wedge j < t_0]$

Because the tenseless S is stative in this case, $\ell_{Marie} = \{\langle 0,0\rangle\}$. That is, the corresponding $i = \{0\}$. This value does not block the equation $\{0\} = \{0\}$ and it means that Mary will be assigned a predication "Path" having the size of just one time point with respect to which the evaluation of the tensed phrase takes place. In this way, the transition from not knowing to knowing expressed by (46) follows from the use of Past, i.e. from the presence of $i_1 = i_2$ in INFL$_<$ when applied to ASP$_=$(S).[38]

The same applies to a sentence like (47) which can also be treated on the basis of (42b):

(47) a. *Marie souleva des tables*
          'Mary lifted tables'
      b. $\exists i_1 \exists i_2 \exists j[\text{MSdT}(i_2) \wedge i_1 = i_2 \wedge A(i_1) = j \wedge j < t_0]$
      c. $= \exists i \exists j[\text{MSdT}(i) \wedge A(i) = j \wedge j < t_0]$

The tenseless S *Marie soulever des tables* is durative. Yet (47a) describes a situation which has been closed off. The sense of termination is only due to INFL$_<$: it puts j before the point of speech and therefore it follows that the event described by par MSdT is ended. Note in passing that the $i_1 = i_2$ does not constitute a part of the present or future tense. And indeed *Marie soulevera des tables* (Mary will lift tables) is not terminative, neither is *Marie saura la réponse* (Mary will know the answer). So what is expressed by coercive rules in De Swart's analysis, follows here from the truth of the complex proposition $i_1 = i_2 \wedge A(i_1) = j \wedge j < t_0$.

9.   *Habituality in Germanic languages*

In Verkuyl (1995b) I have paid attention to the question of how to account for the "double use" of sentences like *Mary walked to school*: it may pertain to an episodic sentence but also to a habitual sentence. The leading idea of this analysis is that in the optimal case the two interpretations should have the same representation. This is an ambitious aim, but it may be achieved by applying universal quantification to the set of indices i associated with the tenseless S. So, suppose that *Ivan drank two beers* as an episodic sentence is represented as (33) repeated here as (48a), and that we have (48b) as its habitual counterpart.

(48) a. $\exists i \exists j[S_{[+T]}(i) \wedge A(i) = j \wedge j < t_0]$
      b. $\forall i \exists j[S_{[+T]}(i) \rightarrow [A(i) = j \wedge j < t_0]]$

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[38] The aspectuality theory of Verkuyl (1993) does not provide for a full-fledged treatment of distributivity and collectivity in sentences with stative verbs. The intuitive idea is that in those cases, we work with a derived notion of Path either compressed to just one pair as demonstrated here or covering indexed models whose indices provide for the input of the ℓ-function.

The (provisional) representation (48b) says that for all index sets i associated with *Ivan drink two beers*, its actualization is in real time and all the actualizations are before the point of speech. Note that here quantification takes place over i over the whole predication without requiring an exact repetition. That is, for *Three girls ate five sandwiches* both the girls and the sandwiches may differ per i.

Obviously there is some problem with the universal quantification in (48b), although it should be said that quantification over the members of I is restricted by the composition of the aspectual information in $S_{[+T]}$. But this is not sufficient, because it is clear that if we speak about Ivan's habit of drinking beer, the set of relevant indices is contextually determined. In other words, we can change (48b) into (49) assuming a contextually given set of indices I_c as a subset of I.

(49) $\exists I_c \subseteq I \forall i \in I_c \exists j [S_{[+T]}(i) \rightarrow [A(i) = j \land j < t_0]]$

Here we have a regular existential introduction of a subset I_c of I: (49) says that there is a contextually determined (habit) set such that for all its members i if i is associated with the tenseless $S_{[+T]}$ 'Ivan drink two beers' there is an actualization j in real time and all these intervals j lie before the point of speech.[39]

This scheme can be used for sentences with frequency adverbials like *three times* in *Three times John drank two beers*, which presumes an I_c picking it up from the previous discourse or implying it:

(50) $\exists I_c \subseteq I [|I_c| = 3 \land \forall i \in I_c \exists j [S_{[+T]}(i) \rightarrow [A(i) = j \land j < t_0]]$

This also applies to sentences with adverbials like *never* in *Never John drank two beers*.[40]

(51) $\exists I_c \subseteq I \forall i \in I_c [S_{[+T]}(i) \rightarrow \neg \exists j [A(i) = j \land j < t_0]]$

This seems to work quite well. *Three times* is compatible with being on its way to make a real habit, whereas *never* is about a series of virtual actualizations which did not take place during a relevant interval, i.e. I_c.

Coming back now to the point of providing one representation for both the episodic and the habitual interpretation of *Ivan drank two beers* it can be seen that (49) will do the job. In the episodic case the cardinality of I_c is 1, in the habitual case it is ≥ 1.

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[39] An alternative is to introduce I_c in the same way in which contextually defined sets may be introduced: as definite context sets. The introduction of temporal adverbials in a sentence may, of course, replace I_c or make it more explicit.

[40] Note that the contextual nature of the information $\exists I_c \subseteq I$ corresponds with the standard view on quantification in which the domain of quantification is restricted contextually. Never may mean ('never in that period', 'never in my life', 'never ever', dependent on the context in which sentences like *This never happened before*.

This is not an implausible idea at all. After all, we also have the sentence *Ivan always drank two beers*, which can be analyzed as in (52).

(52) $\exists I_c \subseteq I[|I_c| > 1 \land \forall i \in \mathrm{I}_c[\mathrm{S}_{[+T]}(i) \rightarrow \exists j \in \mathbf{R}[A(i) = j \land j < t_0]]$

where $k > 1$ expresses explicitly that k is greater than 1, but in most contexts k will be a higher number, before people find it appropriate to speak about *always*. So, the use of *always* makes it impossible to have an episodic actualization and this is simply because *always* gives plural information about the cardinality of I_c. In *Ivan drank two beers* this information is not given, so (49) turns out to be adequate underinforming us about whether the cardinality of I_c is 1 or greater than 1.

The leading idea here is that the information contained by ADV "multiplies" the aspectual information expressed by the ASP-node. In the case of *three times*, the multiplication is straightforward, as expressed by (49), whereas for *always* information leading to (52) will do.[41] The form in (49) may be obtained by assuming universal quantification over ASP by an ADV-node remaining indeterminate as to the number of actualizations enforced by ASP$_=$. This analysis would be in line with the analysis in Partee (1973) requiring an implicit domain to which tense is to be related. So, even if there is no explicit adverbial in sentences like *Mary walked to school* we assume there to be domain-information with respect to which the sentence is understood.

10.   *ASP$_{\alpha'}$ and ASP$_\alpha$*

It is now time to bring different lines together and to sort out the relevant issues involved. We have seen in section that a natural place to locate an ASP-operator is between the VP and the external argument. The semantics of the values of α in ASP$_\alpha$ has been phrased in terms of an operator originally defined for a position between S and INFL, but it is clear that this semantics concerns the Path of the external argument: the i in the formulas given above is nothing but the Path for the external argument values. Recall our sentence *Three girls ate five sandwiches* and the representations in (11), (29), (30) and (31). So, technically there should be no problem in rephrasing the definitions of PROG in (34) and the other ASP-nodes in (42). I shall not do so here, because this requires the discussion of the formal type-logical machinery underlying the formulas given here. So, I will assume that the definitions of the values of α can be maintained as they are given above, the difference being that syntactically they are given "earlier" (given a bottom-top interpretation). In fact, there is an important empirical argument supporting this move from Figure 5 to Figure 4.

(53)   a.   Three girls were eating five sandwiches
        b.   All boys were writing a letter

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[41] These will be λ-expressions of the form $\lambda I : |I| = 3 \land \dots$.

Sentences like (53) show that the $\subset$-relation holds "before the multiplication" discussed earlier. That is, (53a) should apply to a situation in which none of the girls had already eaten her five sandwiches. In other words, and in terms of our observation with respect to (37), now for each girl g_j, $\ell'_{g_j} \subset \ell_{g_j}$. Analogously, (53b) describes a situation in which all boys were still involved in writing a letter. This makes the location of ASP in Figure 4 a natural place to account for this progressive split.

Yet, our analysis of habituality and the fact that imperfectivization in some Slavic languages are closely tied up with the expression of habituality make it attractive to retain the ASP-position of Figure 5 as a position relevant for the analysis of aspectuality. So, let us consider Figure 7. Ignoring INFL for the moment we take $\text{ASP}_{\alpha'}$ as
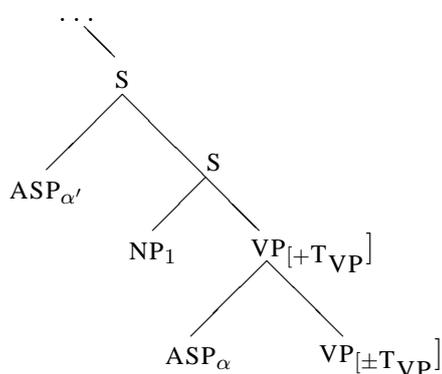

Figure 7:*Operation on* ASP

an operator on the aspectual information determined by ASP_α. From the preceding section it follows that a natural interpretation of the values of α' is essentially quantificational. So, let us assume that α' stands for values roughly represented as ≥ 1, > 1 or $= 1$. On this assumption it becomes clear that $\text{ASP}_{\alpha'}$ is determined by the contextually or explicitly given frequency adverbials discussed earlier. Note also that the presence of $\text{ASP}_{\alpha'}$ gives us the opportunity to influence a choice between the injective and kolkhoz-collective interpretation. But data in the Slavic languages suggest an even more important position of $\text{ASP}_{\alpha'}$ as a numerical operator: its use in secondary imperfectivization.

11.   *Imperfectivization in Slavic languages*

Let us discuss some of the cases of imperfective sentences in Slavic languages and first see which ASP_α is called for: $\text{ASP}_\subset$ or $\text{ASP}_\subseteq$ and then see what can be accounted for in terms of $\text{ASP}_{\alpha'}$. One may feel comfortable with Comrie's general characterization of the imperfective in Slavic languages which says "that the Imperfective expresses no specific reference to the completeness of the event" (1976:113). Intuitively, this selects

$\text{ASP}_\subseteq$, because one may say that if $\text{ASP}_=$ refers to completeness by explicitly requiring identity, $\text{ASP}_\subset$ refers to it as well, because it requires the event to be not complete. I think that it is justified to tie up $\text{ASP}_\subseteq$ with Comrie's general description, which is quite generally assumed in the literature.

Now, iterativity being the other main function of the imperfective aspect, there seem to be two forms of imperfectivity, so we need to be more specific about the way the ASP-nodes can be said to operate. In the preceding section, the representation of habituality in languages like English and Dutch was systematically related to the representation of episodicity, but it should remain possible to distinguish them, whenever necessary. Let us therefore first have a brief survey of the cases that should be taken into consideration.

Dimitrova-Vulchanova (1996) distinguishes between two main classes of aspectual affixes in Bulgarian. The first class consists of highly grammaticalized affixes, such as the perfective *-n-* and *na-* and the imperfective *-a-*, *-ja*, *-va-*, and *-ova-*. In this class one often does not find secondary imperfectivization.[42] Thus, in pairs of sentences like (54) there is a primary perfective form *kupja* and an imperfectivized end form *kupuvam*.

(54) a. *Toj kupi kušta*
        He buy-Aor/Perf a house
        'He bought a house'
    b. *Toj kupuvaše kušta*
        He buy-NonAor/Imperf house
        'He was buying a house'

The perfect verb form is not morphologically marked and it is only the use of the Aorist that contributes to the terminative interpretation here. The imperfective verb form is said to correspond to the English Progressive Form: it expresses that he was involved in buying a house. Dimitrova-Vulchanova calls this the interval-interpretation of the imperfective. It comes close to what is said to be an episodic event.[43]

One might wonder whether the imperfective form *kupuvase* expresses $\text{ASP}_\subset$ or $\text{ASP}_\subseteq$. Dimitrova-Vulchanova (p.c. by email) observes that *kupuvase* may be used in two different contexts.

(55) a. *Ivan kupuvaše kušta, kogato go vidjax*
        Ivan was buying a house, when I met him
    b. *Po edno vreme, Ivan kupuvaše kušta*
        At some point, Ivan was buying a house

---

[42] Stambolieva (1995) observes that there are about fifty of them.

[43] This formulation is as clear as the notion of episodic sentence itself. One may be involved in buying a house for quite a long time. As long as the corresponding event is called episodic (when terminated), the two notions may be equated.

The episodic sentence (55a) corresponds with the English Progressive Form and might therefore be characterized in terms of the progressive operator $\text{ASP}_\subset$, because the choice of the imperfective verb is a clear sign that the event 'Ivan buy a house' was not terminated at the point when I met him. By means of (55b) the speaker says that "at some point in the past, Ivan was buying a house, and I don't know what happened later, i.e. he might have actually bought the house already". Here we see a clear $\text{ASP}_\subset$-interpretation.

There are certainly pairs like (54) in which the imperfective form also expresses habituality. Lindstedt (1984:29) observes for Russian that (56a) with the primary perfective form *čital* may express that he only read parts of a letter each day, whereas (56b) would express that he finished reading a letter each day.

(56) a. *On každyj den' čital pismo*
          Every day he Imp-read a letter
      b. *On každyj den' pročital pismo*
          Every day he Perf-read a letter

In other words, the primary imperfective may occur in an environment expressing habituality, but we see that in these cases an adverbial is necessary to bring about this interpretation. In terms of Figure 7 an explanation is available: $\text{ASP}_{\alpha'}$ multiplies the information provides by the tenseless S, ASP_α having a $\subset$-value in the case of (56a) and an $=$-value in the case of (56b).

In Bulgarian most imperfective-perfective pairs have a secondary imperfective (or derived imperfective): they form aspectual triples. Consider the following sentences in (57).

(57) a. *Ivan piše edno pismo*
      b. *Ivan napisa edno pismo*
      c. *Ivan napisvaše po edno pismo*

Here the primary imperfective form in (57a) expresses an interpretation in which Ivan was involved in writing one letter, in (57b) he finished one letter, and (57c) expresses that Ivan was in the habit of writing one letter per implicit time unit (say every day, every weekend, or something). Note that the distributive particle *po* is added here to mark distribution, although this need not always occur as shown by (58).[44]

(58) a. *Ivan izjaždaše sandviča tam*
          Ivan (regularly) ate a sandwich there
      b. *Ivan razdavaše xljab*
          Ivan (regularly) handed out bread

---

[44] The particle *po* may occur in Bulgarian as a preposition, a prefix, but it is also use in the sense of the English times in *tri po dve* (three times two).

The use of the secondary imperfectivization infix can be seen as an instruction to take $\text{ASP}_{\alpha'}$ in its plural interpretation: it encodes the information that the set I_c has a cardinality greater than 1 requiring [+T], whereas the choice for the primary imperfective might signal a preference for cardinality 1 requiring [–T]. In general, a situation in which [–T] undergoes multiplication is not really quite normal.[45]

Given the two ASP-nodes, it becomes possible to analyse the secondary imperfective form as being associated with $\text{ASP}_{\alpha'}$. This explains the "local" terminativity caused by the $\text{ASP}_=$-operator *na-* in (57c). Such an analysis would explain why the secondary imperfective form in Bulgarian is to be associated with the expression of repetition.[46] It is evident that the natural context in which sentences like (57c) are expressed is one in which use is made of adverbials like *vseki den* (every day), *tri păti* (three times), *vinagi* (always) etc. But the repetition may be given as well contextually, i.e. along the lines sketched above in the section about habituality in Germanic languages.

12.   *Perfectivity in Slavic languages*

In section the perfective operator was discussed in some detail, but after the introduction of the $\text{ASP}_=$-operator it is necessary to see what it does in Slavic languages. To begin with, the effect of the equation $i_1 = i_2$ in (42) can be used to explain "regular" cases like (2b) *Ivan vypil dva piva*. Here it confirms somewhat redundantly—as in the case of the Passé Simple—the [+T]-nature of the tenseless 'Ivan -pil dva piva'. However, $\text{ASP}_=$ can also be assumed to explain the difference between the Russian sentences discussed in Bache (1985:47).

(59)   a.   *On prožil tri goda v Moskve*
             He Perf-lived three years in Moscow
        b.   *On žil tri goda v Moskve*
             He Imp-lived three years in Moscow

(60)   a.   *Ja uže pročital etu knigu*
             Ik already Perf-read that book
        b.   *Ja uže čital etu knigu*
             Ik already Imp-read that book

The sentences in (59) have in common the stative (tenseless) information 'He live three years in Moscow', the perfective prefix *pro-* operating on a [–T]-structure. Suppose that the index-structure connected with 'On ∅-žil tri goda' (with ∅ for Imp- or Perf-) is semantically some index associated with some arbitrary object. In other words,

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[45] Lindstedt observed that (56a) is possible but a little awkward.
[46] Not all Slavic languages apply imperfectivization in the same way; cf. Eckert (1985) for differences between Czech and Russian; see also Guentcheva (1990:51-82).

the stative Path is the set $\{\langle 0, 0 \rangle\}$, constituting a point (or interval) necessary for the evaluation.[47] Now, ASP$_=$ explicitly requires that this index pair be fully actualized, whereas ASP$_\subseteq$ does not speak out on this: it simply follows from the information $j < t_0$ in INFL$_<$. This difference would explain the aspectual difference between (59a) and (59b), which is that the perfective sentence enhances the expression of the limitation of the period. This intuition can be expressed rather naturally by the equation. The same holds mutatis mutandis for the difference between (60a) and (60b), which is that the use of the perfective prefix makes the information that I had already read that book somewhat more emphatic (1985:41). In general, I think that all the perfective cases in Slavic languages discussed so far can be handled quite well in terms of ASP$_=$: it requires full actualization. This explains for Bulgarian why the perfective prefix is not allowed in present tense.

13.   *Problems with bare plural NPs*

With respect to the perfective operator in Bulgarian, there is a problem raised in Dimitrova-Vulchanova (1996:28). According to her, sentences like (61a) are ungrammatical.

(61)   a.   **Xora izjadoxa pet sandviča*
            People Perf-ate five sandwiches
       b.   **Xora izjazdaxa po pet sandviča*
            People Perf-ate-Imp distr. five sandwiches

She considers this a counterexample to the claim that a perfective prefix is "rightward" oriented. In her view, the *iz-* instructs the bare plural external argument to "stay away". This observation is not without a challenge. Dančev (1989) observes that "when submitted to informants (i) *Soldiers crossed the street* was translated with both perfective and imperfective forms of the respective Bulgarian verb" and he continues that this is dependent on expansion of the context. E.g. in *A siren whailed somewhere in the distance. Then a dog chased a cat into a passage. Soldiers crossed the street . . ..* "For obvious reasons (concatenation of consecutive events), all the informants chose perfective forms of the Bulgarian verb". Yet, it is clear that Bulgarian imposes heavier constraints on the relation between bare plurals and a perfective prefix than Russian, where it is possible to have an acceptable counterpart of (61a).

(62)   *Deti pročitali komiksy za den*
       children Perf-read comics in a day
       'The children read the comics in a day'

---

[47] This is, of course, close to the standard view in which a change requires two points (or intervals) of evaluation and a state one. We assume that there is some index pair available; cf. Verkuyl (1993:345f.).

However, Russian has its constraints as well: it is impossible to have (62) as the trans-
lation of the English *Children read the comics in a day*, as observed in Schoorlemmer
(1995:98). It should be the translation given above in (62) with *the* children. So, here
we see that (62) is acceptable on the assumption that the subject *deti* is [+SQA]. Bul-
garian turns out to be stricter here, possibly because it has a definite article which lacks
in Russian. Yet it is clear that there is no place for a bare plural co-occurring with a
[+T]-VP.

In English, sentences like (63) are acceptable with a bare plural subject, as
Dančev's example illustrated.

(63)   a.   People ate 5 sandwiches
       b.   Patients died here by the dozens
       c.   Children were fighting at the close of the school

Here too, we find some restrictions. The sentences express that it was customary for
people to eat five sandwiches, or that for some time people used to die for some reason,
or they express episodicity as part of a description in which a sort of summation of
events is given.

In French, bare plurals as expressed by *des/du*-NPs also show heavy constraints
on their occurrence as pointed out in detail by Bosveld-de Smet 1998. She argues that
these NPs have a preference for cumulative interpretation in the sense of Scha 1981,
which means that they do not participate in distributive or collective interpretations
discussed above.

(64)   a.   *Des enfants engloutissaient des tartines*
            Children devoured sandwiches
       b.   *Des amis sont venus me voir*
            Friends came to visit me

In general, bare plural NPs are not able to split events in the sense in which in (10)
Three girls ate 5 sandwiches event-splitting takes place by the function in (11), which
assigns to each of the girls a Predication Path.

The point made by Bosveld-de Smet for French can be used for the English cases
as well as for the problem in the Bulgarian (61): *izjadoxa* cannot have "double duty"
as the corresponding morphologically simpler verb forms in Germanic languages like
English and Dutch or in a Romance language like French. By its requiring episodic-
ity, it requires event-splitting; that is, the possibility for the function demonstrated in
(11) to apply to the external argument. The difference between Bulgarian and Russian
could be explained by saying that Bulgarian having a definite article prohibits the for-
mation of a bare plural domain for the external argument and that Russian (lacking a
definite article) enforces a definite domain. The use of the Aorist in Bulgarian seems
to favour a 'one-event' interpretation, witness the sentences in (). Without an explicit
particle like *po* the sentence *Tri momičeta izjadoxa pet sandviča* can only pertain to

the kolkhoz-collective eating of five sandwiches. In this respect, the fact that secondary imperfectivization is tied up with iteration provides an argument for the idea that a quite complex division of labour between the perfective Aorist and secondary imperfective non-Aorist has been sorted out, roughly along the lines of one-event vs. multiple events, but also obtaining in case of a plural external argument. I think that from these considerations the ungrammaticality of (61) follows straightforwardly: the bare plural requiring cumulativity and underdeterminedness of the denotation of the external argument NP is incompatible with the collective constant function fed by *iz-* which needs a bounded domain to apply to. The ungrammaticality of sentence (61b) may be explained on the ground of it being impossible for the bare plural to undergo orderly distributive event-splitting.

For English we would have to appeal to the habitual or cumulative reading and assume that *people* has a sort of cumulative interpretation over the collection I_c of indices. The absence of a perfective prefix and the non-existence of the Aorist explains why the English sentence is acceptable in its restricted interpretation along the lines of the constraints described by Bosveld-de Smet.

14.   *Conclusion*

By the above analysis of aspectual operators in terms of set-theoretical relations and quantificational information, I believe, one may draw Slavic languages into the family of languages for which a compositional approach appears to be justified. It seems to me that the formalization given here is fully compatible with syntactic approaches in which functional nodes like Agr and ASP are used. I have remained indeterminate here. The fact that the present framework is compatible with certain syntactic insights is a nice coincidence. What is important is the division of labour between information expressed by the tenseless S, the aspectual operators ASP_α and $\text{ASP}_{\alpha'}$, and INFL. The semantic aspectual information expressed compositionally has been shown to interact with the tense operator INFL (when applied) and with the two aspectual operators discussed here. In this way, Slavic and non-Slavic languages can be dealt with in a compositional framework.

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