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A DUAL MODEL OF INNER ASPECT AND TELICITY

The paper presents a novel approach to eventualities which, to a large extent, reconciles the two traditional classes of theories of inner aspect: those based on decomposition and those appealing primarily to the (usually mereologically modeled) quantity properties of events. The paper argues that the two classes of accounts are not in competition; rather, they target two distinct sets of empirical phenomena: the part-structure of the eventuality and the properties of quantity that it displays. Mutual relation of these two domains are discussed in light of the model proposed.

Key words: inner aspect, telicity, event-countability, quantification, concord.

1. Introduction

This annual publication has two volumes this year. Celebrating the retirement of two distinguished professors of this department, they can be seen as twins. Accordingly, this paper is a twin of the paper published in the twin volume to the current one. The current paper is focused on the presentation of a theoretical model, which then receives a discussion and evaluation in its twin paper titled *Properties of the dual model of aspect and telicity*.

Most available formal theories of inner aspect can be divided into two classes. One class of approaches take telicity as the central notion of inner aspect. They crucially rely on the decomposition of eventualities and relate telicity to the presence of the telos, which is usually defined as a subevent, or set of subevents, that takes the final position in the event structure. (I use the term subevent in the decompositional sense, to denote an event that takes part in the template of a more complex event, and not in the mereological sense of just any part of an event.) The second class of approaches are those that see quantitative, or mereological, properties as the central notion of inner aspect. In determining the inner aspect of an eventuality, these approaches look at the properties of its predicate and determine its properties at the relevant level.

In this paper, I present a novel approach to eventualities which, to a large extent, reconciles the two traditional classes of theories of inner aspect. In this

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model, syntax and semantics are one and the same module, the core task of which is to build complex conceptual structures from atomic conceptual units. The relatively simple structure that I propose for eventualities accounts for both decompositional and mereological observations.

In section 3, the model proposed is discussed with respect to the mereological approaches. In section 2, I start from a simple model I constructed as a middle value of the event decomposition approaches already available in the field and I observe some of its contradictions. In solving these contradictions, I develop a more refined model, which is based on a structure that I call the telic template. In the remainder of the section, I sketch the main properties of this model in the light of decompositional semantics. Section 5 concludes.

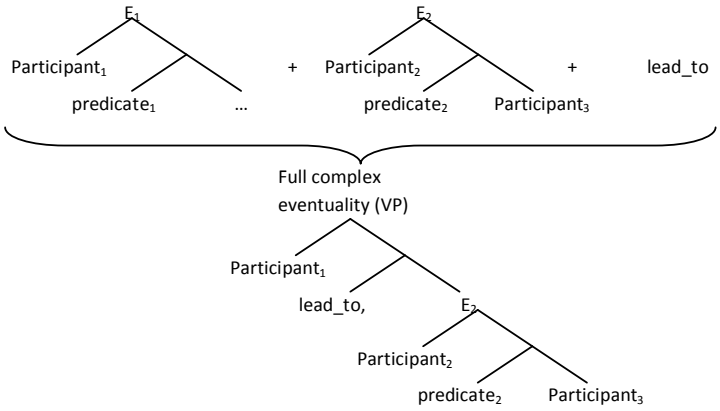
Before continuing to sketch the model, I would like to stress one important aspect of the broader picture to which it belongs. As mentioned above, I assume that there is no semantic module, and that syntax directly interfaces the discourse (for some arguments in favor of this view, see Arsenijević & Hinzen 2007). This is also reflected in my views on quantification, scope, and the positions in which certain elements are (base-)generated. I consider, for instance, that a single element is often independently generated in more than one position, or more precisely in every position in which it predicates/scopes. This gives a very rich and explicit semantic representation with multiple copies of the same semantic material in different positions in the hierarchical structure. In general, I assume that the interface between syntax and phonology reduces the multiple copies as much as their structural relations allow. When a constituent appears in more than one position, the interface mechanisms try to recognize the biggest chains with sufficiently local relations between the links, and delete all but one of the identical units. When the structural relations are not sufficiently local, these elements cannot be deleted, but often can be reduced to anaphors or pronouns. A precise specification of these processes is a research program per se, and is not discussed in this paper.

2. Refining the model

2.1. Introduction: a simple event decomposition model

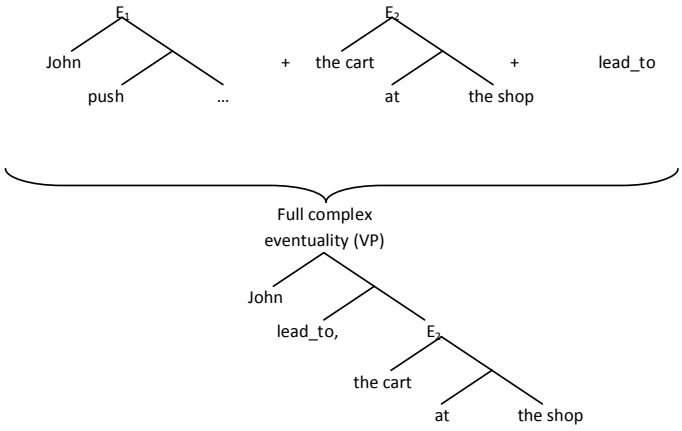
Consider a model as sketched in (1), where two eventualities, each represented as a simple phrase, establish a relation in which one of them (E_2) is the complement of the other (E_1). In addition to this, the head of E_1, in addition to the 'lexical' predicate, contains the predicate *lead_to*. The aggregate derived interpretation is that E_1 continues and reaches a point at which E_2 is established. In this way, E_1 acquires the property of process, entailed by the fact that it leads to a change (i.e. to a new value for a certain property). E_2 acquires the property of result, because it is the state with which a certain process ends. The combination of the initiating and result interpretational components is taken to derive telicity and this entire template therefore represents the general structure of a telic eventuality.

(1) Decompositional model of full eventuality at the syntax-semantics interface.



Let me illustrate this with a concrete example. The VP of the sentence in (2) is presented as a structure built from two phrases, each of them representing a simple eventuality (i.e. an eventuality hat is not composed in the described manner, and hence atelic: a process or a state, henceforth SEv).

(2) Structure of the VP in 'John pushed the cart to the shop'



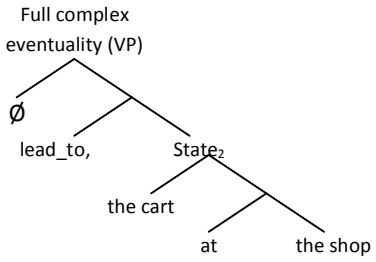
One eventuality (E_1) involves the conceptual contents of the verb *push*, applied as a predicate over two arguments. One of the arguments of E_1 is *John* and the other is E_2. The head of E_2, i.e. its predicate, carries the conceptual contents of the preposition *at*. It marks the very simple spatial relation of having locations which are sufficiently near each other on some appropriate scale provided by the context. This predicate takes two arguments: *the cart* and *the shop*. The full

structure is interpreted as follows. John is in the state of pushing, which has the property of being a process and results in the cart being at the shop.

The structure presented here is a hybrid of several recent models of event structure. In syntax, it combines elements of the approaches like Larson (1988), Hale and Keyser (1993) or Svenonius (1996), and in semantics it most directly incorporates elements of the theories of Parsons (1990), Pustejovsky (1991) and Ramchand (2002). In this section I briefly discuss several special forms that this structure may take, to show how it can handle some of the central phenomena of the aspectual and argument structure. In the remainder of the paper, I propose fundamental modifications to this model, which bring a number of theoretical and empirical advantages.

The structure in (2) can appear in different underspecified forms. One option is that the specifier of the higher phrase (the subject of E_1) is not specified. This derives the unaccusative structure presented in (3) (case assignment is ignored, as a matter of the higher structure). The participant that contributes the *lead_to* component is not specified. Apart from that, it is equivalent to the full template.

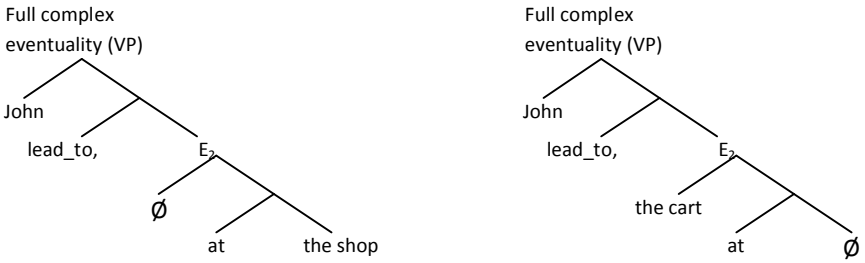
(3) Telic unaccusatives (the specifier of E1 unspecified): 'The cart rolled to the shop'[2]



It appears to be impossible to leave any other argument of the telic structure unspecified (considering pro-drop to be a case of proper specification and discourse-licensed drop of its phonological material), as the impossibility of properly unspecified telic readings in (4) confirms. This overt realization requirement is particularly strong for the Undergoer (the specifier of the lower phrase), since in these cases even a strongly contextually provided candidate does not lead to a well-formed structure. For the Goal (the complement of the lower phrase), it is possible to contextually force certain acceptable readings (for instance if the bounded path of the pushing eventuality in (4b) is strongly contextually suggested).

[2] The fact that the predicate of the result state in this example is represented as *at* and the sentence lexicalizes it as *to* requires the treatment of the preposition *to* as the lexical realization of the meaning associated to the preposition *at* when it appears in the result subevent. In fact, I would even go as far as taking the morpheme *to* as the marker that appears on a locative preposition and marks its agreement with the head that assigns it a result interpretation (i.e. with the head of the first higher phrase). For a more thorough discussion of the prepositional meanings, see Arsenijević (2005).

(4) a. *John pushed to the shop in 3 hours.
b. *John pushed the cart (to) in 3 hours.



In this section and in section 3, I present a model in which the Undergoer, unlike the Goal and other roles, apart from its direct contribution, also has a special status with respect to the structural representation of the eventuality. The asymmetry observed above therefore results from the special place of the Undergoer in the structure of a telic eventuality.

The other interesting underspecified form of the full template of eventuality is the one in which one of its two phrasal components is empty (has no functional or lexical material) and therefore absent from the structure. This structure represents atelic eventualities, both those involving a process, as in (5a), and those involving states, as in (5b). An interesting question at this point is whether these two types of eventualities have a different representation in grammar or not. So far, I treated them as equal, but I address this question more explicitly in Arsenijević (2006a, ch. IV).

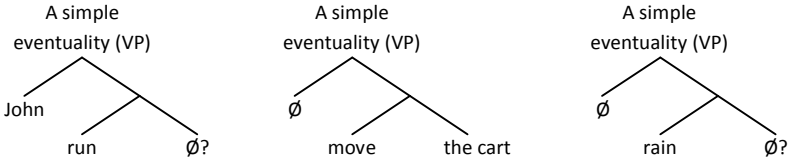
(5) a. John pushed the cart.
b. John knows Mary.

Finally, it is possible to combine the two ways in which the template can be underspecified, in which case a number of underspecified argument structures of atelic eventualities are derived. If the eventuality lacks an overtly specified complement, the derived structure is that of unergatives, as in (6a). If the missing argument is the specifier of the phrase, the derived structure is an atelic unaccusative, as in (6b).[3] And if it lacks an overt specification of both its

[3] Note that in the model developed below in this section, the specifier and the complement of a process swap their positions.

arguments, the structure derives an 'impersonal' atelic eventuality, as in (6c) (in English, this requires that the expletive *it* is generated in some higher position and does not represent a participant in the eventuality).

(6) a. John ran.
b. The cart moved.
c. It rained.



These last three structures point in the direction of the following phenomenon. There seems to be a difference between the ways in which the specifier and the complement are unspecified. It has been argued, since Hale and Keyser (1993), that unergatives usually involve the incorporation of the object into the verb. If this were the case, then the lack of an overt complement would normally still involve a (possibly light or defective representation of the) participant of the relevant kind, which underwent incorporation, while the lack of an overt specifier in the representation of a state would completely exclude the interpretation of this argument from the structure. In other words, the empty categories involved in the two classes of verbs differ. The empty category in the complement position stands where an incorporated argument was generated before incorporation. This argument is still easily recoverable from the verb: it is just not overtly specified as an argument. The empty category in the specifier position stands for a participant that is really unspecified. In the semantic interpretation, it is ambiguous between any possible referent in the discourse. Some disambiguation is usually provided by pragmatics, from the discourse and real world knowledge, but the degree of recoverability based on the material present in grammar is zero, since nothing has ever been generated in this position.

Just for illustration, let us look at the examples in (7).

(7) a. John ran.
a'. John did/made a run.
b. John yawned.
b'. John did/made a yawn.
c. John slept.
c'. *It slept John.
d. Kiši.
S-C
rains
'It rains.'

d'. Pada kiša.
falls rain
'It rains.'

The unergative verbs in (7a, b) can both have a more or less felicitous paraphrase involving a light verb and an object (7a', b'). The same holds for the impersonal VP in (7d), for which I give an example from Serbo-Croatian (S-C), where the fact that the expletive is not required makes the point more obvious. The excorporation of the incorporated argument from the verb leaves to the verb only a very light meaning of initiation and possibly control.

However, in the unaccusative and stative VPs in the given examples, it is impossible to reconstruct any Initiator. If anything caused John to be asleep in (7c), there is not only no hint in the VP as to who or what that is, but even that there was a causal relation involved. Moreover, if anything caused the rain to fall in (7d), there is no specification whatsoever in the VP of what that is, and no hint that the eventuality involves an initiating component.

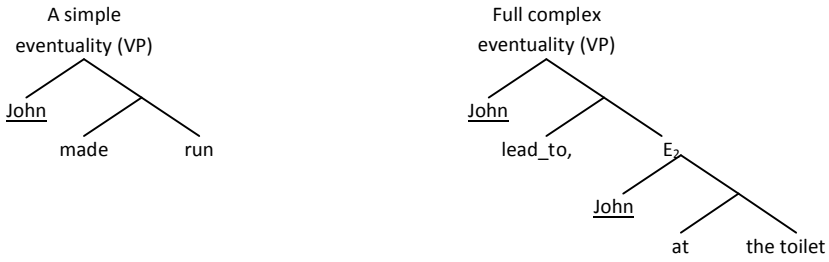
If all lexical semantic material in the meaning of the verb is taken to be incorporated primarily from its complement (and perhaps also from other structural elements), then the only structure that could be treated as genuinely intransitive would require a light verb, with an argument in its specifier, but without any overt or contextually given participant interpreted in its complement. Such expressions are ungrammatical, as shown in (8).

(8) a. *John was.
b. *John does.
c. *John has.

This matches the intuition about this issue. For any predicate, there must be at least one property of its most direct, or deepest, argument, i.e. of its complement, that the predicate modifies or gives a value to. Being the most direct argument of the predicate, i.e. being generated in the complement position, also means being first in the hierarchy that determines priority of specification, i.e. obligatoriness of an argument. In other words, only if no argument of the predicate is specified will it be possible to have an unspecified complement of a simple eventuality. This would give us a predicate corresponding to an impersonal light verb, an informationally vacuous meaning. From the syntactic point of view, this means that the specifier cannot be merged if there is no complement, which is in fact a trivial consequence of the definition of the specifier, which involves merging with a complex structure and not with a head; to get a complex structure, the head has to merge with something, and this something, which is neither a specifier nor a head, can only be a complement. This implies that unergatives are transitives in disguise and only unaccusatives really have a structure with an unspecified argument.

One final interesting property of the presented template is that it can have the same argument in more than one position. For instance, in the structure in (6a), there are two possibilities. One follows from the discussion of ergative structures above, and it consists in having the semantic contents of the verb *run* generated in the complement position and then incorporated ('John made a run'). The other possible interpretation describes an eventuality initiated by John, in which he himself changes location. In other words, in at least one possible meaning, the sentence is interpreted as John acting in a running manner and changing location in this process, where John is both the Initiator and the undergoer of the event. This structure is represented as in (9a), and as (9b) shows, it has a corresponding VP that takes a telic template.

(9) a. John ran.
b. John ran to the toilet.



Normally, only one of the two identical instances of an argument (here *John*) receives a full overt realization, while the other instance is either left without any lexicalization, or it surfaces as an anaphor or a reflexive. The degree of reduction of the latter instance (anaphor, reflexive, clitic, deletion) depends on various aspects of structural locality between the different instances of the same element, and possibly also on some lexical and phonological conditions. I do not discuss these issues.

In this paper, I simply use two independent copies of such elements, assuming that they represent the semantic material in the relevant position. This approach requires that lexicalization kicks off relatively late, at the PF interface. As noted in section 1, the desirable syntax would have no movement, but only independent base generation of the relevant material. When a number of structural sequences are filled with the identical material and satisfy certain syntactic locality conditions, all but one can be deleted, or lexicalized in some reduced way (e.g. by resumptive pronouns).

To wrap up, atelic eventualities are simple and represented by one phrase alone, while telicity is derived in a structure involving two phrases, and realizing two predicates (two subevents). This formalizes the traditional intuition that telic eventualities have more material than atelic ones. They involve two

eventualities: one that contributes the process and one that specifies the telos (result, culmination). This opens several interesting questions about aspect, among which the following.

What is the nature of a process and how is it related to the notion of result (particularly important for the present model, in which they both originate from the predicate *lead_to*)?

Can the result subevent be a process, or a telic eventuality, or is it always a state, and can the initiating subevent be a state or does it have to be a process?

How is the notion of process realized in atelic eventualities such as (5a) and (6), for they do not include the predicate *lead_to*? (There is no sense in which the predicate of these VPs would lead to their object.)

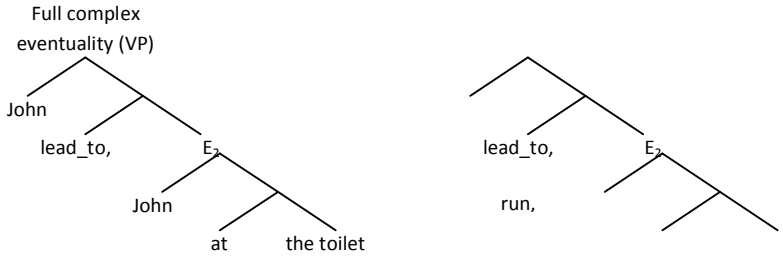
How can the relation between the two subevents that build the telic structure be formally defined and represented?

These questions underlie the entire paper, and each section provides part of their answers. In treating more concrete questions, the paper leads to a rounded and complete picture of what the template of a telic eventuality looks like, what its interpretational properties are, what restrictions it obeys and why.

2.2. Concatenation plus [ADD TO]

Before going on, let me give some additional background for the use of the graphical tree representations and for the place of the structures they represent in the modular organization of grammar. I consider syntax and semantics to be one module. Syntax is the computational engine that generates complex concepts (possibly not the only one such module), and semantics is a descriptive theory of the intuitions about syntax. Structures represented by trees in this paper, like for instance (10), are present mainly in two different modules: in the lexicon and in syntax. In the lexicon, structures like (10b) represent the meaning of the lexical entry, and often have a large number of empty positions, which can be filled in syntax by structures involving other lexical material. In syntax, these structures represent complex concepts, built from primitive two place predicates which are structurally organized so that arguments of one predicate are always predications built from another predicate. Null arguments, appearing at the level when the intended concept is sufficiently specified, are the strategy to prevent infinite regress. I assume that the syntactic structure is lexicalized in cycles, by matching the structures associated with lexical entries with parts of the derived sequence that is being lexicalized. A cycle in lexicalization is a referential expression, denoting an eventuality, an object or a discourse domain, and corresponding to Chomsky's (2001) notion of phase (see Arsenijević 2007 for a further discussion).

(10) a. John ran to the toilet
b. /run/



The structure in (10a) represents the concept corresponding to the eventuality in which John runs to the toilet, ignoring the complexity of the arguments, as well as other components of the sentential meaning such as tense, assertion etc. Moreover, the predicates used, like *lead_to*, *at*, and especially *run*, are not necessarily primitive, and might in fact be decomposed to a large number of primitive ones, for instance *place*, *legs*, *speed* etc. Obviously, I am assuming a deep decompositional model of syntax, which is natural if its purpose is taken to be to build complex concepts from simple ones. However, especially with the simplifications assumed, most of the contents of the paper are orthogonal to this assumption, which is why I do not dwell on it more than is necessary.

Several questions posed in the preceding subsection target the nature of the predicate *lead_to*, which is taken as the nucleus of the complex (= telic) eventuality template. This predicate has two different effects. First, it introduces the notion of process in the structurally higher subevent of the telic template. Second, it specifies the relation between the two subevents in the template: one of them initiates the other, which is thus interpreted as the result. In addition to these two components, this predicate also shares the head in which it appears with the lexical predicate of the initiating subevent. The decompositional approach taken suggests that all of these components should get independent structural realizations.

In order to properly define the notion of process, a good starting point would be to look at atelic eventualities that differ only in this respect, such as those in (11).

(11) a. John pushed the cart.
b. John knows Mary.

Both eventualities are atelic and both are represented by transitive VPs, but the one in (11a) involves a process, while the one in (11b), which is stative, does not. Verkuyl's (1993) description of states is that during the whole interval in which a state holds, the domain that it relates to stays unchanged. The meaning of the sentence in (11b) does not entail any change in the domain to which it refers. This does not hold for the interval of an eventuality involving a process. At least one property of one of its participants changes in the course of this eventuality. In (11a), this is true of the location of the cart. That it is location that is affected, and not some other property, is encoded in the lexical semantics of the verb. This change seems to be constant, homogeneous, without singling out any parts of the interval as having different dynamics or properties. A process can therefore be viewed as 'a state of process'.

Verkuyl represents this homogeneous change as a constant adding to the value of a certain property in the domain of the eventuality. Moving 'adds to' the location, heating to the temperature, learning to the knowledge, etc.[4] Verkuyl introduces the feature [ADD TO] to represent this property. When present, this property is marked with a plus-sign after the opening bracket ([+ADD TO]), and when absent with a minus-sign ([–ADD TO]). This property can be described as value-accumulativity, since it accumulates the value of the properties that it relates to over time. In what might be the most neutral definition, it is a monotonic function which maps from the temporal interval of a state onto the value of a certain property from the domain of this state (for a discussion of this view, see Arsenijević 2006a ch. IV). I use Verkuyl's name for this predicate, but for the sake of uniformity with my own notation, I write it without brackets, as *add_to*[5]. So far, I include the predicate in the representation only when it is present, without making use of plus- and minus-signs.

The introduction of the predicate *add_to* splits the predicate *lead_to* to two parts. Having introduced the predicate *add_to*, I now turn to the remaining component: the one relating the two subevents of the telic template. What is minimally required to hold between an initiating subevent and the result that it initiates is for them to be ordered so that the initiating part comes before the result. Ordering of this kind corresponds to the relation of asymmetric concatenation. Ergo, the second component of the predicate *lead_to* concatenates two predications into a larger structure. This concatenation is asymmetric, or directed, since it always concatenates the result subevent *after* the initiating one (the notion *after* is used here in a general ordering sense and not as a temporal relation), establishing a relation in which the end of the subevents is adjacent to

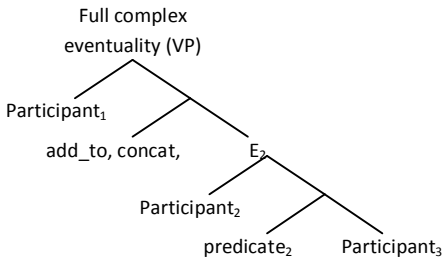
[4] With cooling down, shortening and similar processes, there is still adding to the value of a property (coldness, shortness).

[5] Observe that the predicate *lead_to* establishes interpretation with respect to another subevent, while the predicate *add_to* rather relates to a property within the semantic domain of the Sev (whether subevent or atelic eventuality) in which it appears.

the beginning of the other (Krifka 1998 gives a definition of concatenation). I represent this concatenating predicate as *concat*.

Now I can replace the predicate *lead_to* with the cluster of two predicates *add_to* and *concat*. The predicate *add_to* can appear not only in telic eventualities, but also in atelic processes, while the predicate *concat* can only appear in telic eventualities, since it joins two subevents into a telic structure. We arrive at the structure in (12).

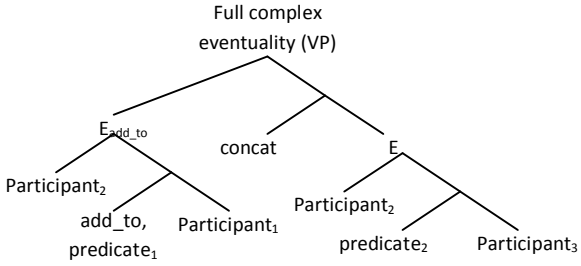
(12) Full template of eventuality with the predicates *add_to* and *concat*



Now we can deal with the next question: how can the same head host two different functional predicates: that of a process (*add_to*) and that which relates two SEvs (*concat*)? The problem has one particularly striking dimension: the predicate *concat* mutually relates the two subevents, but appears as a part of one of them.

The natural move is to split the problematic head and make a more explicit representation of the template. In this representation, the telic template is a phrase that takes eventualities as arguments, and is headed by the predicate *concat*. The initiating subevent appears in the specifier position and the result subevent appears in the complement. This is shown in (13).

(13) Telic template: concatenating a process and a state



The predicate *add_to* appears in the head of one of the ordered SEvs, together with the lexical predicate. This SEv, which comes first in the concatenation, takes

the specifier position. The predicate in its head 'applies' to the specifier, entailing a process affecting a property of the specifier, while the complement 'contributes' this predicate to the eventuality (i.e. initiates the dynamicity). The lexical predicate that appears in the same head is interpreted as a kind of a modification of the predicate *add_to*, which specifies the property that is changing its value and/or the way in which this is done (it may be seen as an incorporated complement or modifier, see the discussion around the examples (7) and (8) above, as well as Harley 2003).

The aggregate interpretation of the modified telic template is that the complement of the phrase headed by the predicate *concat* is adjacent and appears after the specifier, and this is a crucial component of the initiating-result relation between the subevents. The initiating subevent specifies that the participant generated in the complement of this subevent contributes the notion of process. This process adds a certain value to some property of the participant in the specifier of this subevent. The telic eventuality terminates when this property reaches the value specified in the result subevent.

The predicate *concat* is necessary but not sufficient to derive the meaning of the initiating-result relation. Ordered concatenation between two simple eventualities does not entail that one of them initiates the other and that the other is therefore its result. The additional ingredient of the template that conspires with concatenation to derive this relation is the identity between the specifiers of the two subevents (marked as Participant_2). The aggregate interpretation is as follows:

1. In one subevent (E_{add_to}), the value of a certain property of one of the participants (Participant_2) undergoes a homogeneous accumulation;
2. This value accumulation is specified through the predicates appearing with the predicate *add_to* in the head of the initiating subevent;
3. The subevent in which the initiation and the process are taking place (E_{add_to}) is adjacent to and ordered before the other subevent (E);
4. This other subevent (E) also involves the Participant_2 and defines a particular value for its property that is under change in E_{add_to}.[6]
5. This value is defined relative to a third participant (Participant_3).

From now on, I will be using the label *VP* only to denote the structure corresponding to the telic template, with a concatenation of two SEvs. For stative eventualities and processes I will keep using the term *simple eventuality*, abbreviated SEv. SEv can appear alone, or as an argument of the VP.

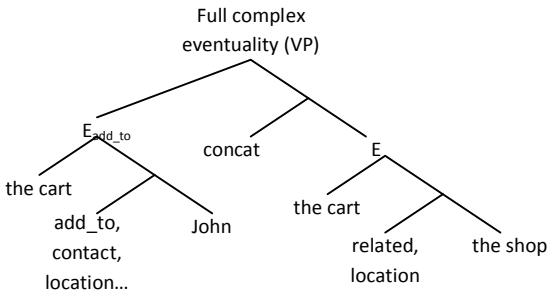
As argued in the rest of this paper, the properties of the structure which derive the listed steps are all, from the aspect of grammar, just properties of one possible structure, which is thus not special in any sense in the syntax alone. Structures without some of these properties are also possible, and they do appear

[6] Indexing is used for presentation only, to mark that the arguments in the two positions involve identical material.

in language. The fact that exactly this structure received the status of a template is probably motivated by its pragmatic aspects. This structure derives the meaning of a delimited change. While just a concept like any other in the abstract domain of grammar, in language use – the meaning of a delimited change is a frequently and important one. This might have triggered the grammaticalization of the relevant aspects of lexical entries associated with these meanings, leading to the appearance of functional items linked with the relevant semantic structure. In other words, the telic template is a pragmatically interesting case within the wide range of possible syntactic structures. Its status in grammar, though quite universal in languages of the world, is not a universal of grammar, but rather an essentially pragmatic consequence of its frequency in use.

Let me illustrate the semantic components of the interpretation of the telic template listed above with a real sentence. Observe the example in (14).

(14) Expanded telic template for 'John pushed the cart to the shop'



In this example, John initiates a process which affects the location of the cart. This process is immediately followed by a state in which the location of the cart has the value 'at the shop'. The combination of the predicate *concat* and the identity of the material in the specifiers of the two SEvs derives the meaning of change. If this same property of the participant is being 'added to' in one SEv (the initiating SEv) and has a certain value in another which immediately follows it, i.e. the result SEv, then this property changes its value to the one specified in the result subevent. The specifiers of the two SEvs hence specify the Undergoer of the change.

The set of predicates in the head of the result subevent (E) corresponds to the lexical meaning of the preposition *at*, phonologically realized as *to* when heading the result subevent of a telic template. The property of the Undergoer that reaches its result value in this subevent is determined by the *location* component in the head position. The value of this property is specified by the component *related* in the same head position, which specifies that the property of location of the Undergoer is related to the Goal, i.e. the shop. The fact that the predicate *related* in fact operates over the predicate *location* signals that a further decomposition

can be pursued within each of the SEvs, but I do not discuss this in the present paper.

The set of predicates in the head of the initiating SEv is lexicalized as the verb *push*. As discussed in Arsenijević (2006a:52-57), the meaning of certain verbs, like *kill*, *create* or *straighten*, involves a combination of predicates from the head of the initiating SEv with the Goal participant in the complement of the result SEv (for instance *kill* involves both the result of someone being dead and the process that initiates this result). The predicate *location* in (14) determines the Undergoer's property whose value is changed, and the predicate *contact* (with probably a number of additional predicates) specifies the way in which it is done.

The ways of deriving different types of argument structure, such as unaccusatives and unergatives, which are discussed in the beginning of this section, still apply. In addition however, some facts about them are now more strongly motivated. For instance, it is now much clearer why the telic template is so bad if the Undergoer is not overtly specified. Without an Undergoer, the template cannot be formed, because the Undergoer is part of its definition (by the coreference of specifiers requirement over the two SEvs). In fact, as argued in 3.6 and 3.7, not only must the Undergoer be present, but it is also subject to certain syntactic and semantic constraints.

2.3. Summary

In this section I briefly presented a neutral model as the starting point in developing a better one. This structural model consists of two phrases, one of which is projected on top of the other, representing the result and the initiating subevent, linked by the predicate *lead_to*. Different underspecified variants of this structure represent different special argument structures, such as unaccusatives and unergatives. The complete structure, with its both phrases fully specified, derives a telic eventuality.

To solve some problems that the model faces, the predicate *lead_to* was split into two predicates: the predicate *add_to*, which contributes dynamicity, and the predicate *concat*, which relates the initiating subevent to the result subevent.

The extended model, representing the template of a telic eventuality, is labeled VP, and it is a phrase headed by the predicate *concat*, labeled VP, and its two phrasal arguments. The two arguments represent the process- and the state- subevent in the template, and the predicate concat specifies that the relation between them. The subevent in the specifier is headed by the predicate *add_to*, possibly in combination with some other predicates. The interpretation of concatenation ties up with the coreference between the specifiers of the two subevents in the *concat* phrase, an aspect that receives a detailed elaboration in section 3.

In this template, thematic roles like Initiator, Undergoer and Goal are derived from the structural relations and requirements. In the next two sections I

discuss the ways to predict whether the reference type of the relevant argument will have effects on the reference type of the eventuality, without resorting to thematic roles.

The template defined in this way represents telicity as a decompositional property. Telic eventualities are complex: they consist of two simpler eventualities. Telicity is identified with involving a result component, without resorting to effects of temporal intervals, properties of arguments and different modifiers, in line with the decomposition view of inner aspect. The next section elaborates on this choice, and heads towards a model that incorporates the quantificational view as well, arguing that the two views target different, although closely related, phenomena.

3. Quantificational aspects

3.1. Introduction: inner aspect and core telicity

So far three points are defined as crucial for the structure proposed for telic eventualities:

1) the predicate *add_to*, which brings in the process (dynamic) interpretation.
2) the predicate *concat*, which contributes to the initiating-result component.
3) the coreference between the specifiers of the two subevents.

In this subsection, I introduce the core of a novel approach to inner aspect and the so-called tests for telicity. It further develops the view of inner aspect that divides it into two different notions, one of which, discussed in section 2, will be referred to as telicity, and the other, yet to be defined, as the actual inner aspect. Although closely related, the distinction between these two notions leads to important theoretical advantages in the research of aspect. While telicity only relates to the intiation-result component, i.e. to whether an eventuality concatenates two subevents, inner aspect involves, and directly relates to, an additional semantic component: quantification.

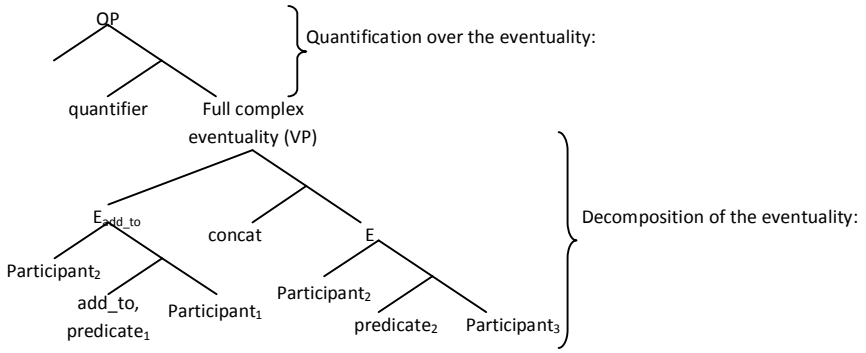
I argue that just as nominal predicates, eventualities may involve quantification, and that inner aspect is in fact a property related to the presence or absence of quantification over the eventuality. Inner aspect only indirectly reflects telicity. In this respect, I present the structure of the VP as fully parallel to that of the NP, in particular to the one proposed in Borer (2005a). Semantically and syntactically, the telic template directly corresponds to the domain of grammatical number in the NP (they both introduce the property of countability to the predicate of their respective expression), and inner aspect corresponds to quantification in the NP.

This means that I extend the model of the semantic and syntactic representation of eventualities presented so far by adding one more component, quantification. Crucially, this quantification is not inherited by the eventuality

from its arguments or other elements: it is base generated on the VP representing an eventuality. This is not a radically innovative step: approaches such as Di Sciullo & Slabakova (2005) or Zhang (2002) argue for the important role of quantification generated on the eventuality. The present model, however, offers a richer and more explicit elaboration of this aspect of the VP.

Quantification over the eventuality is introduced in a projection immediately over VP, which I label QP, as in (15). QP is headed by the same quantificational predicates that figure in nominal quantification.

(15) Extended model: a quantified VP



The parallel between quantification over eventualities and nominal quantification is full: both involve functional projections which introduce quantificational predicates to the structure over which they projects (for the structure in the nominal domain, see for instance Zamparelli 1995 and Borer 2005a). In many languages, including English, the quantificational layer over the eventuality has no overt realization, but may be reflected through quantification over the nonspecific arguments of the eventuality.

In the remaining of the paper, I use the terminology as in (16).

(16) a. Telicity, taking two values:
1) atelic – corresponding to simple eventualities;
2) telic – corresponging to the telic template.
b. Inner aspect, taking two values:
1) homogeneous – combining with *for*-phrases and not with *in*-phrases;
2) non-homogeneous – combining with *in*-phrases and not with *for*-phrases.

Telicity relates to whether the eventuality involves two subevents organized in a telic template, i.e. whether its interpretation involves the initiating-result structure. Inner aspect relates to the quantificational (or mereological), properties

of eventualities, which are attested in tests of inner aspect (traditionally also called tests of telicity, but clearly not so in the terminological division that I introduced). I chose the values homogeneous and non-homogeneous because whether divisiveness and cumulativity have to go together is subject to debate (Arsenijević 2006a, ch. 2).

Once the representation of an eventuality is supplied with quantification, it should display some interaction with the (lack of) quantification over the participants that are embedded in the eventuality. Such interactions, which especially involve distribution and scope, often appear between quantifiers within the same clause or within an even smaller domain such as VP. I argue that this is exactly how the well-known dependencies between inner aspect of an eventuality and the quantificational properties of its participants are instantiated. Furthermore, in certain well defined cases, the present model analyzes the quantification on the participants as a concord-like reflex of the quantification over the eventuality.

The general view that correlations between the quantificational properties of an eventuality and the quantificational properties of its arguments are a consequence of distribution between quantified expressions has been proposed in Jackendoff (1996) and Ramchand (2002). To my knowledge, however, no explicit technical elaboration of these ideas has yet been proposed in the literature.

I first discuss how and why participants of an eventuality receive quantification from the eventuality level. I show that this effect strictly depends on the nonspecificity of the participants.

3.2. Nonspecific arguments in telic eventualities

In this subsection I first briefly present the phenomenon of specificity and then concentrate on the global picture of its interaction with the quantification over the eventuality. The aim is to present a certain type of binding by higher predicates, that only nonspecific arguments of an eventuality may undergo. My major point is that, as already suggested in 2.2, predicates of arguments that are specific are not transparent for interactions with the predicate of the eventuality, or even higher ones. This is because they establish reference independently of the eventuality in which they appear as arguments. No such barrier is present in the predicates of nonspecific arguments, which therefore can be bound by the higher predicates. I propose a particular technical account for how and when this binding occurs, which also provides additional explanation for why exactly nonspecific arguments are available for this type of binding. In this domain, I concentrate on those aspects that I find relevant for the way inner aspect of an eventuality correlates with the quantificational properties of its participants.

With respect to the way they establish reference, NPs can be *specific* or *nonspecific* (this in fact holds for all phrases that can be referential, but only NPs are relevant for the current discussion). One way to define specificity is through the level of freedom in establishing reference: an NP is specific in a given context

if a) the lexical component of its predicate determines a nonempty set that includes the referent of the NP as one of its members, and b) the NP nevertheless has no freedom in referring among the members of this set: the particular referent is unambiguously determined in the context. Unlike nonspecific use, specific use of NPs requires that at least one of the interlocutors, or one of the animate referents in the discourse, knows a definite description, true only of the referent that the NP refers to. This is illustrated in (17).

(17) a. John saw the car.
b. John saw a certain car.
c. John saw some car or other.

The sentences in (17a, b) both have specific direct objects. The specificity of the object in (17a), which is also definite, entails that it is a particular token of car that John saw, and that this token is determined independently of the sentence. This is possible because, being discourse-old, the referent was known to the speaker and all the collocutors before the sentence was uttered. The sentence in (17b) has a specific indefinite direct object. There is a particular car to which the relevant NP refers, although not all of the interlocutors know which exact car this is. Yet, the particular car still has to be identifiable independently of the sentence. One or more of the interlocutors, or perhaps only John himself, was able to identify the particular car that the sentence is talking about even before the sentence was uttered.

The sentence in (17c), as opposed to the other two, has a nonspecific direct object. It states that John saw some car, and due to the singular of the argument NP, there is one particular car that John saw in the eventuality that the sentence refers to. However, this particular car cannot be identified independently of the eventuality in which it was seen. Without this eventuality, the nominal expression *some car or other* refers to any car in the world. Only with the eventuality it gets a definite description (the exact car that is seen by John in the eventuality referred to in the sentence).

The point I want to make is that nonspecific arguments are referentially bound by the eventuality in which they appear. Their participation in the eventuality makes them specific for the further discourse, acting as a definite description. The particular referent of the NP is bound by the predicate of the eventuality. This binding is even more obvious, if the eventuality distributes over some other referent. The eventuality in (18) is distributed over reference times, which are under universal quantification.

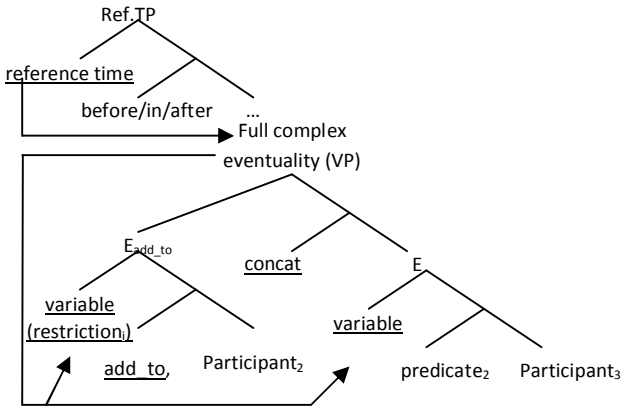
(18) Every time John drives someone else's car, he has an accident.

This sentence can be paraphrased as follows: for every eventuality in which John drives a car which does not belong to him, there is an eventuality of John having an accident. This distributive reading for the two eventualities

requires that there is an epistemic evaluation time (a temporal interval in which it is evaluated whether the sentence is true) for each par of instances of the two eventualities. For every different epistemic evaluation time, there has to be a reference time. And at each of those reference times, there is a referent that can be described as a member of the set of cars that do not belong to John and as the car that John is driving at the reference time. Each particular instance of the eventuality involves one car from the set of those that do not belong to John. The exact car is specified as the one involved in the particular instance of the eventuality. This means that the reference time referentially binds the eventuality, which in turn binds the nonspecific argument *someone else's car*.

In this view, a nonspecific participant can be seen as a locally bound variable: it is bound by the closest available quantified element. This can be the eventuality, as in (17c), or, though indirectly, the reference time as in (18). If bound by a specific element, this argument naturally also becomes specific in the discourse, as is the case in (17c). Independently of the eventuality, the NP cannot establish a unique reference. The eventuality provides, or mediates in providing, the nonspecific NP with a definite description. Assuming that the nonspecific argument is derived in the Undergoer position, this yields the form of the template in (19).

(19) Telic eventuality template with a nonspecific Undergoer



The nonspecific participant, here the Undergoer, is represented as a variable with a certain restriction. The restriction is in fact the property denoted by the nonspecific NP. Hence, the restrictoion denotes a set, and the Undergoer may refer to any member of this set. In (17c) this is the set of cars and in (18) the set of cars that do not belong to John. The variable in the Undergoer positions is bound by every predicate that c-commands them both, and which is of a kind that is absent from the predicate of the NP.

For instance, if, like in (18), the NP lacks quantifying predicates, and the closest quantifying predicate in the c-commanding structure appears in the reference time argument, as presented in (19), the quantifying predicate of the reference time argument will bind the NP (via the eventuality, which also lacks a quantifying predicate). This leads to the distribution of the Undergoer over reference times. The same goes for the predicates of specificity and definiteness: if present in the higher structure, they will bind all the c-commanded NPs that lack these predicates.

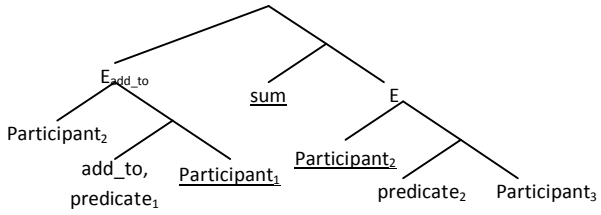
If two or more nonspecific elements are present inside the VP, and if they have the same restriction, they come out as coreferential. This is due to the fact that since they have the same restriction, they determine the same set within which they may refer, and since they share all the same binders, they pick out from that set the same referent. The properties of the telic template are therefore preserved, including the coreferentiality of the two positions in which the Undergoer is generated.[7] Without this property, if there were no guarantee that the two argument positions involve reference to the same participant, two orthogonal predicates would be concatenated, which does not derive the interpretation of initiating a result.

This illustrates one more property of the telic template. The predicate of concatenation can in fact be presented as a mere sum. I assume the standard definitions of the operations of sum and concatenation, like for instance used in Krifka (1998), where concatenation is a sum of objects that are adjacent and therefore do not have shared parts or intersections. The concatenation interpretation in the template comes from the identity of the two relevant participants in the SEvs that undergo the sum. The two SEvs undergoing the sum assign two different values to one and the same property of their arguments. If these two arguments happen to be coreferential, then the two SEvs cannot hold in the same temporal interval, which means that their sum can only be formed as a concatenation. The asymmetry aspect comes from the asymmetry of the syntactic structure (specifier vs. complement).

[7] This relates to the notion of uniqueness proposed by Krifka (1992, 1998). A thematic role can specify that a certain participant shows uniqueness for a certain eventuality, and that an eventuality shows uniqueness for one of its participants. The account introduced here generalizes both these relations for all nonspecific participants: whatever participant is denoted by the nonspecific NP generated in some position, it is unique for one instance of the eventuality derived by the VP. Krifka's notion of uniqueness is slightly different, because it also involves the pragmatic knowledge about concepts like creation or consumption.

(20) a. Head of VP contains the predicate *sum*; the interpretation of concatenation is derived by the fact that the two summed SEvs cannot overlap since they share one argument, but assign different values to one of its properties.

b. The telic template with the predicate sum.



Back to the effects of specificity, for the reasons presented above, it is expected that specific nominal expressions show no interactions with the predicate of the eventuality, or with the higher predicates in the structure. The example in (21) confirms this: the reading with a different specific car per reference time is out.

(21) Every time John drives a certain car, he has an accident.

Nonspecific arguments are expected to be bound by predicates of specificity and definiteness, which is confirmed by the fact that a nonspecific nominal expression used in a specific eventuality receives the status of a definite for the further discourse, like in (22).

(22) A: John saw <u>some car or other</u> and went home.
B: Was <u>the car</u> yellow?

Furthermore, we expect that if a nominal expression is base generated nonspecific and without predicates of quantification, and a predicate of quantification is present in the c-commanding structure, this quantifying predicate will bind the nominal expression, and it will be interpreted as distributed over instances of the referent that involves the quantifying predicate. I argue that this is exactly how the correlations between inner aspect and the properties of arguments emerge. Moreover, I argue that binding of the described type is the structural mechanism in which all distributive readings of nonspecific expressions are derived.

3.3. Correlations between inner aspect and the arguments of an eventuality

Let us consider the consequences of the view presented above for inner aspect. It has been observed, at least since Verkuyl (1972), that the inner aspect of an eventuality correlates with some quantificational properties of its participants.

As shown in (23), if in a sentence with a telic non-homogeneous eventuality, one of the participants is replaced with a bare plural or with a mass noun, the tests indicate that the eventuality becomes homogeneous.

(23) a. John pushed the cart to the shop in ten minutes/?for ten minutes.
b. John pushed the cart <u>to shops</u> for ten minutes/?in ten minutes.
c. John pushed <u>carts</u> to the shop for ten minutes/?in ten minutes.

Many linguists (including Verkuyl 1972, 1993; Krifka 1992, 1998 and Borer 2005b) have developed accounts in which the inner aspect of an eventuality is sensitive to the (properties of) quantification of its participants. They assume that this quantification is always determined independently of the eventuality, and that the relevant NPs are generated in the relevant position in a VP, fully specified for their quantificational properties. The eventuality itself is not considered to have proper independently generated quantification, although some sort of quantification can be introduced through temporal adverbials of quantification, as in (24).

(24) a. John pushed the cart to the shop twice.
b. John pushed the cart to the shop several times.

In this section, I present an account of the relation between inner aspect and the quantification on its participants that includes the opposite direction as well. I argue that predicates of eventualities may involve independent quantification, in the same way as nominal expressions do, and that this quantification may bind the nonspecific arguments of the quantified eventuality. This binding may leave a trace in the form of a lexicalization of the binding quantifying predicate on the bound nominal.

I also argue that the so-called tests for telicity only diagnose quantification over the eventuality, and not telicity as defined in this paper. Because the quantification diagnosed by the tests can be reflected on the nonspecific participants of an eventuality, although this is not where it is base-generated, the impression is created that the quantification of participants has an effect on inner aspect. The effects actually go the other way around: the quantification of the eventuality, i.e. its inner aspect, is lexically reflected on the nonspecific argument(s) that it binds.

Crucially, this means that the syntactic form of an eventuality may contain a quantificational specification, just like the nominal arguments of that eventuality may contain quantificational specification. Both can also remain quantificationally unspecified, in which case homogeneous meanings are derived.

Let us start from the facts illustrated in (25), which show that the inner aspect of an eventuality only manifests sensitivity to the quantificational properties of its nonspecific arguments.

(25) a. John pushed the (five) carts to the shop in ten minutes/?for ten minutes.
b. John poured the (five glasses of) water into the barrel in ten minutes/?for ten minutes.
c. John pushed certain (three) carts to the shop in ten minutes/?for ten minutes.

The quantification over the definite and therefore also specific NPs in (25a-b) has no effect on telicity. The same holds for the specific indefinite NP in (25c), if the interpretation is excluded in which only the kind of carts is specific and not the actual referent. Whether they involve numerals, quantifiers or just definite or specific plurals does not matter for inner aspect: the eventualities are non-homogeneous. This has traditionally been treated by postulating a relevant property in each of the domains, and defining mechanisms in which the two properties can influence each other (e.g. Verkuyl 1972). The relation esablished between the eventuality and its arguments is bidirectional: properties of eventualities may transfer onto the arguments and properties of arguments may transfer onto the eventualities in which they appear. I present an alternative explanation, which is theoretically simpler, arguing that the relation between the eventuality and its arguments goes in only one direction: predicates of the eventuality can bind its arguments. This leads to a less costly theory, in which only one tool: predication into the c-commanded domain, is used to account for all the effects of correlations between the inner aspect of the eventuality and the surface forms of nominal expressions representing the arguments.

In the approach argued for here, the observed behavior of specific arguments means that specificity presents a barrier that blocks the quantificational and specificity-related predicates of the NP from interacting with the corresponding predicates of the eventuality. In other words, being generated as specific, the NP cannot be bound by any of the predicates of the eventuality. Only nonspecific NPs can be bound by the eventuality, and only nonspecific argument NPs show a real correlation between their quantificational component and the inner aspect of the eventuality. Empirically, specific NPs correlate indeed only with the non-homogeneous inner aspect and nonspecific NPs correlate with both values of inner aspect. To sum up, comparing the examples in (25) to those in (23), we reach the conclusion in (26).

(26) Only the quantificational properties of nonspecific participants in an eventuality display correlations with inner aspect.

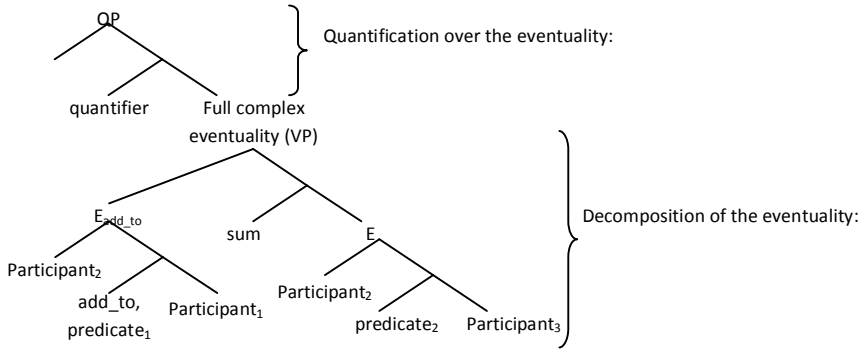
So far, this approach can be taken as a purely theoretical turn, which captures the facts as well as previous theories. One of the goals of the remainder of this paper is to illustrate both the theoretical and the empirical advantages of this approach. First, however, I provide a more detailed picture of the approach itself.

As observed above, nonspecific participants are bound by the structure in which they are embedded. This may yield three types of cases:

1. the nonspecific participant has no quantification and no grammatical number of its own and therefore, in addition to specificity, receives both properties from the eventuality in which it appears, or from some higher predicate (issues of grammatical number in the domain of eventualities is discussed later in this section).
2. the nonspecific participant has its own grammatical number, and is bound by the eventuality or by some higher structure only for quantification and specificity.
3. the nonspecific participant is specified for quantification, and only lacks specificity, so it gets bound by some higher structure which is specified for this property, usually the reference time.

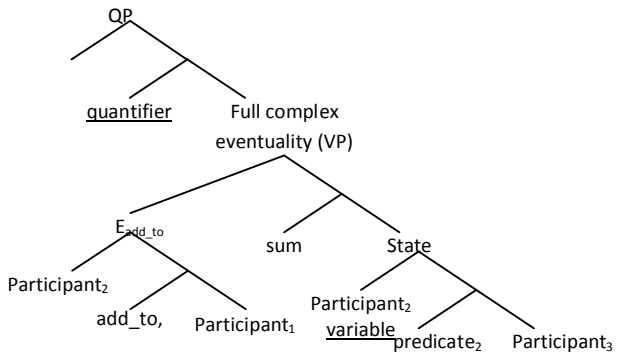
Let us look again at the structure in (15), repeated in (27), and see how it can be used to represent the binding relations between argument NPs and the higher predicates, in particular the quantifier over the eventuality.

(27) Extended model: a quantified VP



Let us take an eventuality in which one of the participants is a variable, and let that participant be the Undergoer. The structure will be as in (28).

(28) Quantified template



$Participant_3$

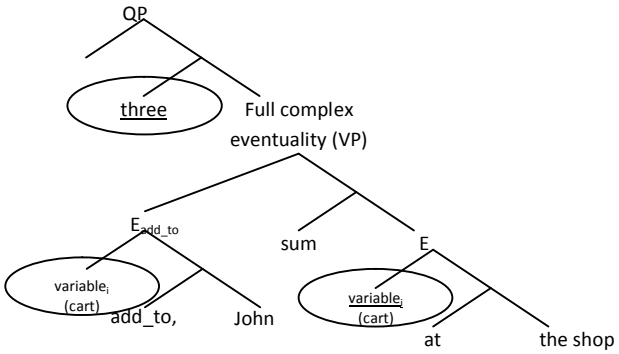
That the Undergoer is a variable means that it is nonspecific and crucially non-quantified. It therefore appears as a variable with respect to quantification and is bound by the quantifier over the eventuality. If, as it is the case with English, the language in question does not have morphemes which can lexicalize quantifiers over eventualities, it is impossible to overtly mark that the structure of the eventuality involves quantification. However, in a case such as the one presented, in which the quantifier binds a NP inside the eventuality, the visibility of the quantification can be regained by lexicalizing (a concord marking of) the quantifier on this NP. This creates an ambiguity: the nonspecificity of the NP signals that the quantifier that it bears may be generated on the NP, but also alternatively on the predicate of the eventuality.

In general, there are three interesting cases of this kind of binding. One is that an overt quantifier is generated in the QP that gets a reflex on one or more nonspecific participants, as in the example in (29) for the reading in which there are three eventualities of eating a single sandwich. This also applies to the eventuality in (30). The second involves a singular eventuality; then, the relevant participant(s) surface(s) in the singular, as in (29b). Finally, it is possible that there is no quantificational predicate at all, in which case a bare VP is projected. As discussed below, a bare VP corresponds to a bare plural in the nominal domain. This level also has the potential to bind nonspecific participants, provided that they lack grammatical number, and these participants can therefore surface as bare plurals, as in (29c).

(29) a. John ate three sandwiches.
b. John ate a sandwich.
c. John ate sandwiches.

A structural representation of a typical example is given in (30).

(30) Quantified VP of 'John pushed three carts to the shop'



The quantifier *three*, which is base-generated to quantify over the eventuality, binds the variable inside the eventuality (the Undergoer, *cart*).

It is crucial for the structure above that the Undergoer is generated without the predicates of quantification and specificity. If it were generated as a quantified NP, it would not be bound at all and the quantifier over the eventuality would be left without lexicalization and hence invisible (unless other strategy applied). The quantifier *three* in (30) has no overt realization in the position where it is generated – in the predicate of the eventuality. It only has a concord reflex on the NP that it binds, which is in fact how it is made visible. The nonspecificity of the Undergoer preserves the information in the sentence in (30) that the quantifier may have originated at the eventuality level, where it quantifies over the entire VP and not only over the participant.

The fact that there is also an alternative structure available for the same sentence, i.e. that the quantifier *three* is base-generated on the NP, does not present a problem for this analysis. It simply represents an instance of structural ambiguity. The reading corresponding to this alternative structure is often referred to as the collective interpretation of the relevant NP. Finally, there is also a reading in which the phrase *three carts* is specific. In this case too, the quantifier is base-generated within the NP.

More complicated cases are possible as well, such as for instance one where a quantified eventuality involves more than one non-quantified nonspecific participant. In this case, there are two options for structural representation. One is that the quantifier appears on each variable NP, as in (31a). The other is that the quantifier is lexicalized on only one of the variable participants, while other such NPs appear as definite and in the plural, and are interpreted as distributed over the NP that lexicalizes the reflex of the quantifier, as in (31b). I remain agnostic as to the way definite nominal expressions as in (31b) are generated and whether they distribute, noting only that this definite NP is similar to other types of non-discourse-old NPs with a definite article, such as *the car* in (31c).

(31) a. John pushed <u>three</u> carts to <u>three</u> shops.
b. John pushed <u>three</u> carts to <u>the (respective) shops</u>.
c. A taxi-driver left <u>the car</u> and ran away. / <u>The car</u> of a taxi driver can be good.

In this subsection, I proposed a further extension to the model, which introduces a layer of quantification over the VP. The motivation for this comes from the fact that quantified eventualities can be conceptualized, and are often referred to by linguistic expressions. This implies that the conceptual representation of an eventuality may involve quantification, and consequently, that it is represented in syntax with an own quantificational predicate. I made a distinction between telicity and inner aspect by associating the latter to the layer of quantification, and the former to the structure of the VP. They bind non-quantified NPs that represent the participants and trigger a kind of concord on the bound NP. In the following two subsections, I argue that VP corresponds to the nominal bare plural, as a

projection that specifies the predicate derived to involve a (particular) unit of counting.

This simplifies the traditional view, by excluding any transfer of semantic properties from the arguments to the predicate of the eventuality. The only direction of transfer is from the eventuality to its arguments, and it takes place via the described kind of binding. Eventualities may or may not involve the quantificational predicate; if they do, they are homogeneous, if not – non-homogeneous. As discussed in the next two subsections, the only property of the remaining part of the predicate of the eventuality that has any effects on inner aspect is whether it involves the telic template, i.e. whether it defines the unit of counting, required by most quantificational predicates. Other components, including properties of arguments, are orthogonal to inner aspect.

Not all nonspecific NPs are generated as non-quantified. Consider the reading of (32a) with only one instance of the eventuality of eating, involving a participant that consists of three sandwiches. A more serious problem is that, at least at first sight, it seems that not all the non-quantified participants are bound by the QP (and the VP) of the eventuality. Observe in this respect (32b): in one reading there are three instances of the eventuality in which a single student drinks wine, but the nonspecific Undergoer still appears as a mass noun – not even as bare plural.

(32) a. John ate three sandwiches.
b. Thee students drank wine.

For the former type of cases (32a), the natural step is to consider that the quantifier is base-generated on the participant and not on the eventuality. But then one should not expect that the quantifier on the participant has any effects on the inner aspect of the eventuality. I argue that this is a correct prediction and that the eventualities with quantified participants are, just as expected, ambiguous between the homogeneous (bare plural, i.e. iterative) and the non-homogeneous (singular) reading. This is due to the possibility that the specific and quantified NPs be collectively bound by the bare plural of the VP and, if specified, the singular of the eventuality.

The latter type of problematic VPs (32b) is countable, but it has arguments surfacing as mass nouns. I argue, however, that in these cases the mass NPs have a partitive meaning, and are embedded as partitive complements within extremely light arguments in the relevant positions. They are not direct arguments of the VP and therefore do not get bound by the quantification of this VP. Together with some other questions, these problems are analyzed and discussed in the remainder of this section.

3.4. Mereological relations

This subsection deals with the relations between the inner aspect of an eventuality and the mereological properties of the NPs expressing its participants. The discussion so far has presented one possible way in which this relation can be established directly by means of predicate-binding and quantification.[8] This differs from traditional views. Most authors who try to establish a semantic link between these two phenomena use the mereological properties of the predicates of units of these types (see for instance Krifka 1992 and 1998, Verkuyl 1993, Borer 2005b).

Mereological approaches are based on the properties of predicates related to the part-whole relation between their arguments. At the core of most such approaches are two properties, divisiveness and cumulativity, which are defined as in (33).

(33) cumulativity: $\forall$P.CUM(P) $\Leftrightarrow$ [$\forall$x, y.P(x)$\wedge$P(y) $\Rightarrow$ P(x$\oplus$y)];
Krifka (1998)

A predicate P is cumulative iff whenever it holds for two entities x and y it also holds for their union ($\oplus$ stands for the sum relation, an idempotent, commutative and associative function from the Cartesian product over a type, in this case the one of predicates, to the type itself: UP×UP → UP).

divisiveness: $\forall$P.[DIV(P) $\Leftrightarrow$ [[$\forall$x.P(x) $\Rightarrow$ $\exists$y.P(y)$\wedge$y<x] $\wedge$ $\wedge$ [$\forall$x,y.P(x)$\wedge$P(y)$\wedge$y<x $\Rightarrow$ P(x-y)]];

Borer (2005b)

A predicate is divisive iff when it holds for an entity x, it also holds for at least one other entity y which is a part of x, and when P holds for x and its part y, it also holds for the complement of y with respect to x.

Divisiveness and cumulativity relate to the predicates of both nominal expressions and eventualities. If both properties are absent, we speak of quantization and if they are both present, of homogeneity. Predicates of telic eventualities are argued to lack cumulativity (Krifka 1998), or either (or both) of these properties (Borer 2005b).[9] It has also been observed (see especially

[8] In this paper, I emphasize the importance of the relation established between a certain predicate and constituents that it c-commands, and which lack the corresponding predicate in its structure. In such a configuration, the lower c-commanded constituent, if non-specific, is fully dependent on the c-commanding predicate. For this relation, I use the term *binding*. This is, however, not the exact configuration usually referred to as binding, above all because binding takes place between referents, not predicates. Perhaps the proper term to use therefore is *predicate-binding*. I continue to use the term *binding* anyway, not only because it is shorter, but also because I do not exclude the possibility that various other instances of binding can also be accounted for in terms of the described configuration.

[9] For Krifka, not all telic eventualities are non-divisive and non-cumulative: there are also other ways to derive telicity, such as delimiting the temporal interval of the eventuality. However, the

Tenny 1994) that there is a correlation between the presence of these properties in the predicate of the eventuality and its presence in the predicates of some of its participants.

Whether a predicate is cumulative and/or divisive depends crucially on whether it involves any quantification and, if so, what type of quantification. Since quantifiers tend to be phonologically realized on nominal expressions, the cited authors have all assumed that the quantifying predicates are generated in the NP and then possibly transferred onto the eventuality. The present approach takes t he opposite direction.

All the tests for inner aspect are based on the compatibility of different values of inner aspect with some predicates that project higher than the structural domain in which inner aspect receives its value. All four classical tests for inner aspect, represented in (34), involve temporal modification and probably also reference time.

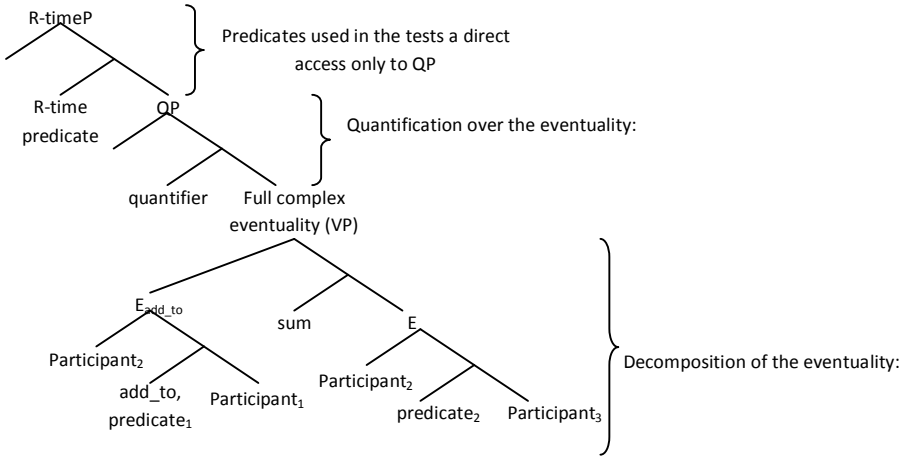
(34) a. John is killing Bill. –/→ John has killed Bill.
b. John finished drinking the soup.
c. John killed Bill in ten minutes/?for ten minutes.
d. John drank the soup on Friday and on Saturday. – NON-AMBIGUOUS: 2 pushing eventualities.

This is most obvious for the progressive test in (34a), which is based on the aspectual difference between present or past progressive and present perfect. The aspectual verb test in (34b) involves an explicit ordering with respect to reference time, although it also detects more fine-grained aspectual classes, rather than mereological properties. The temporal adverbial test in (34c) clearly deals with reference time, just as well as the conjunction test in (34d).

The introduction of the reference time and its ordering with respect to the temporal interval of the eventuality takes place at a structural level higher than the quantification over VPs. It is probably one of the structurally the lowest (and therefore most local) projections above the QP and, naturally, it interacts with the contents of the QP (a phenomenon traditionally described as selectional restrictions). In this view, the tests in (34) show the compatibility of inner aspect (QP) with some particular predicates projected on top of the relevant structure.

most directly relevant case in the present discussion involves deriving Krifka's telicity from the mereological properties of the predicate of the eventuality and I usually only consider this one.

(35) The projection specifying reference time immediately above QP



This means that tests for inner aspect only access the QP and that the structure lower than the QP can be 'inspected' only to the extent that it is reflected in the presence vs. absence of the QP, or in its particular contents. Therefore, mereological properties relevant for the results of the tests for inner aspect are read off the level of the QP, and not in the structure below this projection.

To be more precise, similarly to Borer (2005b), I relate homogeneity to the lack of any quantificational predicates, i.e. lack of a QP, and non-homogeneity to the presence of such a predicate, i.e. to the presence of a QP. Tests for inner aspect are sensitive to the presence of this projection. For instance, as argued for different reasons Arsenijević (2006a, ch. IV), the progressive, the perfect, the perfective and the secondary imperfective all require the presence of a QP. Similarly, temporal *for*-phrases combine only with structures that already involve a quantificational predicate and *in*-phrases with those that lack one.

In this way, the division of aspectual phenomena in the VP in terms of inner aspect and telicity allows us to identify that the locus of the mereological properties lies in the quantification that the eventuality involves, rather than in any of the participants or in the decomposition of the eventuality. The fact that the mereological properties of an eventuality sometimes correspond with those of its participants does not indicate that the properties of the participants are assigned to the eventuality. On the contrary, the properties of the eventuality are in certain cases assigned to the participants by the mechanism that has been introduced in this section. Divisiveness and cumulativity are related to a level that is, both in syntax and in semantics, higher than that of core telicity. While telicity is related to whether the VP consists of two concatenated SEvs or it involves only one SEv, the mereological properties of an eventuality depend on the quantification that can appear on top of this structure.

4. Concluding and evaluating remarks

In this paper, I presented a new model of eventualities in syntax. It establishes a strict parallel between the NP as accounted for in Borer (2005a) and the projections of the VP. SEvs can be used to build a semantically richer structure when they appear as arguments of the predicate *sum*. If it happens that in such a structure, one SEv is dynamic, corresponding to a process, and the other is stative, and in addition that the same participant appears to have a property affected in the dynamic SEv and to bear a certain value for the same property in the state, the interpretation of change is derived. In such a structure, the interpretation of concatenation is the only available one for the predicate *sum*, and the relation of initiation and result is established between the two SEvs. I call this structural pattern the telic template. This is the only way to derive a telic eventuality, and telicity comes from the concatenation, in which stative SEv defines the termination of the eventuality. The dynamic SEv is interpreted as initiating the termination. For the telic template I used the label VP.

I argued that the telic template derives a unit of division for the predicate of the eventuality and that it corresponds in this way to grammatical number, or the classifier, in the nominal domain. The unit of division of a telic eventuality is the instantiation of the single concatenation that defines it.

Finally, an eventuality can be quantified. The quantifier of an eventuality is generated in the projection that appears immediately above the VP, and which I labelled QP. The quantifier over a VP normally has no lexical realization and it can only be reflected as a nominal quantifier over one of the arguments of the eventuality. This happens if the argument in question is originally generated as a non-quantified nonspecific NP. Lacking its own quantification, it can be bound by the quantifier over the eventuality, and as a reflex of this binding, it lexicalizes a corresponding nominal quantifier. This mechanism of lexicalization is presented as yet another type of concord, similar to the negative concord in which the negation over an eventuality appears overtly on its nonspecific arguments. Overt lexicalization of quantification over the eventuality in languages like Chinese further supports the account.

The model proposed reconciles the decompositional and quantificational approaches to eventualities. The phrase most relevant for the decomposition of the eventuality – VP – also has very direct effects on the quantificational structure of the predicate that is derived. It is therefore at once a representation of the semantic decomposition of telicity and a well-defined functional projection that corresponds to grammatical number in nominal expressions, and licenses the projection of quantification.

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DVOJNI MODEL UNUTRAŠNJEG ASPEKTA I TELIČNOSTI

Rad predstavlja novi pristup sintaksi i semantici događaja koji miri dva tradicionalna tipa analize unutrašnjeg aspekta – onaj zasnovan na semantičkoj dekompoziciji događaja na poddogađaje (uzročne, procesne, rezultatske) i one koji pristupaju iz ugla svojstava kvantiteta, najčešće modelovanih mereološkom semantikom. Rad pokazuje da dva tipa analiza nisu međusobno isključivi, i ne nadmeću se za status bolje teorije, već se dobro kombinuju u jedinstvenu teoriju sa širim i dubljim empirijskim domenom. Osnovni argument za ovakav stav zasnivaju se na rasvetljavanju međusobnih veza i uslovljenosti dekompozicijskih i kvantitativnih svojstava događaja.

Ključne reči: unutrašnji aspekt, teličnost, brojivost događaja, kvantifikacija, slaganje.