The aspectual impact of French locative goal PPs

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1 Introduction

This paper presents an attempt to account for the aspectual properties of the French sentences containing goal Preposition Phrases. It is well-known that when a motion verb may be combined with a locative goal PP, this combination has the effect of changing the aspectual type of the sentence. For example, although (1a) describes an atelic eventuality, (1b) describes a telic one:

(1)   a. John pushed the car (*in an hour)

     b. John pushed the car into the garage (in an hour)

In recent years, a number of analyses have been proposed to account for the contrast in (1) (e.g. (Tenny 1992), (Verkuyl 1993), (Krifka 1995), (Jackendoff 1996)). Although they differ in theoretical background and technical detail, most of these analyses share the basic intuition that the telicity properties of sentences in (1) derive from the boundedness properties of the path the theme is described to move on: *push* describes lexically a motion along an unbounded path, and thus (1a) describes an atelic eventuality. In (1b), the PP describes the end of the path; the described path is bounded by the PP, and the described eventuality is telic.

The situation is more complicated in French, where two distinct types of locative goal PPs yield the same aspectual class alternation effect :

(2)   a. Paul a poussé la voiture (*en une heure)
        *Paul pushed the car (*in an hour)*

     b. Paul a poussé la voiture dans le garage (en une heure)
        Paul pushed the car into (litt. in) the garage (in an hour)

     c. Paul a poussé la voiture jusqu'au garage (en une heure)
        Paul pushed the car into (litt. to at) the garage (in an hour)

This data presents a challenge for theories of aspect designed to account for the contrast in (1), since French seems to make a distinction that does not exist in English. In this paper, we will investigate the properties of the two types of French goal PPs, and attempt to show that existing theories of aspect can not readily account for the data. Relying on Moens & Steedman's (1988)'s nucleus model for events and on Glasbey's (1994)'s situation-theoretic theory of aspect, we will then present a novel analysis which accounts for the aspectual class alternations while doing justice to the complexity of the data.

2 Two kinds of locative goal PPs

2.1 The basic data

The prepositions in (2b) and (2c) clearly belong to different classes: *dans(in)* belongs to the class of *static locative prepositions*, and may be used to form a locative adjunct (3a–3b), a predicative complement (3c), or an argument PP with a different semantic role (for instance *source* in (3d)):

(3)   a. Paul mange dans le jardin
          Paul is eating in the garden

       b. L'homme dans le jardin est un ami de Marie
           The man in the garden is a friend of Marie's

       c. Paul est dans le jardin
           Paul is in the garden

       d. Paul a pris ce livre dans le tiroir
           Paul took this book from (litt. in) the drawer

By contrast, the preposition *jusqu'à* in (2c) is comparable to the English preposition *to* in that it inherently describes a goal. *Jusque* itself may be seen as a preposition modifier which may take any static locative preposition as an argument to yield a new preposition with a goal interpretation.

In order to keep the distinction clear, we shall, in the remainder of this paper, call PPs such as *dans le garage* in (2b) *static locative goal PPs* (SLG PPs), and PPs such as *jusqu'au garage* in (2c) *dynamic locative goal PPs* (DLG PPs).

Although some verbs such as *pousser* may combine with both types of goal PPs, this is not the general case; some motion verbs are only compatible with one kind of goal PP:[1]

(4)   a. * Paul a marché dans le parc

       b. Paul a marché jusqu'au parc
           Paul walked into the park

(5)   a. Paul est entré dans la pièce

       b. * Paul est entré jusque dans la pièce
           Paul entered the room

2.2   A problem of compositionality

At first sight, the DLG PPs may be treated on a par with English goal PPs, as describing the end of a path. The SLG PPs raise a compositionality issue : since any static locative preposition may head an SLG PP, and since a class of inherent goal prepositions independently exists, there seems to be little reason to postulate a set of specialised goal prepositions homonymous to static locative prepositions.[2] Thus the 'goal' component in the interpretation of (2b) can not be located in the semantics of the preposition itself. The obvious alternative is to state that the 'goal' component is part of the verb's semantics. Such an analysis works fine with a verb such as *amener* (*take to*):

(6)   Paul a amené Marie à Paris
      Paul took Marie to (litt. at) Paris

amener is lexically telic, and hence one may assume that it describes lexically a movement along a bounded path. The SLG PP only specifies where the path ends. But the proposal runs into problems with a verb such as *pousser*: since the verb is lexically atelic, it describes lexically a movement along an unbounded path. With such a verb, it seems that the 'goal' component belongs neither to the verb nor to the preposition.

This feature of (2b) is a problem for any account of French goal PPs. It seems that one needs to assume that some glue relation external both to the denotation of the verb and to the denotation of the preposition must be provided.

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[1]For large-scale classifications of French motion verbs, see e.g. (Boons 1987), (Laur 1991), (Asher & Sablayrolles 1994).

[2]In contrast, as (Jackendoff 1990) notes, the data suggest that in English, locative goals are always expressed by inherently dynamic prepositions, and that seemingly all-purpose prepositions such as *under* are actually pairs of semantically distinct homonyms. This is motivated by the fact that in English, some static locative prepositions, such as *at*, can't head a goal PP. Note that the French counterpart of *at*, *à*, can head an SLG PP, as in (6).

2.3 The aspectual peculiarities of French goal PPs

Putting aside the compositionality problem for the time being, one may be tempted to assume, as (Asher & Sablayrolles 1994) do, that the two kinds of goal PPs are simply two distinct ways of specifying a boundary for a path. The following array of facts shows that this is not the correct approach.

At first sight, one may be tempted to view both types of sentences as accomplishment descriptions: the described eventuality is both telic and temporally extended, two properties that are usually taken as characteristic of accomplishments. However, applying standard tests for aspectual classes (cf. e.g. (Dowty 1979)) leads to an intriguing picture: sentences with SLG PPs pass most tests for accomplishments, but, as (Jayez 1996) shows, sentences with DLG PPs should be classified as achievement descriptions according to these tests. To take only a few examples, sentences with DLG PPs are incompatible with *passer une heure à* (*spend an hour*) and with *finir* (*finish*), contrary to typical accomplishment sentences and on a par with typical achievement sentences:

(7)   a. Paul a passé une heure a peindre un tableau
          Paul spent an hour painting a picture

    b.   * Paul a passé deux minutes à atteindre le sommet
          *Paul spent two minutes reaching the top

    c. Paul a passé une heure à pousser la voiture dans le garage
          Paul spent an hour pushing the car into (*litt.* in) the garage

    d.   * Paul a passé une heure à pousser la voiture jusqu'au garage
          *Paul spent an hour pushing the car into (*litt. to at*) the garage*

(8)   a. Paul a fini de peindre le tableau
          Paul finished painting a picture

    b.   * Paul a fini d'atteindre le sommet
          *Paul finished reaching the top

    c. Paul a fini de pousser la voiture dans le garage
          *Paul finished pushing the car into (*litt. in*) the garage*

    d.   * Paul a fini de pousser la voiture jusqu'au garage
          *Paul finished pushing the car into (*litt. to at*) the garage*

We may therefore conclude at least that sentences containing DLG PPs are not accomplishment descriptions. If accomplishments and achievements are the only two types of telic eventualities, then sentences containing DLG PPs must be achievement descriptions. But note that the tests for achievements in (Dowty 1979) are all negative tests: achievement sentences are taken to be those sentences that (i) describe telic eventualities and (ii) do not occur in some contexts where only accomplishments are possible. Thus it should come as no surprise that the class of sentences discriminated by these tests is not homogeneous.

On closer examination, it appears that sentences containing DLG PPs miss a number of properties that are typical of achievement descriptions. Achievement descriptions can usually co-occur with punctual time adverbials; but this is not the case for sentences containing DLG PPs:

(9)   a. Paul a atteint le sommet à 8h32
          Paul reached the top at 8:32

    b.   * Paul a marché jusqu'au sommet à 8h32
          Paul walked to the top at 8:32

A further peculiarity of sentences containing DLG PPs is that, contrary to typical achievement descriptions, they are not felicitous in the *imparfait* under an episodic interpretation:

(10) a. Paul atteignait le sommet quand il s'est mis à pleuvoir
          Paul was reaching the top when it started to rain

b. * Paul marchait jusqu'au sommet quand il s'est mis à pleuvoir
    *Paul was walking to (*litt. to at) the top when it started to rain*

The *imparfait* in episodic sentences may be taken as a rough equivalent of the English progressive. Thus it may be concluded that sentences containing DLG PPs can not be progressivized.[3]

To conclude, it appears that sentences containing DLG PPs belong to an aspectual class that is distinct from both the class of accomplishment sentences and the class of achievement sentences. They therefore differ sharply from sentences containing SLG PPs, which qualify as accomplishment descriptions. It results that the difference between sentences (2b) and (2c) can not be reduced to a difference in compositionality.

On a more general level, it seems difficult to extend the kind of analysis presented in the introduction to account for the complex data we have encountered: the data calls for a rich ontology allowing to distinguish different ways of bounding an event, with different aspectual consequences. Although the link between event telicity and path boundedness is intuitively appealing, there is no intuition that the path described by (2b) differs from the path described by (2c). This is not to say that the difference can not be ultimately traced to a difference in path descriptions, once an appropriate ontology has been found. But in the absence of strong intuitions, it is more promising to begin by describing the problem from a purely aspectual point of view, and to leave the exploration of the link from the event domain to the path domain for future work.

3 Structured events and co-predication

In the preceding section, we have established the need for two semantically distinct ways of specifying a boundary for an event. This section will be devoted to an informal presentation of the proposed solution.

(Moens & Steedman 1988) propose a theory of aspect based on an ontology of structured events. According to their proposal, telic events are associated with a complex structure, an *event nucleus* consisting of various eventualities. As (11) illustrates, an event nucleus can be split three parts : a *preparatory phase*, a *culmination* and a *consequent state*.[4] The preparatory phase is an activity (a process in Moens & Steedman's (1988) terminology), the culmination is an achievement, and the consequent state is a state.

(11)

	culmination	
preparatory phase		consequent state
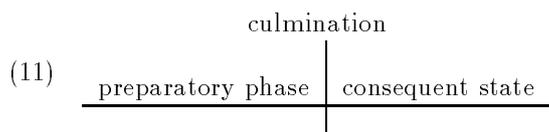
Here we will use the intuition behind Moens and Steedman's model without committing ourselves to the details of their analyses. For our present purposes, Moens and Steedman's event nuclei exhibit just enough structure. We need to distinguish two ways of bounding an event. The idea is that a basically atelic eventuality may be bound either by providing a culmination or a result state for that eventuality.

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[3]This is confirmed by the fact that they are not felicitous either as complement of *être en train de*, which is the standard schoolbook translation of the English progressive:

(1) a. Paul était en train d'atteindre le sommet
        Paul was reaching the top
    b. * Paul était en train de marcher jusqu'à la plage
        *Paul was walking to (*litt. to at) the beach*

[4]In this paper we have used the traditional Vendlerian terminology to refer to the different types of eventualities. Moens and Steedman's terminology is only used to refer to relations between eventualities. Thus the term *culmination* refers not to a type of eventuality, but to a relation between two eventualities, the second of which has to be an achievement.

As a consequence, DLG PPs will be analysed as achievement descriptions that refer to the culmination of an event nucleus whose preparatory phase is described by the verb. Similarly, SLG PPs are analysed as state descriptions which refer to the result state of the event nucleus.[5]

We still have to clarify how the meaning of the verb and the meaning of the preposition are related, and how the description of some part of an event nucleus constrains other parts of that event. Section 4 is devoted to the second task; We will concentrate on the first in the remainder of this section.

The informal analysis just sketched presupposes an analysis of goal PPs as eventuality descriptions. We will thus adopt a version of (Gawron 1986)'s *co-predication* analysis of argument PPs. The basic features of a co-predication analysis of PPs may be summarized as follows:

- The preposition denotes a two-place relation.

- The preposition and the verb share an argument, which is either the subject or direct object of the verb.

- The content of a sentence containing a co-predicator is (derived from) the conjunction of the content of the verb (combined with its arguments) and the content of the preposition (combined with its arguments).

Thus, assuming a conventional Davidsonian semantics, the content of (2b) may be taken as being the following proposition:

(12) $\mathbf{pousse}(e, \mathbf{paul}, \mathbf{la\text{-}voiture}) \wedge \mathbf{dans}(e', \mathbf{la\text{-}voiture}, \mathbf{le\text{-}garage})$

The analysis in (12) is incomplete in that it does not specify how the eventuality described by the verb and the eventuality described by the preposition are related. Gawron assumes that this is not a problem, and that the relation linking verb and preposition content is to be taken in a stock of general purpose *bondedness relations*, which have a status similar to that of discourse relations. Although we will not be able to justify this move here for reasons of space, it appears that an explicit representation of the link between the two situations is necessary for our present purposes. Thus the two described situations will be taken to be related by a *co-predicating role* (CPR). Thus a more adequate rendering of the content of (2b) is (13):

(13) $\mathbf{pousse}(e, \mathbf{paul}, \mathbf{la\text{-}voiture}) \wedge \mathbf{dans}(e', \mathbf{la\text{-}voiture}, \mathbf{le\text{-}garage}) \wedge \mathbf{movres}(e, e')$

The CPR **movres** is a relation linking a movement event to its result state. We assume that $\mathbf{movres}(e, e')$ only if $\mathbf{cons}(e, e')$, where **cons** is the relation linking an event to its consequent state in Moens & Steedman's (1988)'s sense. Thus $\mathbf{movres}(e, e')$ implies *inter alia* that e is a telic eventuality and e' is a state, and that e temporally precedes e'.

We may likewise take the content of (2c) to be (14):

(14) $\mathbf{pousse}(e, \mathbf{paul}, \mathbf{la\text{-}voiture}) \wedge \mathbf{jusqu'à}(e', \mathbf{la\text{-}voiture}, \mathbf{le\text{-}garage}) \wedge \mathbf{movculm}(e, e')$

where **movculm** is a relation linking an event to its culmination.

4   Towards a treatment of aspectual class alternations

In the preceding section, we have discussed informally a novel treatment of the aspectual class alternations illustrated in (2). This section is dedicated to the formalization of the proposed treatment. The account is couched in the version of Situation Theory presented in (Barwise & Cooper 1991), and relies on a modification of Glasbey's (1994)'s situation-theoretic ontology for aspect.

The first paragraph contains a very brief review of relevant concepts of situation theory; the second paragraph summarizes Glasbey's theory of aspect. We will then present the modifications that allow to account for the facts.

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[5]The proposed solution for SLG PPs is similar to the analysis sketched in (Pustejovsky 1991).

4.1   Situation Theory

The essential property of situation theory we will use here of is the fact that it assumes the existence of two kinds of predicates: types and relations. *Types* are most similar to traditional relations. A type may be combined with an *assignment*[6] of appropriate arguments to yield a proposition. A *relation* may be combined with an assignment to yield an *infon*.

Infons are basic items of information. An infon σ may be *supported* by a situation s ($s \models \sigma$). More precisely, infons are themselves *types of situations*. which have a special property: they induce a part-of relation $\unlhd$ on situations. Thus situations may be compared according to which infons they support.

(15) $s \unlhd s' \leftrightarrow \{\sigma \mid s \models \sigma\} \subseteq \{\sigma \mid s' \models \sigma\}$

Infons and propositions may be combined by boolean operations. Moreover, an *abstraction* operation is supplied, which allows one to form new types and relations from a proposition (or an infon) and an assignment.

(16) illustrates the notations that will be used in this paper :

(16)   a. $(x_1, \ldots, x_n) : TYPE$
        The assignment $(x_1, \ldots, x_n)$ is of type TYPE.

        b. $\langle\langle \mathbf{relation}, x_1, \ldots, x_n \rangle\rangle$
        *The infon obtained by assigning $(x_1, \ldots, x_n)$ to the relation **relation**.*

        c. $[x_1, \ldots, x_n \mid \sigma]$
        The relation obtained by abstracting $(x_1, \ldots, x_n)$ from the infon σ.

        d. $[x_1, \ldots, x_n \mid p]$
        The type obtained by abstracting $(x_1, \ldots, x_n)$ from the proposition p.

As is customary in semantic applications of situation theory, verbs will be taken to denote relations. The relation has argument roles corresponding to NP complements of the verb, plus at least one extra role for a time argument. A simple sentence is associated with the proposition that there is a situation which supports the infon obtained by applying the relation associated with the verb to the semantic objects corresponding to its NP arguments, and a time t. Thus an utterance of sentence (2a) is associated with a proposition like (17):[7]

(17) $s \models \langle\langle \mathbf{pousser, paul, la-voiture, t} \rangle\rangle$

In order to rephrase the co-predication analysis presented in section 3, we will assume that eventualities are a kind of situations. Prepositions will be analysed as relations between two individuals and a time, and CPRs as binary situation types. Thus the propositions associated with (2b) and (2c) are respectively (18a) and (18b).

(18)   a. $s \models \langle\langle \mathbf{pousser, paul, la-voiture, t} \rangle\rangle \wedge s' \models \langle\langle \mathbf{dans, la-voiture, le-garage, t'} \rangle\rangle$
            $\wedge\, (s, s') : MOVRES$

        b. $s \models \langle\langle \mathbf{pousser, paul, la-voiture, t} \rangle\rangle \wedge s' \models \langle\langle \mathbf{jusqu'à, la-voiture, le-garage, t'} \rangle\rangle$
            $\wedge\, (s, s') : MOVCULM$

4.2   Glasbey's analysis

(Glasbey 1994) grounds aspectual classes in infons. They are defined in terms of unary types of infons, the most important ones being the following:

(19)   a. $\forall \sigma(t)\, [\sigma(t) : ATELIC \leftrightarrow [\forall s\, [s \models \sigma(t) \rightarrow \exists t'\, [t' \sqsubseteq t \wedge s \models \sigma(t')]]]]$

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[6]Technically, assignments are partial functions from a set of *role indices* to a set of objects. This is needed to identify which argument corresponds to which role of the predicate without relying on linear order. Here indices will never be made explicit.

[7]For the sake of simplicity, we will treat all NPs as if they were proper names.

b. $\forall \sigma(t) \, [\sigma(t) : TELIC \leftrightarrow [\forall s \, [[s \models \sigma(t) \rightarrow \exists t' \, [t' \sqsubseteq t \wedge s \models \sigma(t') \rightarrow t' = t]]]]]$

Here $\sigma(t)$ and $\sigma(t')$ are those infons that differ only in the value of their time argument, respectively t and t'. Thus an infon is atelic if it has at least one similar "subinfon"; it is telic if it has no such subinfon.

Eventualities are then treated as situations, and the telicity properties are directly transferred from infons to eventualities. This is achieved by considering only situations of a particular type, i.e. those situations that do not have more than one temporally maximal infon[8]. This is done via the definition of a *key* infon of a situation:

(20) $\quad \forall s \, \forall \sigma(t) \, [(s, \sigma(t)) : KEY \leftrightarrow s \models \sigma(t) \wedge \forall \tau(t') \, [s \models \tau(t) \rightarrow t' \sqsubseteq t]]$

An eventuality is defined as a situation which does not have more than one key infon:

(21) $\quad \forall s \, [s : EVY \leftrightarrow \exists \sigma \, [(s, \sigma) : KEY \wedge \forall \tau \, \neg[(s, \tau) : KEY]]]$

Telicity properties can then be straightforwardly transferred from infons to eventualities: an eventuality is telic if its unique key infon is telic, and it is atelic if its key infon is atelic.

4.3   Telic infons vs. telic eventualities

In Glasbey's work, telicity is formalized as a property of both infons and of situations, and the telicity of an eventuality is entirely determined by the telicity of its unique key infon. In order to account for the impact of goal PPs, we propose is to relax somehow the constraint on the infons an eventuality may support. Thus, in a sentence like (2b), the infon introduced by the verb is atelic, but the described eventuality supports some other telic infon that renders it telic. This extra infon is crucially linked with the presence of a goal PP.

For independent reasons, we will propose to change the class of infons that determine an eventuality's telicity. For reasons that will become clear shortly, key infons will be replaced by *terminal* infons, i.e. infons which have the same temporal end as the eventuality:[9]

(22) $\quad \forall s \, \forall \sigma \, [(s, \sigma(t)) : TERM \leftrightarrow \forall \tau(t') \, [end\text{-}of(t') \leq end\text{-}of(t)]]$

A telic eventuality is any eventuality that has a telic terminal infon:

(23) $\quad \forall s \, [s : TELIC \leftrightarrow \exists \sigma \, [\sigma : TELIC \wedge (s, \sigma) : TERM]]$

An eventuality is atelic if it has no telic terminal infon.

The treatment of goal PPs may now be presented. Assuming that the verb *pousser* introduces an atelic infon, in order for (2c) to describe a telic eventuality, this eventuality has to be constrained to support some telic terminal infon. This may be done by assuming the following natural axiom:

(24) $\quad (s, s') : CULM \rightarrow [s' \unlhd s \wedge end\text{-}of(s) = end\text{-}of(s')]$

Where $\unlhd$ is the part-of relation on situations.[10] That is, if s' is the culmination of s, s' is part of s and s and s' have the same temporal end.

Once this axiom is assumed, it follows from (18b) that s, the situation described by the verb, is telic: s' must be a 'terminal' part of s, and $\langle\langle \mathbf{jusqu'à, la-voiture, le-garage, t'} \rangle\rangle$ is a terminal infon in s'; thus it must be a terminal infon in s too. Since this infon is telic, s is a telic eventuality.

A similar explanation can be constructed for *Jean pousse la voiture dans le garage*: one only has to assume the following natural axiom:

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[8]This restriction is necessary, because ordinary situations may support any number of infons of arbitrary size; thus knowing that a situation supports an atelic infon is not sufficient to insure that it does not support a larger, telic infon.

[9]*end-of* is taken to be a function which takes a time interval as its argument and gives its right boudary. By extension we will write $end\text{-}of(\sigma)$ for the end of the time argument of infon σ, and $end\text{-}of(s)$ for the end of the time argument of situation s' terminal infon.

[10]That is, $s \unlhd s'$ iff all infons supported by s are supported by s'.

(25) $(s, s') : CONS \rightarrow s : TELIC$

It follows from this axiom and (18a) that s must be a telic eventuality.

It appears that by allowing eventualities to support more than one terminal infon and by redifining telicity, one is able to account for the fact that sentences containing locative goal PPs describe telic eventualities. All that has to be done is to add a number of rather natural axioms, which should probably be assumed anyway.

4.4 Minimal Situations

The remaining problem is to make sure that *Jean pousse la voiture* describes an atelic eventuality. One can assume that this sentence is associated with the proposition:

(26) $s \models \langle\langle \mathbf{pousser, paul, la-voiture, t} \rangle\rangle$

And that the described situation must be an eventuality; but it could be the case that apart from $\langle\langle \mathbf{pousser, paul, la-voiture, t} \rangle\rangle$, s supports some extra telic terminal infon, say $\langle\langle \mathbf{jusqu'\grave{a}, la-voiture, le-garage, t'} \rangle\rangle$. Therefore we must apply some constraint on the infons that can be supported by s.

Considering the argument in the preceding paragraph, it appears that the described eventuality must support two sets of infons: first, the sentence is associated with a proposition p, and for every part $s \models \sigma$ of p, s must support σ. Second, s must support all the infons σ such that $s \models \sigma$ follows from p and the axioms.

The idea is then not to let any more infon in; the described situation should support only those infons it can't do without. In order to formalize this, we define a notion of *minimal situation satisfying a description*. Intuitively, a situation is minimal with respect to a description if it supports all the infons that figure in that description plus any other infon imposed by the axioms of Situation Theory, and nothing more.

Different formulations of this notion of minimality may be given, depending on what type of object one takes the description to be. Although this is a somewhat arbitrary choice, we will use a unary type of situation as the description. This is intended to be the type that can be derived from the proposition associated with a sentence by abstracting the described situation parameter. Thus for (2a) we will use the type:

(27) $T = [s \mid s \models \langle\langle \mathbf{pousser, jean, la-voiture, t} \rangle\rangle$

The definition of the binary type MIN(imal) is the following:

(28) $(s, T) : MIN \leftrightarrow s : T \wedge \forall s' \; [s' : T \wedge s' \trianglelefteq s \rightarrow s = s']$

The situation s is minimal with respect to type T if s is of type T and there is no situation contained in s which is of type T.

If the eventuality a sentence describes is constrained to be minimal with respect to the associated type, the desired effect is reached. Consider (2a) first; the associated type is (27). $(s, T) : MIN$ will be true if s supports $s \models \langle\langle \mathbf{pousser, paul, la-voiture, t} \rangle\rangle$, and no other infon except those that are imposed by the axioms. Suppose the axioms impose no other terminal infon; then, since this infon is atelic, s will be atelic too.

Now consider the alternative case, namely (2c). The associated type is the type T' obtained from proposition (18b) by abstracting the situation s. s will be minimal with respect to T' only if $s \models \langle\langle \mathbf{pousser, paul, la-voiture, t} \rangle\rangle$. But, as was shown in the preceding paragraph, any situation of type T' will also support $\langle\langle \mathbf{jusqu'\grave{a}, la-voiture, le-garage, t'} \rangle\rangle$. Thus s will at least support those two terminal infons. Suppose it supports only these two infons. Since one of them is telic, s will be telic too.

The proposal just formulated allows to get the right telicity properties for (2a) and (2c) (and similar cases). Interestingly, this solution relies heavily on the basic tenets of situation theory.

The distinction between infons and situations is the crucial point which allows one to establish a distionction between the telicity of a verb and the telicity of the complete sentence it is embedded in.

It should be emphasized that the analysis is very similar to Glasbey's (1994) for sentences with no goal PP: the minimality condition on described situations has an effect that is quite similar to the effect of the unique-key-infon constraint on eventualities.[11]

5   Accounting for the aspectual peculiarities of DLG PPs

In section 2.3 we presented data showing that sentences containing DLG PPs have an ambivalent aspectual status. Although they clearly describe telic eventualities, they qualify neither as accomplishments nor as achievements according to conventional tests. Moreover, we saw that these sentences are infelicitous in the *imparfait*. This complex array of data raises many questions, and we have not yet been able to give a precise account of the aspectual properties of DLG PPs. We may however sketch informally the kind of explanation to which an extension of the analysis presented in this paper could lead to.

In the preceding section, it has been assumed that sentence (2c) describes a situation supporting at least two terminal infons: an atelic infon associated with the verb *pousser*, and an achievement infon associated with the preposition *jusqu'à*. It is thus tempting to view the peculiar aspectual properties of (2c) as a consequence of the composite infonic structure of the described eventuality. Let us assume that operators such as time adverbials or aspectual verbs take the eventuality described by their complement as argument, and check the infonic structure of this eventuality. The sentence will be felicitous only if every terminal infon in the described eventuality is compatible with the operator.

Under these assumptions, we can account straightforwardly for the observed properties: the eventuality described by (2c) supports both an achievement infon and an activity infon. Thus it can not be the argument of those operators that are incompatible with achievements (such as *passer une heure à* or *finir de*); neither can it be the argument of operators that are incompatible with activities, such as punctual time adverbials.

As to the infelicity of the *imparfait*, the explanation is slightly more complicated. It is known that progressivization of an activity of accomplishment and progressivization of an achievement yield different results. The difference is illustrated by the contrast in (29). Suppose that Paul is pushing the car towards the garage, and that the following two sentences are descriptions of the situation:

(29)   a.   Paul poussait la voiture quand il s'est mis à pleuvoir
           Paul was pushing the car when it started to rain

       b.   Paul atteignait le garage quand il s'est mis à pleuvoir
           Paul was reaching the top when it started to rain

In (29a), the rain can begin at any moment during Paul's journey towards the garage, whereas in (29b), the rain can only begin during some final part of the journey, which has to be temporally close enough from Paul's reaching the garage. We may thus suppose that *Paul poussait la voiture* describes a situation which is an extended part of the push, whereas *Paul atteignait le garage* describes a situation which is only a final part of the push. Since (2c) describes an eventuality that supports both an activity and an achievement infon, we may assume that putting it in the *imparfait* places contradictory temporal requirements on the described situation: it has to be both an extended part of the push and a final part of the push. Thus (2c) is infelicitous in the *imparfait*.

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[11]The difference is that Glasbey puts no constraint on the smaller infons an eventuality may support.

6   Conclusion

We have examined the aspectual properties of two types French locative goal PPs, and shown that an analysis distinguishing two ways of bounding an event was needed. We have proposed to use Moens & Steedman's (1988) nucleus model for events to account for the differences. Glasbey's (1994) situation-theoretic treatment of aspectual classes has then been modified in order to provide the basis for a formal account of the aspectual class alternations. The resulting model seems to be well-suited to account for the aspectual peculiarities of goal PPs.

The analysis has a number of features that we did not mention for reasons of space. It extends straightforwardly to basically telic verbs and to *throw*-verbs. It can account for the fact that a number of verbs unexpectedly can not combine with DLG PPs. Finally, the situation-theoretic hypotheses are confirmed by the behaviour of motion descriptions in attitude reports.

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