

# **Identifying and computing temporal locating adverbials**

**with a particular focus on  
Portuguese and English**

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**Telmo Mória**

**Lisboa, 2000 (February)**



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# Abstract

This dissertation deals with the semantics of temporal locating adverbials, comprising two main topics: first, the **identification** of this class of expressions, by distinguishing between it and other classes – namely temporal measure adverbials and time-denoting expressions – whose semantic proximity raises important categorisation issues; second, the **semantic computation** of temporal locating adverbials in the formal framework of Discourse Representation Theory, taking the presentation of Kamp and Reyle (1993) as the basic reference. The second topic necessarily leads to the analysis of the **interaction** between adverbial temporal location and other semantic domains that significantly affect the relations expressed by locating adverbials, among which aktionsart, causality and quantification stand out.

The semantic-syntactic identification of temporal locating adverbials, as opposed to the two mentioned “bordering” categories of temporal measure adverbials and time-denoting expressions, required choices concerning their internal structure and their semantic function. Thus, temporal locating adverbials are analysed as containing a (basic or derived) time-denoting expression as immediate constituent, and as having a double semantic role – on one side, defining a frame for temporal location out of the interval expressed by their time-denoting complement and, on the other, defining a (location) relation between that (location) frame and the located entities. As a consequence, the apparently ambivalent measure/locating adverbials – like *for the last three hours*, or *from nine to five* – are considered as mere temporal locating adverbials, and the apparently ambivalent locating/time-denoting expressions – like *yesterday*, *last week*, or *before 1980* – are regarded as mere time-denoting expressions. The outcome of this categorisation is, I argue, a manifestly simple, structured and well-defined system (of adverbial temporal location), with an evident generalisation power.

With respect to the semantic computation topic, I propose a general DRS-construction mechanism (i.e. a set of rules) based on Kamp and Reyle’s (1993) but departing from it in some significant aspects. The changes I suggest are essentially motivated by the analysis of structures that were not examined in that work. Within the subtopic of the interaction between locating adverbials and other semantic domains, I study the impact of aktionsart values, causality and quantification on adverbial temporal location, and conclude that a more fine-grained typology of location relations than the one normally used in the literature is linguistically pertinent. With regard to this issue, particular emphasis is laid on a location mode that I term “full-scanning inclusive location”, which, to my knowledge, has not been given in the semantic literature the distinguished status it, in my opinion, rightfully deserves.



## Resumo

A presente dissertação ocupa-se da semântica das expressões adverbiais de localização temporal, dividindo-se em dois grandes tópicos: em primeiro lugar, a **identificação** desta classe de expressões, distinguindo-a de outras – nomeadamente, as expressões adverbiais de medição temporal e as expressões denotadoras de intervalos – cuja proximidade semântica com aquela coloca questões de categorização; em segundo lugar, a **computação semântica** das expressões adverbiais de localização temporal, no quadro teórico da Teoria da Representação do Discurso (Discourse Representation Theory), tomando como referência básica a apresentação de Kamp e Reyle (1993). A exploração do segundo tópico conduz obrigatoriamente à análise da **interacção** entre a localização temporal (adverbial) e outros domínios semânticos que afectam de modo significativo as relações expressas pelo localizadores adverbiais, onde sobressaem a “aktionsart”, a causalidade e a quantificação.

A identificação semântico-sintáctica das expressões adverbiais de localização temporal, em contraste com as duas categorias “limítrofes” referidas – as expressões adverbiais de medição temporal e as expressões denotadoras de intervalos – conduziu a opções no que respeita à sua estrutura interna e à sua função semântica. Assim, as expressões adverbiais de localização temporal são analisadas como contendo complementos (básica ou derivadamente) denotadores de intervalos e como desempenhando um papel semântico duplo – por um lado, definindo um intervalo para a localização temporal a partir do período representado pelo seu complemento e, por outro lado, definindo uma relação (de localização) entre esse intervalo (locativo) e as entidades localizadas. Em consequência, as expressões adverbiais que aparentemente expressam, de forma ambivalente, valores de medição e localização – por exemplo, *durante as últimas três horas* ou *das nove às cinco* – são consideradas simples localizadores temporais e as expressões adverbiais que parecem simultaneamente expressar valores de localização e designar intervalos – por exemplo, *ontem*, *a semana passada* ou *antes de 1980* – são consideradas simples denotadores de intervalos. O resultado desta categorização é, segundo defendo, um sistema (de localização temporal adverbial) manifestamente simples, estruturado e bem-definido e ainda com uma evidente capacidade de generalização.

Quanto ao tópico da computação semântica, proponho um mecanismo geral (isto é, um conjunto de regras) de construção de representações discursivas (DRSs) baseado no de Kamp e Reyle (1993), mas com diferenças significativas. As mudanças que sugiro são essencialmente motivadas pela análise de estruturas que aqueles autores não contemplam. No âmbito do subtópico relativo à interacção entre as expressões adverbiais de localização temporal e outros domínios semânticos, estudo o impacte dos valores de “aktionsart”, causalidade e quantificação na localização temporal adverbial e concluo que uma tipologia de relações de localização mais fina que a normalmente usada na literatura é

linguisticamente pertinente. Neste domínio, dou ênfase especial a um modo de localização temporal que designo como “full-scanning inclusive location” (“localização inclusiva totalizante”), à qual não foi conferido na literatura semântica, tanto quanto sei, o estatuto especial que em minha opinião verdadeiramente merece.

Do ponto de vista estrutural, esta dissertação organiza-se em três partes do modo a seguir descrito.

A Parte I, introdutória, integra três capítulos que têm como objectivos principais: situar e limitar o tópico da dissertação no âmbito das questões sobre tempo – Capítulo 1 (“O tempo nas línguas naturais: aspectos gerais básicos”); fazer uma breve descrição dos subsistemas da “aktionsart” e do tempo verbal, atendendo à sua especial importância para a análise da localização temporal adverbial – Capítulo 2 (“*Aktionsart* e tempo verbal: dois subsistemas fundamentais para a análise da localização temporal adverbial”); apresentar de forma sucinta a Teoria da Representação do Discurso, o quadro formal usado nesta dissertação, em especial no que respeita ao seu tratamento das questões temporais – Capítulo 3 (“Teoria da Representação do Discurso: um quadro formal de análise”). É de salientar ainda que, no âmbito do segundo capítulo, são apresentados de forma esquemática os sistemas temporais verbais (do modo indicativo) do português e do inglês, segundo a descrição de Peres (1993) e Kamp & Reyle (1993), respectivamente.

A Parte II centra-se na definição do conceito de “expressão adverbial de localização temporal”. O seu primeiro capítulo é introdutório e tem dois propósitos essenciais: apresentar taxinomias divergentes que surgem na literatura e evidenciam a pertinência de se discutir o tema da categorização – Subcapítulo 4.1 (“Algumas classificações divergentes de expressões adverbiais de tempo”); apresentar o mecanismo geral de construção de representações discursivas directamente relacionado com as expressões adverbiais de localização temporal a que acima se fez referência – Subcapítulo 4.2 (“Algumas noções básicas e pressupostos sobre localização temporal, medição temporal e denotação de tempo”). Os dois capítulos seguintes ocupam-se dos já mencionados problemas de categorização, que resultam da existência de expressões aparentemente ambivalentes – Capítulo 5 (“A linha divisória entre as expressões adverbiais de localização temporal e as expressões adverbiais de medição temporal”) e Capítulo 6 (“A linha divisória entre as expressões adverbiais de localização temporal e as expressões denotadoras de intervalos”). A segunda parte da dissertação contém ainda um capítulo, relativamente marginal em relação ao tópico categorial, em que é descrito e formalmente analisado um conjunto de expressões (denotadoras de intervalos) que envolvem, de forma algo imbricada, os domínios da denotação de tempo, da medição temporal, da quantificação sobre entidades ordenadas no eixo do tempo e da localização temporal – Capítulo 7 (“Medir, contar e localizar: observações sobre uma subclasse de expressões denotadoras de intervalos”).

Por último, a Parte III desta dissertação explora – de forma relativamente limitada – a diversidade de modos de localização temporal. O seu primeiro capítulo apresenta uma classificação das relações de localização temporal que resulta de se considerar o contributo de diversos elementos da frase, tais como o operador de localização temporal (tipicamente uma preposição), os valores de “aktionsart” das entidades (situações ou intervalos) a



localizar, valores de causalidade eventualmente associados ao uso de complementos situacionais na expressão adverbial e valores de quantificação sobre as entidades localizadas (associados a diferentes componentes da frase) – Capítulo 8 (“Modos de localização temporal: visão geral”). No que respeita a este capítulo, é de salientar a apresentação de uma construção que, tanto quanto sei, ainda não foi notada na literatura na forma exacta que esta reveste. Esta construção, onde, defensavelmente, o localizador temporal funciona como um comutador aspectual, consiste na combinação – associada a valores de causalidade – entre uma descrição de um evento pontual e uma expressão adverbial não-pontual (com *desde*), como na frase *o Paulo deixou fumar desde que soube que tinha problemas nos pulmões*.

O segundo e último capítulo da terceira parte centra-se na “localização inclusiva totalizante”, um modo que proponho seja distinguido da “localização inclusiva simples” e que, tanto quanto sei, não foi identificado como autónomo na literatura – Capítulo 9 (“Interacção entre a quantificação e a localização temporal (adverbial)”). A localização inclusiva totalizante envolve a localização temporal de entidades não-atómicas (somas de situações ou de intervalos), com um requisito de maximidade relativamente ao intervalo de localização. Por exemplo, a frase *o Paulo escreveu três livros desde 1980* requer que a totalidade dos livros escritos pelo Paulo no intervalo relevante seja tido em consideração, ao contrário da frase *o Paulo escreveu este livro em 1980*, que não apresenta tal requisito.

Com esta dissertação pretendi dar um contributo para o estudo dos sistemas de localização temporal adverbial de línguas como o inglês e, principalmente, o português. É, no entanto, minha convicção e esperança que este contributo possa ter um alcance mais alargado, lançando alguma luz sobre a temática da expressão temporal adverbial noutras línguas ou famílias de línguas.



## Foreword

1. This thesis is written in English. I have always been an enthusiast about this language, first at high school, and later as an undergraduate student at the Universidade Nova de Lisboa (where I got a degree in Portuguese-English Language and Literature). However, not being an English native speaker, nor having ever lived in an English speaking country, it is likely that the reader may come across (hopefully not too many) grammar mistakes. I have to thank many corrections in previous versions, specially to João Peres, Hans Kamp and Rainer Bäuerle. I apologise for the remaining mistakes.

2. Although I focus on two specific languages, Portuguese and English, this dissertation also belongs in the domain of general theoretical linguistics. I trust that the conclusions I arrive at are of relevance for linguistic systems in general and not only for the two prevailing object-languages taken into account.

My primary focus is on Portuguese, the only language in which I can scrutinise with some degree of confidence the subtle variations and intricacies of natural language sentences (a constant source of surprise and marvel to me!). My secondary focus is on English, which simply cannot be ignored, given its importance in the semantic literature. Besides Portuguese and English, other languages may episodically be examined (German, for instance, is particularly focused in chapter 5).

Throughout this dissertation there will be language-specific assertions, others applying just to the languages considered, and still others assumed to have a more general import. I trust that the different scopes are perspicuously expressed at the relevant places.

3. A word about notation. As a rule, I present illustrative examples in pairs Portuguese / English. The English sequences may have three different “statuses” though, which I signal differently: *quotes* mark mere glosses (where a literal correspondence is given only for the expressions under analysis); *brackets* mark translations (these are in principle grammatical, and correspond approximately to the attached Portuguese expressions, but are not under discussion); finally, *absence of punctuation marks* signals that the English sequence is (also) under discussion. The Portuguese expressions are normally placed above the English ones (in numbered examples), or before them separated by a slash (in body text). In well indicated cases, a comment applies to English / Portuguese counterparts, but for simplification I use just the English form in the body text (this occurring frequently in chapter 6, for instance, where I often just mention *before* or *after*, even though their Portuguese counterparts – *antes* and *depois* – have mostly identical properties).

4. The formal framework I use for meaning translation is the Discourse Representation Theory, in the version of Kamp and Reyle (1993). Although I make a brief presentation of this theory, particularly in what concerns its treatment of time in natural language, familiarity with many of its aspects is presupposed.



# **Part I**

## **Introduction**

This part deals with preliminary issues. In chapter 1, I will make some general considerations about the expression of time in natural language, which is the semantic area that includes the topic of this dissertation. I will start by briefly mentioning the issue of the logic representation of time, and subsequently describe in a schematic way the main subareas within the realm of temporality, both in terms of semantic concepts, or domains (e.g. location, duration), and in terms of the linguistic subsystems that express those concepts (e.g. verb inflection, time adverbials). The main aim of this description is to situate – and delimit – my topic: the expression of temporal location by adverbials means. Along the exposition, I will illustrate some of the questions to be addressed, and refer to the (possibly related) main issues that I will sidestep or leave for further research.

In chapter 2, I will consider in a very abridged form two temporal subsystems which closely interact with temporal locating adverbials, and are therefore crucial for the analyses to be made here. The first is the subsystem of *aktionsart* – a term, now standard in the literature, introduced by the school of the *Junggrammatiker* at the end of the 19<sup>th</sup> century –, which involves a subclassification of eventualities according to (essentially) temporal parameters, such as extendedness, homogeneity and constitutive elements. As is well-known, the *aktionsart* category to which a located entity belongs is essential in determining the modes of temporal location it can be involved in. The second subsystem to be considered in chapter 2 is *tense*, a term used to refer to the expression of time at the verb level (as opposed to the expression of time at the level of adjunct expressions, which is the central theme of this dissertation), and which can be marked, in the languages considered, either by inflexional morphemes or by (so-called) auxiliary verbs. As is widely known, tense and temporal locating adverbials interact intensely, both contributing to the location of eventualities in time. However, as I will try to show, the information conveyed by time adverbials can be considered separately, and therefore these expressions constitute an autonomous area of study (to which this dissertation is intended as a contribution).

Finally, in chapter 3, I will make a brief presentation of the formal semantic framework I will resort to. This is the Discourse Representation Theory (DRT), a linguistic theory developed after the seminal work of Hans Kamp (1981), which is nowadays a widespread framework for semantic research, both at the level of purely theoretical linguistics and at the level of computational implementations. As is widely recognised, this theory provides – in the version presented in Kamp and Reyle (1993), which I take as a basis – one of the most comprehensive treatments of temporal phenomena available in the literature, integrating the basic insights of the classical works of Reichenbach (1947), Vendler (1967), Davidson (1967) or Link (1983). This fact justifies my option for DRT as the basic tool for linguistic analysis. In this chapter, I will not attempt to do an extensive

presentation of the theory, but will rather focus on the aspects that are more relevant for this dissertation. These include, in particular, the general mechanism for building semantic representations (discourse representation structures), and the basic elements of temporal analysis in the areas of tense, aktionsart and temporal adverbials.

# Chapter 1

## Time in natural languages: general basic aspects

### 1.1. Representing time and temporal relations in natural languages: instants, intervals and events

As often noted, reference to time is pervasive in natural languages such as Portuguese or English. The question of how to model the way time is conceptualised in natural language has been a subject of much attention in the literature for many decades now. A central question in this study is of ontological nature. In the semantic framework I adopt – Discourse Representation Theory – a structure of eventualities is taken as an ontological primitive, together with a structure of instants (where from a structure of intervals is derived), which has the structural properties of the set of real numbers. These two structures are interconnected, and essential in modelling the way language expresses time and temporal relations.

In many previous works and theories, however, this interdependence was not assumed. Although this dissertation is certainly not the place to attempt a thorough review of the history of time studies in Logic and Linguistics, some references are compelling, among which the work of Prior (1967), which constitutes a major first step in the logical analysis of time. Before Prior, in standard propositional logic, sentences were simply represented by a propositional variable (e.g.  $p$  or  $q$ ), which involved no reference to any particular time. This author devised a system where propositions can be affected by temporal operators (*tense operators*), namely **P** (for past times) and **F** (for future times), whence (i)  $p$  is reinterpreted as “it is the case *at this moment* that  $p$ ”, (ii)  $\mathbf{P}p$  stands for “it was the case *at least once before now* that  $p$ ”, and (iii)  $\mathbf{F}p$  for “it will be the case *at least once after now* that  $p$ ”. The verification of truth for these formulas is based on instants, e.g.:

- (1)  $\mathbf{P}\phi$  is true in  $\mathbf{M}$  at  $\mathbf{t}$  iff  $\exists \mathbf{t}' (\mathbf{t}' < \mathbf{t} \wedge \phi$  is true in  $\mathbf{M}$  at  $\mathbf{t}'$ )  
(*apud* Kamp and Reyle 1993: 487)

Priorean tense logics (including extensions to predicate logic of Prior’s original system, which was devised for propositional logic) have proved insufficient or inadequate to represent natural languages like English. Among its often mentioned drawbacks (cf. e.g. Kamp and Reyle 1993: 491-498, or Moens 1987: 12 ff.) are (i) the possibility of iterating tense operators (forming complex formulas like  $\mathbf{PP}\phi$ , or  $\mathbf{PPFP}\phi$ ), which does not have a natural language counterpart in tense iteration, and, more importantly, (ii) the incapacity to express temporal anaphora, temporal deixis, or the natural language interactions between tense and other temporal elements – nouns, adverbs, etc.

Furthermore, the standard models for Priorean tense logics are instant-based: they assign truth values to atomic formulas at instants of time, predicates being assigned extensions at instants. Now, as shown by many authors (cf. review of arguments in e.g. Tichý 1985, or

Moens 1987), these models do not seem to adequately represent the way in which speakers use language. As Kamp and Reyle (1993), put it:

“(...) one comes to realize (...) of more and more predicates that they cannot be treated as primitive relations between individuals and instants. Indeed, it becomes doubtful if there are *any* predicates P such that P being true of **a** at **t** would not have to be analysed in terms of what is the case at times in **t**’s vicinity” (p. 503).

It has also been argued that

“in language one never seems to refer to punctual, dimensionless entities. Even punctual expressions as in (53) do not single out the dimensionless entities of point logics but seem to refer, rather, to some more extended period – however short it may be:

- (53) (a) At 6 o’clock sharp, Harry left the office.  
(b) At that very moment, the building collapsed.” (Moens 1987: 31)

To overcome the handicaps of instant-based semantics, many authors turned later to an interval-based semantics (cf. e.g. Bennett and Partee 1978, or Dowty 1979). This approach, however, has also shown some insufficiencies, among which the difficulty in evaluating the truth at (or with respect to) intervals, given the problem of (possible) gaps in the relevant eventualities (cf. e.g. Moens 1987: 32, Kamp and Reyle 1993: 501-502, and the references therein).

A way out of most problems associated with the instant and interval semantics was provided by the now widely embraced strategy of taking events – on a par with times – as basic entities of the semantic models (despite some well-known problems of establishing secure identity criteria for events). Event-based semantics have been developed by many authors, after the work of Davidson (1967), who firstly used logical forms in which events were explicitly represented. A categorisation of eventualities in subclasses (Vendler 1967), and a conception of eventualities as complex entities with an internal structure (cf. e.g. Moens 1987, and previous works mentioned therein), for instance, have proven crucial for a more effective modelling of the way speakers conceive time and temporal relations in discourse. This will be seen in some detail throughout this dissertation, and I will not elaborate more on this issue at this point.

## **1.2. Temporal domains of natural language (and the focus of this dissertation)**

### **1.2.1. Temporal relations: location, frequency, number and duration**

In order to get an overall picture of the temporal relations in natural language, three distinguished components have to be taken into account:

- (i) the relation itself, which can be of different sorts – e.g. location, measurement, counting;
- (ii) the “subject(s)” of the relation – i.e. the located or measured entity, for instance –, which can be of different ontological categories (including temporal) – e.g. eventualities, intervals, ordinary individuals;



- (iii) the “object” of the relation – i.e. the locating area or the measurement value, for instance –, which has necessarily to be a temporal entity (be it basically temporal or not) – e.g. parcels of the time axis (including calendar units and “running times” of eventualities), amounts of times.

Let us start by focussing on the cases where the entities of (ii) are eventualities. With respect to the possible ways in which eventualities can be linguistically related to time, three subsystems stand out as relatively prominent: **location in time**, **frequency** and **duration** (cf. Peres 1993: 5). This trilogy is particularly evident in the domain of temporal adverbials, which are often subdivided into classes according to these notions (cf. section 4.1):

- (2) a. O Paulo casou *em 1980*. [location]  
       Paulo got married *in 1980*.  
       b. O Paulo costumava ir ao cinema *três vezes por semana*. [frequency]  
       Paulo used to go to the cinema *three times a week*.  
       c. O Paulo trabalhou *durante três horas*. [duration]  
       Paulo worked *for three hours*.

All these sentences relate eventualities to time. In (2a), the eventuality of Paulo getting married is *located* on the time axis (by specifying a frame within which it falls). In (2b-c), there is some kind of *quantification* involving the described eventualities: in (2b), a *frequency relation* is expressed between the (repeatable) eventuality of Paulo going to the cinema and a given time unit (week); in (2c), the eventuality of Paulo working is *temporally measured*, that is, its duration is quantified.

The subsystem of frequency is often associated with the subsystem of **number** (cf. Bennett and Partee 1978), illustrated in the following sentence:

- (3) O Paulo foi ao cinema *três vezes*.  
       Paulo went to the cinema *three times*.

In these sentences, contrary to (2b), there is no expression of a pattern of repetition of the described eventuality; rather, the total number of its occurrences is asserted. In other words, these structures involve an *absolute* – and not a *relative* (to a unit of time) – *counting* of eventualities<sup>1</sup>.

It must be stressed that, normally, the absolute counting of eventualities is temporally bounded, i.e. circumscribed within a time frame. In examples like (3), no frame for the counting operation is explicitly provided, whence the whole past – as established by the tense form of the verb – acts as such<sup>2</sup>. In the following examples, the frame is set by the antecedent context – in (4a) – or is explicitly marked by a frame adverbial – in (4b):

<sup>1</sup> Cf. Swart (1993: 296-298) for some exceptional cases where “adverbials of number” have a semantic behaviour akin to “frequency adverbials” (or, in her terms, “quantifying adverbs”).

<sup>2</sup> For pragmatic reasons (given that going to the cinema can be a highly recursive eventuality), this “whole-past” reading may be odd (a more normal expression being, in these cases: *o Paulo (só) foi ao cinema três vezes em toda a sua vida* / *Paulo (only) went to the cinema three times in his whole life*). However, with other (less highly recursive) eventualities, the reading at stake is perfectly normal:

- (4) a. Na semana passada, o Paulo saiu imenso à noite. Foi ao cinema três vezes.  
Last week, Paulo went out a lot at night. He went to the cinema three times.
- b. O Paulo foi ao cinema três vezes na semana passada.  
Paulo went to the cinema three times last week.

The relative counting of eventualities – as in (2b) – can also be temporally bounded. Note that *três vezes* / *three times* can be replaced by *três vezes por dia* / *three times a day*, in (4). However, contrary to what is normally the case with the absolute counting, the relative counting can also appear in association with a generic value (i.e. not framed by a specific time interval), as when the simple present is used in the main clause:

- (5) O Paulo vai ao cinema três vezes por semana.  
Paulo goes to the cinema three times a week.

Many authors keep the concepts of frequency and number clearly separate – cf. e.g. Bennett and Partee (1978: 22 ff.), who consider a macro-class of “adverbials of number and frequency”, or Vlach (1993)<sup>3</sup>. This separation seems in fact desirable, given the semantic differences just mentioned, and their different linguistic properties (e.g. with respect to their effect on the aktionsart of the expressions with which they combine):

“(...) phrases like *three times* are straightforward quantifiers over events, not frequency adverbials. They do not go in the syntactic position of frequency adverbials (\**Allen went to Nome three times for a year*), which is to say they don’t create process sentences. (...) Frequency adverbials at most say something about how much per unit of time, not about how much in absolute terms” (Vlach 1993: 251-252).

From the few examples considered so far, the following (provisional) general picture of the linguistic relations involving the concept of time emerges (cf. revised version on page 14):

**Table 1. Subtypes of temporal relations (provisional)**

<i>Table 1. Subtypes of temporal relations (provisional)</i>				usual designation
Temporal relations	location			→ (temporal) location
	quantification	measurement		→ duration
		counting	relative (to a time unit)	→ frequency
			absolute	→ number

- (i) O Paulo casou três vezes.  
Paulo got married three times.

<sup>3</sup> Some authors, however, do not distinguish these classes – cf. e.g. Tichý (1985: 277): “It is the function of phrases like ‘exactly twice’, ‘every five minutes’, and ‘half the time’ to indicate (...) frequency (...); these phrases are thus fittingly called *frequency adverbs*”.

In the examples given so far, the entities entering into the temporal relations of Table 1 were all eventualities. In the discussion below, it will be clear that at least some of these relations can involve other types of entities, namely intervals and ordinary individuals, which can also be temporally located or temporally measured, for instance.

It is not my purpose to do in this introductory chapter (or, for that matter, in this dissertation) an extensive survey of all the linguistic factors that need be taken into account in the treatment of the temporal domains of Table 1. It is also not my purpose to discuss at this point the – sometimes fuzzy – boundaries between (some of) these domains. My main aim in this chapter is to situate my topic – temporal location – within a more general view of the expression of time in natural languages, so as to delimit the scope of my work with a certain level of detail. In order to do so, I will consider in what follows (within this section) each of the four mentioned subsystems individually, focusing on their expression by adverbial means, and try to describe – up to a certain extent – the parameters required for their integrated study and the aspects that will and will not be taken into account in this dissertation.

### 1.2.1.1. Temporal location

Temporal location (as expressed by adverbial means) involves a relation between a given entity – the located entity – and, typically, a parcel of the time axis – the location interval. Located entities can belong to at least the ontological categories of eventualities – cf. (6a) – and time intervals – cf. (6b). In this dissertation, I will consider both these cases.

- |        |  |                             |
|--------|--|-----------------------------|
| (6) a. | O Paulo casou em 1980.<br>Paulo got married in 1980. | [location of eventualities] |
| b.     | um fim-de-semana em 1980<br>a weekend in 1980        | [location of intervals]     |

A location relation between ordinary individuals and parcels of the time axis seems also possible, at least in restrictive constructions like (7). I will ignore this type of constructions.

- (7) um pintor do século XIV<sup>4</sup> / os pintores do século XIV  
a 14<sup>th</sup>-century painter / the 14<sup>th</sup>-century painters

As said above, the “location site” is typically a parcel of the time axis. However, there is also room for a certain amount of variation in this component.

Firstly, what has been traditionally called *temporal location* may involve either a direct relation of the located entity to an interval – as in (8a) – or a direct relation of that located entity to another eventuality (locating eventuality), which on turn can be explicitly related, or not, to a parcel of the time axis – as in (8c) and (8b), respectively:

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<sup>4</sup> Note, however, that the expression *uma casa do século XIV* (a 14<sup>th</sup>-century house) can describe a house (existing now) that was built in the 14<sup>th</sup> century. So, in this expression, the temporal relation seems to involve an eventuality (the object creation), rather than the object itself as a whole.

- (8) a. O Paulo casou em 1980. [(strictly) time-related location]  
 Paulo got married in 1980.
- b. O Paulo casou durante a guerra. [eventuality-related location]  
 Paulo got married during the war.
- c. O Paulo casou duas vezes [desde que se licenciou, em 1988].  
 Paulo has got married twice [since he graduated, in 1988].  
 [eventuality-related location]

In cases of type (8b-c), the “running time” of the eventuality, in the sense of the “smallest closed *interval* that contains it” (cf. discussion of LOC, in chapter 3), rather than the eventuality itself, can be taken as the locating entity, thereby unifying the two types of location. This is in fact assumed by many authors (e.g. Kamp and Reyle 1993; cf. section 4.2.3.2). In this dissertation, I will consider both the time-related and the eventuality-related location, although the second poses specific – particularly complex – questions (some of which will be mentioned in different sections) that I will not be able to address.

Secondly, the locating entity – whether an interval or an eventuality – may occur in association with different types of quantification, thereby determining different types of location. The locating entity may be, for instance, *definite* – i.e. uniquely determined – as in (9a), or *indefinite* – i.e. existentially quantified – as in (9b) (for other quantificational structures, see sections 1.2.1.2 and 4.2.3.4). Using an analogy suggested in Peres (1996), I will term these subtypes of location *proper* and *common*, respectively (cf. section 4.2.3.4):

- (9) a. O Paulo nasceu em 1980. [proper location]  
 Paulo was born in 1980.
- b. O Paulo nasceu num ano bissexto. [common location]  
 Paulo was born in a leap year.
- (10) a. Esta ponte ruiu durante o terramoto do ano passado. [proper location]  
 This bridge collapsed during last year’s earthquake.
- b. Esta ponte ruiu durante um terramoto. [common location]  
 This bridge collapsed during an earthquake.

Note that, in all these cases, a single location time – whether definite or indefinite – is involved. In fact, the expressions that fall under the designation of locating (or frame) adverbials in the literature are usually all characterised by the fact that they define single location times. Expressions involving more than one location time (and therefore some form of eventuality-iteration) – like *todos os anos bissextos / every leap year*, or *muitas noites / many nights* – are usually grouped in a different category: that of “frequency adverbials” (cf. e.g. Bennett and Partee 1978, or Vlach 1993), or “adverbials of temporal quantification” (Kamp and Reyle 1993) – see discussion below.

With respect to the proper and common location, I will focus mainly on the first type (although common locators will also sometimes be taken into account). In chapter 4.2.3.4,

I will discuss some notable differences between the two types of expressions, which can be perceived in different linguistics contexts.

Besides the two already mentioned parameters responsible for variation in the domain of temporal location – viz. the type of located entity (cf. (6)), and the type of locating interval, or locating entity (cf. (8)-(10)) –, a third one has to be taken into account, to wit: the type of relation itself.<sup>5</sup> This third parameter will be the topic of Part III, and actually a constant reference throughout most of this dissertation. At this point, suffice it to say that the relation between located and locating entities may vary, as illustrated in the following examples:

- (11) a. O Paulo esteve doente na segunda-feira.  
Paulo was ill on Monday.  
[**mere overlapping** between the located eventuality (Paulo’s sickness) and the location interval (mentioned Monday)]
- b. O Paulo casou na segunda-feira.  
Paulo got married on Monday.  
[**inclusion** of the located eventuality (Paulo’s wedding) in the location interval (mentioned Monday)]
- c. O Paulo esteve no escritório das 2 às 5 da tarde.  
Paulo was in the office from 2 to 5 p.m.  
[**total covering** of the location interval (mentioned period between 2 and 5 p.m.) by the located eventuality (Paulo’s stay in the office)]

### 1.2.1.2. Frequency

The class of frequency adverbials – as has been presented in the literature – is quite complex and varied. In fact, as is the case with locating adverbials (cf. chapter 4.1), no unanimity seems to exist among authors as to its composition<sup>6</sup>.

In one distinguished type of constructions generally associated with notion of frequency, there is explicit counting of eventualities relative to a time unit. This can be expressed with sequences of the form “x vezes por TIME-UNIT”, in Portuguese, or “x times a TIME-UNIT”, in English (where TIME-UNIT represents units like minute, hour, day, week, year, etc.). Sentence (2b), repeated below, illustrates this construction:

---

<sup>5</sup> With respect to the relevance of these three parameters, cf. Peres (1993: 6): “I would say that [the components involved in the domain of location] (...) can be defined in relation to three questions concerning (i) **what is being located**, (ii) **where it is being located**, and (iii) **how it is being located**”.

<sup>6</sup> For instance: *whenever*-phrases are taken by Vlach (1993) as examples of frequency adverbials; Bennett and Partee (1978) seem to have a different view: “[*Tai always eats with chopsticks*] might not be a statement of frequency of the event of eating with chopsticks. (...) [It] can have the reading [*whenever Tai eats, he always eats with chopsticks*] (...)” (Bennett and Partee 1978: 27).

- (12) O Paulo costumava ir ao cinema *três vezes por semana*.  
Paulo used to go to the cinema *three times a week*.

Note, by the way, that the unit of counting can also be an eventuality (yet, for simplicity, I will continue to refer generically to these expressions as involving a “time” unit):

- (13) O Paulo interrompe o professor *três vezes por aula*.  
Paulo interrupts his teacher *three times a class*.

The term *frequency* – in the sense of “the number of times that something happens per time unit” – applies perspicuously to constructions like (12)-(13). Here, the basic operation associated with the eventualities described in the main clause clearly seems to be one of *counting* (relative to a time unit). Let us call these **constructions of pure frequency**.

However, the term frequency has also been applied – though not by all authors – to other constructions where no (at least explicit) counting of eventualities seems to be expressed. These involve adverbials like *every morning*, *most Thursdays*, *during every service*, *after many meals* (examples from Kamp and Reyle 1993: 635, where actually the designation “frequency” is not used, but rather “temporal quantification”), *whenever Larry sneezed* or *except when it rains* (examples from Vlach 1993: 251)<sup>7</sup>:

- (14) Em 1985, a Mary ia nadar *todas as manhãs*.  
In 1985 Mary went swimming *every morning*. (Kamp and Reyle 1993: 635)

Apparently, these constructions do not (directly) count eventualities, but rather express a relationship between eventualities – Mary’s goings to swim – and intervals – mornings of 1985. In this case, the relation involves universal quantification over intervals: “for every morning (of the mentioned year) there is (at least) one eventuality of the type described”. Of course, this quantification over intervals entails quantification over the described eventualities (which necessarily iterate).

Note, by the way, that the (universally or otherwise) explicitly quantified entities can also be represented by eventuality-descriptions (instead of basic interval-denoting ones). These can, furthermore, be nominal or sentential, as in (15a) and (15b), respectively:

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<sup>7</sup> Bennett and Partee (1978), who also “understand the frequency of occurrence of a generic event to be the number of occurrences of the event for some specified unit of time” (p. 23), consider expressions like (at least some of) those mentioned in this paragraph as frequency adverbials. What they assume is that the number of occurrences may be associated with a covert quantifier (*once* or *at least once*):

“Adverbials such as *every second*, *every minute*, and *every day*, are elliptic for *once every second*, *once every minute*, and *once every day* respectively (or possibly *at least once every second, minute, day*)” (p. 23).

Furthermore, these authors consider that:

“Adverbials such as *always*, *regularly*, *continually* (...) are ways of expressing that a generic event occurred once for every unit of time where the unit of time is not specified” (p. 23); “We can remain indefinite or vague about both the number of repetitions and the unit of time by using expressions such as *seldom*, *occasionally*, *often*, *frequently*” (p.24).

I will not discuss this analysis here.

- (15) a. O padre lia passagens da Bíblia em latim *em todas as missas*.  
The priest read passages of the Bible in Latin *during every service*.
- b. O padre lia passagens da Bíblia em latim *sempre que celebrava a missa*.  
The priest read passages of the Bible in Latin *whenever he celebrated Mass*.<sup>8</sup>

What was said above about (14) applies, with the relevant adaptations, to (15). More specifically: the sentences in (15) express a relationship between the eventualities described in the main clause and those described in the adverbial (the latter being universally quantified): “for every eventuality (of the type described in the adverbial) there is (at least) one of the type described in the main clause”; the universal quantification over the “adverbial eventualities” entails quantification over the “main clause eventualities” (which necessarily iterate).

Notice moreover that, in analogy with locating adverbials that contain eventuality-descriptions (cf. (8b-c)), it can be hypothesised that the “running times” (in the sense described above) of the eventualities represented in the adverbials of (15), rather than the eventualities themselves, are the relevant (universally) quantified entities.

Now, the structures illustrated in (14)-(15) seem considerably different from those in (12)-(13). Two differences are particularly conspicuous:

- (i) In (14)-(15), there is no direct (explicit) quantification over the “main clause eventualities” (although the explicit quantification over the entities – times or eventualities – described in the adverbial entails some form of quantification over them); in (12)-(13), this explicit quantification exists (being expressed by the sequence “*x vezes*” / “*x times*”).
- (ii) In (14)-(15), the times or (“running times” of) eventualities described in the adverbial seem to have the properties of location times (in the broad sense described in 1.2.1.1), that is, they can be (more or less directly, more or less loosely) connected with the time axis; in (12)-(13), the times or eventualities expressed in the adverbial (by the sequence “*por* TIME-UNIT” / “*a* TIME-UNIT”) have the status of mere units of counting, with no direct connection with the time axis.

The (so-called) frequency adverbials of type (14)-(15) – i.e. those that do not express “pure frequency” – are closely related to temporal locating adverbials. So much so that it is perhaps accurate to say that a broad concept of location embraces not only the type of structures mentioned above under the heading “location” (1.2.1.2), but also those of type (14)-(15). In fact, this view underlies the analyses of Kamp and Reyle (1993), who put the difference between *locating adverbials* and *adverbials of temporal quantification* (as they symptomatically designate these “non-pure frequency” adverbials<sup>9</sup>) in the following terms:

<sup>8</sup> The expressions *quando* and *when* often occur in constructions comparable to *sempre que* and *whenever*.

<sup>9</sup> I do not adopt their term “adverbs of temporal quantification” here, because I want to use “temporal quantification” in a broader sense, which covers also (time) measurement.

“Adverbs of temporal quantification [*always, often, mostly, rarely, every morning, most Thursdays, during every service, after many meals*] stand to (...) locating adverbs (...) as quantifying NPs like *every student* or *many students* stand to definite noun phrases such as *Fred, the post office* or *Bill’s children*. (...) quantifying adverbs have in common with [locating adverbs] (...) that they too characterize the location times of the described eventualities. (...) But while the discourse referent for a locating adverb (...) represents a **single time**, those introduced by quantifying adverbs act as **bound variables, ranging over sets of possible location times**” (p. 635, my bold; italics are bold in the original).

This is also the view taken by Dowty (1979):

“Some temporal expressions of English clearly involve quantification over times rather than just reference to single (intervals) of time (cf. *John drinks whenever Mary does, John sings at certain times, Mary sings frequently*), so it will be useful to have a category of English expressions T<sub>m</sub> that denote sets of properties of times. (...) in this way we can **subsume quantification over times and reference to individual times in the same syntactic category**” (p. 326-327, my bold; italics are bold in the original).

In sum, the fact that distinguishes the constructions of type (14)-(15) from those mentioned under the heading “location” is that they involve **quantification over location times** (which entails quantification over the located eventualities). In Discourse Representation Theory (DRT), they are formally distinguished as follows (cf. 4.2.3.4 for more details): (i) (strictly) locating expressions merely introduce a discourse referent for a location time (with a referring or existential status comparable to that of the discourse referents introduced by singular definite or indefinite descriptions of ordinary individuals); (ii) “frequency”, or temporal quantification, expressions like (14)-(15) induce tripartite quantificational structures (with a restrictor and a nuclear scope), called *duplex conditions*, with the discourse referent for the time (or eventuality) associated with the adverbial as a bound variable (cf. Kamp and Reyle 1993: 635 ff., or Swart 1993: 233).

At this point, it is important to emphasise that quantification over location times – just like quantification over ordinary individuals – not always involves “proportional quantifiers” (i.e. those that introduce duplex conditions, which are the only type discussed in Kamp and Reyle 1993). They can also involve “cardinality quantifiers”, as in (16a), or plural definite descriptions, as in (16b-c), for instance:

- (16) a. O Paulo esteve em Lisboa (em) três fins-de-semana.  
Paulo was in Lisbon (on) three weekends.
- b. O Paulo esteve em Lisboa nos três últimos fins-de-semana.  
Paulo was in Lisbon (on) the last three weekends.
- c. O Paulo esteve em Lisboa nos fins-de-semana em que eu estive em Paris.  
(Por isso nunca nos encontramos.)  
Paulo was in Lisbon (on) the weekends I was in Paris.  
(That’s why we never met.)



In cases like (16a), for instance (as in the parallel cases involving cardinality quantification over ordinary individuals), a duplex condition is not needed, given that the relevant expressions make an assertion about the absolute cardinality of a set (the set of weekends, here). Formally, they can be treated with abstraction over time discourse referents (cf. chapter 4.2.3.4).

The type of adverbials that occurs in (16) is normally not mentioned in the taxonomic literature. However, considering that they involve sets of location times (rather than single location times), and therefore entail quantification over the located entities, I assume that they can be paired with those normally associated with the expression of (“non-pure”) frequency – cf. Table 1’ below.

Finally, it must be noted that the area of frequency (understood in its broadest sense) embraces two concepts of particular complexity, that of genericity and habituality, which, as Swart (1993: 13) puts it, “do not only involve quantity, but also some notion of modality or a default property”. These can be expressed also by adverbials means (cf. *geralmente* / *generally*, *habitualmente* / *habitually*), but are quite often merely associated with the tense form of the verb, a remarkable case being illustrated by the generic use of the present:

- (17) O Paulo fuma.  
Paulo smokes.

In this dissertation, I will have nothing to say about genericity and habituality, although I will have to consider these concepts at times (cf. specially chapter 7.3).

As I said, I focus on expressions that involve single location times. I will as a rule ignore those under discussion in this subsection (even in their interaction with strictly locating adverbials), because the specific problems of their analysis, as attested in the numerous works on the subject, certainly call for an autonomous investigation. However, I will briefly discuss some aspects pertaining to their formal treatment in section 4.2.3.4. The analysis of adverbials that quantify over (location) times seems to me a compelling extension of this dissertation, which I leave for future investigation.

In view of the semantic proximity between location – in the strict sense of a relation involving a single (definite or indefinite) location time – and the area of (so-called) frequency which involves sets of location times (be them expressed directly or via eventualities), the table of temporal relations below seems to be more adequate than the provisional one presented on page 6. With respect to Table 1’, it should be noticed that (i) the located, measured or counted entities here are those represented in the matrix structure, not in the adverbial, and (ii) the structures that instantiate the relative counting of eventualities are those classified above as “pure frequency constructions”.

**Table 1'. Subtypes of temporal relations**

				usual designation ↓	
Temporal relations <sup>10</sup>	location	relative to a single interval	singular definites	→	(temporal) location
			singular indefinites	→	
		relative to a set of intervals (entails quantification over the located entities)	proportional quantifiers	→	frequency (temporal quantification)
			cardinality quantifiers	→	frequency? (temporal quantification)
	quantification	measurement		→	duration
		counting	relative (to a time unit)	→	frequency
			absolute	→	number

### 1.2.1.3. Number

As was mentioned before, the subsystem of number (or absolute counting) is distinct from that of “pure frequency” (or relative counting), their basic semantic differences co-relating with quite different formal representations (namely, in Discourse Representation Theory terms, frequency adverbials, unlike “number adverbials”, are associated with duplex conditions<sup>11</sup>).

<sup>10</sup> In Discourse Representation Theory, location, measurement and counting can be generically distinguished in the following formal terms (cf. chapter 3, for the concepts in question):

Take  $\pi$  as the representation of the relevant “subject” of the relation (e.g. the located, measured or counted eventualities). Then: (i) *location* involves a condition of the form  $[R(\pi, t)]$ , where  $R$  is a relation of inclusion, overlapping or similar, and  $t$  is a location time; (ii) *measurement* involves a condition of the form  $[dur(\pi) = mt]$ ; (iii) *counting* involves a cardinality condition like  $[|\pi| = n]$  (where  $n$  is a natural number), associated with an abstraction  $[\pi = \Sigma \pi' [[\pi' \subseteq t] \dots]_{K_1}]$  (where  $K_1$  is a sub-DRS, and  $t$  represents a frame for the counting operation).

<sup>11</sup> More specifically, the difference can be stated in the following terms:

(i) Both the absolute and the relative counting of eventualities involve a cardinality assertion –  $[|ev| = n]$  – and an (associated) abstraction condition –  $[ev = \Sigma ev' [[ev' \subseteq t] \dots]_{K_1}]$  (where  $ev$  is an eventuality discourse referent).

I observed before that the (absolute) counting of eventualities is normally circumscribed (within a time frame). See the example (4b), repeated below (with the expression defining the frame – a temporal locating adverbial – in italics):

- (18) O Paulo foi ao cinema três vezes *na semana passada*.  
Paulo went to the cinema three times *last week*.

I will explore the interaction between eventuality-quantifiers like “x times” (or analogue expressions) and temporal locating adverbials in chapter 9. An interesting contrast, which provides the departure point for the analyses in that chapter, is illustrated by the two Portuguese sentences below:

- (19) a. O Paulo casou três vezes desde 1980.  
Paulo has got married three times since 1980.  
b. \*O Paulo casou desde 1980.  
<sup>OK</sup>Paulo has got married since 1980.

The contrast in grammaticality between Portuguese (19a) and (19b) seems to indicate that some locating adverbials may provide a frame for counting eventualities, but cannot be used to locate simple eventualities (not involved in such process).

#### 1.2.1.4. Time measurement (duration)

Time measurement involves a relation between a given entity (the measured object) and an amount of time. This domain is radically different from those discussed before, because it does not (by itself) involve a relation – be it direct or indirect – with the time axis (cf. chapter 4.2.1).

The entities whose temporal size can be quantified are of different sorts: eventualities, time intervals or “ordinary” individuals, as illustrated in (20), (21) and (22), respectively:

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(ii) In structures with *absolute counting*, these two conditions occur as a rule *in the main DRS* (unless the matrix clause contains a “subDRS-creating” operator – e.g. negation, or a universal quantifier – with scope over the “counting-phrase”). The frame for the counting operation –  $t$  – is normally marked by a locating adverbial, as in *Paulo got married three times [in the eighties]* (although it can also be set just by the tense of the verb, as in *Paulo got married three times*, in which case the temporal restriction in the sub-DRS  $K_1$  can be stated as  $[ev < n]$ , or similar).

(iii) In structures with *relative counting*, the two mentioned conditions –  $[|ev| = n]$  and  $[ev = \Sigma ev' \ [ [ev' \subseteq t] \dots ]_{K_1}]$  – occur *in the nuclear scope of a duplex condition*. The discourse referent  $t$  in this abstraction represents the time unit relative to which the counting is made (e.g. week), and occurs also in the quantifier of the duplex condition –  $[Q\ t]$  – and in the restrictor, in a condition like  $[TIME-UNIT(t)]$ . Note that the counting expressed by the abstraction inside the nuclear scope is absolute, with respect to each  $t$  considered (cf. presence of the sequence “x vezes” / “x times”), whereas the counting expressed by the duplex condition as a whole is relative. The relative counting operation can be temporally framed, as in *Paulo went to the cinema three times a week [in 1985]*; this framing – expressed by a locating adverbial here – possibly corresponds to a condition outside the duplex structure.

- (20) a. O Paulo esteve doente durante dois meses.  
Paulo was ill for two months.
- b. O barco atravessou o rio em nove minutos.  
The boat crossed the river in nine minutes.
- c. um terramoto de quarenta segundos  
“an earthquake of forty seconds”  
a forty-second earthquake
- (21) um período de três horas  
“a period of three hours”  
a three-hour period
- (22) a. um rapaz de quinze anos  
“a boy of fifteen years”  
a fifteen-year old boy
- b. um quadro com mais de cem anos  
“a picture with more than one hundred years”  
a more than one hundred-year old picture

The subsystems of temporal location and temporal measurement interact in many ways. Throughout this dissertation, some of these interactions will be explored, in greater or lesser detail. In particular, I will discuss – in Chapter 5 – the dividing line between the categories of temporal locating and temporal measure adverbials, whose definition is complicated by the existence of apparently ambivalent measure / locating expressions, like those in italics in the following examples:

- (23) O Paulo viveu em Amsterdão *durante os últimos três anos*.  
Paulo has lived in Amsterdam *for the last three years*.  
(cf. Kamp and Reyle 1993: 650)

I will also analyse – in chapter 7 – a subclass of temporal expressions that define intervals via an operation of time measurement, as the following italicised ones:

- (24) a. A ponte ruiu *há dois meses*.  
The bridge collapsed *two months ago*.
- b. *Três dias antes das eleições*, o Paulo decidiu que não ia votar.  
*Three days before the elections*, Paulo decided that he would not vote.

In chapter 9, I will briefly consider the combination of temporal measure adverbials with temporal locating adverbials that have a particularly limited distribution – namely, *desde*-phrases (the Portuguese counterpart of *since*-phrases), as illustrated in (19) above. For structures like

- (25) O Paulo estudou (durante) dez horas desde segunda-feira.  
Paulo has studied for ten hours since Monday.

I will propose a representation involving abstraction over (possibly discontinuous) eventualities, that will make the effect of the measure adverbial comparable to that of the event-quantifier *three times* in (19a).

### 1.2.2. Temporal reference

A section about temporal domains of natural language obviously cannot dispense with a mention of the domain of **temporal reference**, perhaps the most fundamental one, in the sense that it underlies all those mentioned up to now. In fact, prior to locating eventualities in a given period, or defining a pattern of repetition within a given period, for instance, languages need to have the capacity of *referring to* those periods. This is accomplished by way of **time-denoting expressions**<sup>12</sup>, which can be as varied as: *agora / now, ontem / yesterday, o século XIV / the 14<sup>th</sup>-century, duas da manhã / two o'clock in the morning, or o momento em que a ponte ruiu / the moment the bridge collapsed*. Consequently, as expected, time-denoting expressions will play an important role in this dissertation.

In chapter 4, I will discuss in some detail the diversity of this class of expressions, which includes – in a broad sense of the term – also phrases that are not basically time-denoting, but rather basically eventuality-denoting, like those in italics in the following sentences:

- (26) O Paulo casou depois de {*se licenciar / a licenciatura*}.  
Paulo got married after {*he graduated / his graduation*}.

In chapter 4, I will also discuss the semantic differences between the category of time-denoting expressions and the related – but distinct – category of temporal locating adverbials. Furthermore, I will devote chapter 6 to advocate the thesis that a group of expressions that are traditionally categorised as temporal locating adverbials (or ambivalent time-denoting expressions / temporal locating adverbials) are better categorised as (mere) time-denoting expressions. This group includes structurally complex expressions headed by words like *antes / before, depois / after, quando / when, entre / between* ou *há / ago*.

Finally, I will dedicate chapter 7 to the study of a subgroup of time-denoting expressions, which are characterised by the fact that they define intervals with resort to an operation of time measurement, or counting of temporally ordered entities, hence illustrating a curious interaction between different temporal domains:

- (27) há três horas / há três fins-de-semana  
three hours ago / three weekends ago

The domain of temporal reference also involves expressions representing amounts of time (which are essential for conveying information about temporal duration): the so-called **predicates of amounts of time**. These include phrases as varied as *três segundos / three seconds, um ano / a year, meses / months, muito tempo / a long time, tanto tempo como... / as long as...* I will frequently mention predicates of amounts of time, given that they are an essential component of temporal measure adverbials (the other being a – possibly null – temporal preposition), which are the subject of a large part of this dissertation.

Predicates of amounts of time will also be discussed – in chapter 5 – in connection with the well-known fact that some of them have predicates of times (i.e. time-denoting expressions) as homonyms. For instance, the expression *two years* may refer to (i) a period of 730 days, irrespective of where it begins or ends (e.g. the period between April 25, 1974

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<sup>12</sup> See observations about this term in the first footnote of Part II.

and April 25, 1976), in which case it is a predicate of amounts of time, or (ii) two periods beginning at January 1 and ending at December 31, i.e. a set of two calendar years (e.g. 1980 and 1985), in which case it is a predicate of times. As will be observed, this lexical ambiguity may “extend” to the adverbial level, originating genuinely ambiguous temporal locating / temporal measure adverbials:

- (28) O Paulo deu a volta ao mundo *em dois anos*.  
Paulo made a trip around the world *in two years*.

### 1.2.3. Temporal structure of complex entities

Finally, with respect to temporal domains of natural language, a word must be said about the domain of **temporal structure of complex entities**.

Ordinary individuals have a temporal structure, their existence developing naturally through distinct phases, from their creation to their destruction, or death. Carlson’s (1977) concept of *stage* – as temporally/spatially limited manifestations of objects or kinds – is a good illustration of the linguistic relevance of this concept. Intervals of time can also be temporally structured, the most obvious cases being the so-called calendar units: days comprise mornings, afternoons, evenings, and nights, weeks are composed of Mondays, Tuesdays, etc., and years of Januaries, Februaries, etc. It is, however, in the domain of eventualities that the most relevant case (for this dissertation) of temporal structuring of entities emerges. It is now widely recognised in the literature that (at least some) eventualities have an internal temporal structure – which some authors call “nucleus”<sup>13</sup> – with several distinct phases. A simple example is that of a writing-a-book eventuality, which can be segmented into (i) a “preparatory phase” in which the book is not yet completed, but is being mentally conceived and/or written, (ii) a (punctual) “culmination phase” at which the writing comes to an end, and (iii) a “consequent phase” in which the book, as a completed object, exists. Other eventualities are simpler in that they have a “culmination” but no “preparatory phase” – e.g. accidentally finding a coin – or have no distinguishable phases at all – e.g. be happy. The differences at stake are to a large extent conceptual, and their linguistic manifestation has come to be known as **aktionsart**. Now, as I said at the beginning of Part I, the aktionsart category to which an eventuality belongs is essential in determining the modes of temporal location it can be involved in, whence this concept plays a crucial role in this dissertation. A brief description of the aktionsart subsystem will be the topic of section 2.1.

### 1.3. Temporal subsystems of natural language (and the focus of this dissertation)

The concepts referred to in the previous subsection (location, duration, frequency, etc.) may be linguistically marked in different ways (by adverbs, by verb morphemes, etc.), or – to

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<sup>13</sup> Cf. Moens (1987: 47). It must be stressed that, as this author says, “a nucleus is not just a temporal *ordering* of a preparatory process followed by a culmination point, and that in its turn [is] followed by some consequences, but has stronger links to keep it together. (...) these [are] *consequentiality* or *contingency* relations, of which causality and enablement are the most important ones” (pp. 48-49).

put it differently – several types of constituents can be the source of the temporal information conveyed in a natural language discourse.

### 1.3.1. Markers of aktionsart values

Aktionsart values are predominantly expressed by predicates – mainly verbs, but also nouns (cf. eventive *destruição* / *destruction* vs. stative *permanência* / *stay*). The basic aktionsart value of a verb may be changed – or “shifted” – as a result of its combination with e.g. Object or Subject NPs, negation, tense forms, auxiliary verbs or time adverbials, that is, its value may be distinct from that of its dominating VP or S-node. In this connection, the contribution of the so-called “aspectual auxiliaries” – including, in Portuguese, predicative expressions like (i) *começar a*, *passar a* (to begin), (ii) *acabar de*, *parar de*, *deixar de*, *cessar de* (to finish, to stop, to cease), (iii) *estar a*, *andar a* (to be), (iv) *continuar a* (to continue, to go on), or (v) *costumar* (use to) – is particular relevant. These expressions may affect the aktionsart of the eventuality-describing phrases with which they combine, by either circumscribing subparts of the represented eventualities, or by creating derived eventualities by iteration (cf. Peres 1993: 6, who terms these expressions “(situation) reducers” and “(situation) iterators”, depending on the value they express). Given the multiple interactions involved in the computation of the aktionsart information, this process turns out to be particularly intricate, and can only be superficially dealt with in this dissertation (cf. specially chapter 2.1).

### 1.3.2. Markers of temporal reference

With respect to **temporal reference to amounts of time**, the basic markers are temporal nouns that denote time units (“measure nouns”) – e.g. *ano* / *year*, *mês* / *month*, *dia* / *day*, *hora* / *hour*, *minuto* / *minute*, *segundo* / *second* –, which combine with different quantifiers to form predicates of amounts of time – e.g. *três segundos* / *three seconds*, *meia hora* / *half an hour*. Time units can also be represented by vague expressions – e.g. *(um) instante* / *(an) instant*, *(um) bocado* / *(a) while*, *(uma) eternidade* / *(an) eternity*, *(um) abrir e fechar de olhos* / *(the) blink of an eye* (the latter an idiomatic expression involving an eventuality). Vagueness can stem from the quantifier itself, as well – e.g. *poucos minutos* / *few minutes*, *muitas horas* / *many hours*. Quite often the hyperonymic name *tempo* / *time* is used to form predicates of amounts of time – *muito tempo* / *long time*, *bastante tempo* / *a lot of time*, *algum tempo* / *some time*. In the simpler cases I will consider in this dissertation, predicates of amounts of time consist merely of a combination of a measure noun and a cardinal quantifier – *três horas* / *three hours*. These predicates can however be much more complex – *tantas horas quantas...* / *as many hours as...* (comparative), *o mesmo tempo* / *the same time*, *a mesma quantidade de tempo* / *the same amount of time* (anaphorically dependent). None of the complexities mentioned here will be considered in this dissertation. In fact, I will even represent predicates of amounts of time like *three hours* as syntactic unanalysed sequences (as in Kamp and Reyle 1993), ignoring their internal structure.

**Temporal reference to times** (or time denotation) is all but ubiquitous in discourse. Without aiming at exhaustively enumerating its linguistic markers, let us consider some of them.

A fundamental resource of time-denotation is certainly the group of nouns that can be termed strictly temporal in that they directly refer to (more or less restricted) sets of intervals – {*período, momento, intervalo*} / {*period, moment, interval*} (hyponyms), *ano* / *year*, *mês* / *month*, *dia* / *day*, *Janeiro* / *January*, *domingo* / *Sunday*, *manhã* / *morning*, etc. Some complex nominal expressions can possibly be considered the temporal parallel of proper nouns, in that they uniquely refer to (i.e. name) a particular stretch of the time axis – e.g. *1945, Idade Média* / *Middle Ages*, *século XX* / *20<sup>th</sup>-century*. Time-denoting nouns can be used as the head of more complex expressions – strictly temporal NPs –, which are central in time-denotation – *o último dia de Outubro* / *the last day of October*, *o domingo passado* / *last Sunday*, etc.

With respect to time-denoting NPs, it is still worth noting that they can have predicates of amounts of time, rather than predicates of time, as their nuclear constituents. This occurs, particularly, in combination with some adjectives, prepositions or verbs, as in *as últimas três horas* / *the last three hours*, *as três horas antes do início do espetáculo* / *the three hours before the beginning of the show*, *há três horas* / *three hours ago*. As said, this type of expressions – which illustrate a curious interaction between the subsystems of temporal measurement and time-denotation (and, through it, temporal location) – will be discussed in some detail in chapter 7.

As is well-known, time-denotation in natural languages can also be associated with expressions that basically denote eventualities, but which, in some adverbial contexts, acquire a derived time-denoting status (cf. chapter 4). This is true both of nominal and clausal constituents – (*durante*) *o terramoto* / (*during*) *the earthquake*, (*enquanto*) *chove* / (*while*) *it rains*.

Finally, it is also important to note that time-denotation (both “basic” and “derived”) can be associated – as I will claim on chapter 6 – with expressions that are formally PPs, such as those headed by prepositions *antes* / *before*, *depois* / *after* or *entre* / *between*.

One particularly important distinction with respect to the form of time-denoting expressions is that between *referentially autonomous* and *deictically or anaphorically dependent* expressions (parallel to the one established in the domain of ordinary-individual denotation). The first group includes expressions like *1980* or *6 de Agosto de 1945* / *August 6, 1945*, the second expressions like *agora* / *now*, *então* / *then*, *essa altura* / *that time*, or *o próximo domingo* / *next Sunday*. Predicates of times like *Janeiro* / *January*, *domingo* / *Sunday* or *7 horas* / *7 o'clock* are ambivalent: as common nouns denoting sets of intervals (of a given type), they are referentially autonomous expressions – cf. (29a); in some contexts, however, as often noted, they may refer to particular instances of those intervals, e.g. the one closest to the utterance time (or to some other salient perspective point) in the direction of the past or the future – cf. (29b) (where, in Portuguese, only the episodic reading is relevant):

- (29) a. O Paulo fez férias em *Janeiro* várias vezes.  
Paulo went on holiday in *January* several times.



- b. Em *Janeiro*, o Paulo vai aos Estados Unidos.  
In *January*, Paulo will go to the United States.

It is important to stress that the differences between referentially autonomous and referentially dependent expressions at stake pertain primarily to the domain of temporal reference, but “extend” to the domain of temporal location, inasmuch as time-denoting expressions are an essential component of temporal locating adverbials: *até agora* / *until now*, *desde então* / *since then*, *durante esse tempo* / *during that time*, *no domingo passado* / *Ø last Sunday*,... Accordingly, as some authors do, these differences between time-denoting expressions can be taken as a parameter for subclassifying temporal locating adverbials – cf. e.g. Borillo (1983: 111), who distinguishes between “adverbes autonomes”, “déictiques”, “anaphoriques” and “polyvalents”<sup>14</sup>.

In this dissertation, the specific issues raised by deixis and anaphora in the temporal domain are as a rule ignored. However, some referentially dependent time-denoting expressions – namely those that involve measurement from an anchor point (e.g. *há três horas* / *three hours ago*) – will be considered in some detail in chapter 7, as already said.

Last but not least, it must still be mentioned that reference to times in natural languages associates not only with *lexical and pronominal* constituents, but also with *morphological (inflectional)* elements (e.g. tense morphemes – cf. treatment of PAST, PRES and FUT as predicates of time in Dowty 1979: 324, for instance), and can even be *morphologically unmarked* (as is the case with the reference points needed to account for narrative progression). I will say more about this below.

### 1.3.3. Markers of temporal location

With respect to the linguistic expression of **temporal location**, (at least) three subsystems – roughly parallel to the three forms of time-denotation mentioned in the previous paragraph – are of paramount importance:

- (i) lexical expression of temporal location associated with (time) adverbials;
- (ii) morphological and lexical expression of temporal location associated with the verb domain, usually covered by the term *tense* (morphological expression being associated with tense suffixes, and lexical expression with temporal auxiliary verbs, like *ir* or *ter*, in Portuguese, and *will* or *have*, in English);
- (iii) morphologically unmarked temporal location associated with discourse (rhetorical) relations.

#### 1.3.3.1. Temporal location expressed by adverbial means

The first of the three subsystems listed above is the topic of this dissertation. The set of expressions included in it are traditionally called **temporal locating adverbials**, even though the designation (temporal locating) **adjuncts** – cf. e.g. Quirk *et al.* (1985) – is probably a

<sup>14</sup> There are also some temporal locating adverbials – as those headed by English *since*, and (most occurrences of) those headed by Portuguese *desde* – which are intrinsically dependent on some salient perspective point, irrespective of the specific referential properties of the time-denoting expression they include as complement. In these cases, the attribute “deictic” or “anaphoric” applies to the adverbial primarily.

more perspicuous cover term. In fact, although it is often the case that the so-called temporal adverbials occur *adverbially*, i.e. in adjunction to some verbal or sentential category, depending on the syntactic analysis<sup>15</sup> (cf. examples *a* below), they may also generally occur *adnominally*, i.e. in adjunction to a nominal category (cf. examples *b*):

- (30) a. O Parlamento foi dissolvido duas vezes *na década de 80*.  
The Parliament was dissolved twice *in the eighties*.
- b. [A situação do país *na década de 80*] foi debatida no congresso.  
[The country's situation *in the eighties*] was debated in the congress.
- (31) a. Esta ponte foi reconstruída *depois da guerra*.  
This bridge was rebuilt *after the war*.
- b. [A reconstrução da ponte *depois da guerra*] foi considerada vital.  
[The reconstruction of the bridge *after the war*] was deemed vital.

Despite this fact, I will continue to use the term (*temporal*) *adverbial* – in a broad sense which covers both the sentential (or verbal) and the nominal adjunction – since this is the term more commonly used in the semantic literature. Sporadically, I may use also the term (*temporal*) *adjunct* as an equivalent designation.

Temporal adverbials are normally formed by a combination of two elements:

(i) a **time-denoting expression**

It can be basically temporal, like *1980*, or not; for instance, it can be an eventuality-denoting expression, like the NPs *a guerra* / *the war* (in *durante a guerra* / *during the war*), or the clauses *(que) a guerra começou* / *the war began* (in *desde que a guerra começou* / *since the war began*). In certain structures (e.g. with the discontinuous expressions *de...a* / *from...to*), two time-denoting expressions may be involved – *de 1980 a 1985* / *from 1980 to 1985*.

(ii) what I will call a **temporal locating operator**

This is the expression which heads the temporal locating adverbial (i.e. which takes the time-denoting expression above as complement). Note that I use here the term

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<sup>15</sup> I will assume, following Kamp and Reyle (1993) and others, that *proper* temporal locating adverbials (which are the main focus of this dissertation) occur in an extra-sentential position, when combined with sentential expressions – cf. rules  $[S' \rightarrow S\ TA]$ ,  $[S' \rightarrow TA\ S]$ , in Kamp and Reyle (1993: 543). I will not present any syntactic argumentation for this choice though, thereby avoiding the long-debated issue, not crucial to this dissertation, of adverb placement. I will also assume, following Hitzeman (1993, 1997) and others, that *common* temporal locating adverbials are attached to a deeper syntactic position, possibly occurring as VP-adjuncts:  $[VP \rightarrow VP\ TA]$  (cf. sections 4.2.2.5 and 4.2.3.4).

“operator” not in the mathematical sense<sup>16</sup>, but merely as a cover term for the traditional categories of (a) simple or complex preposition (“complex preposition” corresponding to “locução prepositiva” in the Portuguese grammatical terminology – cf. e.g. Quirk *et al.* 1985) – e.g. *em / in, durante / during, desde / since, a partir de / from, ao longo de / throughout* – and (b) conjunction – e.g. *enquanto / while*<sup>17</sup>. For simplicity, I will also use it to refer to discontinuous expressions formed by two prepositions – e.g. *de...a / from... to*. It must be noted that temporal locating operators may sometimes be null ( $\emptyset$ ), as in the following examples (which will be discussed in chapter 6):

- (32) a. O museu esteve encerrado  $\emptyset_{em}$  a semana passada.  
The museum was closed  $\emptyset_{in}$  last week  
b. O museu esteve encerrado  $\emptyset_{em}$  ontem.  
The museum was closed  $\emptyset_{in}$  yesterday.

Given the predominance of prepositions in this group, I may sometimes take the metonymical liberty of referring to the whole group with the term **temporal locating preposition** (specially in contexts where the exact morphological status of the operator is irrelevant).

At this point, it is important to note some major restrictions on the scope of this study on temporal adverbials. Among the aspects that will require further elaboration, given that they are only superficially (or not at all) considered here, are those pertaining to: (i) the occurrence of locating adverbials under the scope of frequency adverbials (pure frequency or not); (ii) sequences of two or more (strict) temporal locators in the same sentence, which raise questions of scope; (iii) variation in the syntactic position of temporal locating adverbials (sentence-initial, intermediate or final). Let us briefly consider them.

Case (i) involves structures with quantification over the location times associated with (common) locating adverbials (in italics below):

- (33) a. O Paulo vai ao cinema *depois de sair do escritório* três vezes por mês.  
Paulo goes to the cinema *after leaving his office* three times a month.  
b. O Paulo visitava Paris *durante o Verão* todos os anos.  
Paulo visited Paris *during the summer* every year.

<sup>16</sup> I use the term “operator” – in lack of a better one – as a cover term for prepositions, conjunctions, or comparable expressions that head temporal locating adverbials (and, as will be mentioned later on, also some time-denoting expressions – e.g. English *ago*, and Portuguese *há*). This term is not intended here in the mathematical sense, where ( $n$ -ary) **operations** convert sets of  $n$  objects ( $n = 1, 2, 3, \dots$ ) of a given sort into another object of the same sort. In fact, as will be seen, I do not treat expressions like temporal locating prepositions as “operators” in this mathematical sense (but rather as binary predicates relating intervals – expressed via their complements – and entities – eventualities or intervals – expressed in the structure to which they apply).

<sup>17</sup> I analyse the “locuções conjuncionais temporais” of the Portuguese traditional grammar – e.g. *desde que* (“since that”), *depois que* (“after that”) – not as a unit, but as a combination of a temporal preposition and a sentence complementiser (“conjunção integrante”). I will also refer to English expressions like *before* or *after*, when preceding a clausal complement, as prepositions (and not as conjunctions).

Although I believe that the algorithm I will propose later on (with possibly some minor adaptations) covers these cases (compare (33b) above with (145), on page 107), I will not be concerned with the specific interaction between the two types of adverbials at stake. Note still that, if the scope is the reverse (i.e. if the frequency expression is under the scope of the locating one), the locating phrase has a “normal” interpretation that can be directly tackled with the construction rule proposed in chapter 4:

- (34) O Paulo foi ao cinema três vezes por mês *em 1980*.  
Paulo went to the cinema three times a month *in 1980*.

Sequences of temporal locators – case (ii) above – occur in different types of constructions. Some involve iterative or habitual readings (associated with the tense of the verb), and therefore quantification over the location times associated with at least one of the locating adverbials (in the examples below, the italicised one):

- (35) O Paulo saía de casa *às 7 da manhã* antes de mudar de casa.  
Paulo left home *at 7 a.m.* before he moved.

The syntactic structure of these sentences clearly seems to be:

- (35)' [... saía de casa *às 7 da manhã* ] antes de mudar de casa ]  
[... left home *at 7 a.m.*] before he moved]

In other structures with sequences of temporal locators, there is no quantification over location times. There, the time spans associated with the various locating phrases are subintervals of each other, in such a way that the shortest location time provides the most precise location:

- (36) a. O Paulo nasceu às três horas, no dia de Natal, em 1967.  
Paulo was born at three o'clock on Christmas Day, 1967.  
b. A reunião realizou-se num fim-de-semana antes da campanha eleitoral.  
The meeting took place on a weekend before the electoral campaign.

These structures raise the issue of the scope relations between adverbials. For the last example, for instance, the following two structures seem possible:

- (36) b'. ... realizou-se [num fim-de-semana [antes da campanha eleitoral]]  
... took place [on a weekend [before the electoral campaign]]  
b''. [... realizou-se num fim-de-semana] antes da campanha eleitoral]  
[... took place on a weekend] before the electoral campaign]

Structure (36b') corresponds to the possibility of *um fim-de-semana antes da campanha eleitoral / a weekend before the electoral campaign* being a constituent, as illustrated in:

- (37) [Um fim-de-semana antes da campanha eleitoral] foi especialmente agitado.  
[A weekend before the electoral campaign] was particularly hectic.

These structures involve temporal location of intervals of the type mentioned in (6b) above. I will discuss this type of location in more detail in chapter 4 (and return to it at other points of this dissertation).

Structure (36b'') involves the possibility of the (common) locating expression *num fim-de-semana / on a weekend* and the locating expression *antes da campanha eleitoral / before the electoral campaign* being independent, as patent in (38); notice that the former possibly attaches to the VP-level, whereas the second attaches to the S-level (cf. sections 4.2.2.5, 4.2.3.4, and analysis of *antes/before*-phrases in chapter 6):

- (38) Antes da campanha eleitoral, [a reunião realizou-se num fim-de-semana].  
(Normalmente, realizava-se num dia de semana.)  
Before the electoral campaign, [the meeting took place on a weekend].  
(Normally, it took place on a weekday.)

Finally, let us consider the semantic variation resulting from the occurrence of adverbials in different positions in the sentence (case (iii) above). This variation may involve questions of contrastive focus, a semantic area that I totally ignore in this dissertation – cf. the possible differences, concerning focus, between (39a) and (39b) (the latter maybe more easily allowing an interpretation in which the event of Paulo and Ana going to Brazil in 1980 is contrasted with things they did in other years):

- (39) a. O Paulo e a Ana foram ao Brasil em 1980.  
Paulo and Ana went to Brazil in 1980.  
b. Em 1980, o Paulo e a Ana foram ao Brasil.  
In 1980, Paulo and Ana went to Brazil.

Another difference involving adverbial placement is that proper locators occur both in sentence-initial and sentence-final position, whereas (single) common locators appear to be compatible only with sentence-final position. This issue will be discussed in section 4.2.3.4.

I will concentrate here on the occurrence of (proper) locating adverbials only in sentence-final position. However, possible focus differences ignored, I hypothesise that the construction rule I will propose for these adverbials applies equally to sentence-initial occurrences (at least in many cases, as (39) and (40), this seems to be the case):

- (40) a. Três edifícios ruíram desde ontem.  
Three buildings have collapsed since yesterday.  
b. Desde ontem, ruíram três edifícios.  
Since yesterday, three buildings have collapsed.

### 1.3.3.2. Temporal location expressed by tense

The second of the three linguistic subsystems related with temporal location mentioned above is that of **tense**. This system, which closely interacts with that of time adverbials, will be briefly discussed in section 2.2.

Given the complexity of the tense systems, both of Portuguese and of English, on which an enormous amount of literature exists, it is not possible to fit within the limits of this dissertation an analysis that truly does justice to its semantic contribution. However, as I will try to show, this does not necessarily impair the analyses to be made here, since the semantic contribution of temporal adverbials can be tackled, up to a certain extent, as an independent subject (cf. Figure 3, on page 99).

As said above, both in Portuguese and in English, the variation in verb forms has a morphological facet, associated with tense suffixes of the verb, and a lexical facet, associated with temporal auxiliaries, like the Portuguese verb *ter*, or the English Perfect auxiliary *have*. With respect to this lexical facet, in particular concerning *ter / have*, there is one caveat. According to some authors' analyses (cf. Kamp and Reyle 1993, for English, and Peres 1993, for Portuguese), these auxiliaries *do not primarily involve temporal location*, given that their basic function is to make reference to the consequent state of eventualities (operating in some cases, aktionsart shifts). In the context of a sentence, these consequent states can be located (with respect to some temporal perspective point), but the location is operated by tense morphemes associated with the auxiliary verb – cf. {*tinha / tem / terá*} (*lido*) / {*had / has / will have*} (*read*) – and not by the auxiliary verb itself<sup>18</sup>. Note that in Kamp and Reyle (1993), the representation of a sentence with *has read*, for instance, includes a *location condition* stating the overlap of the consequent state (*s*) with the temporal perspective point (in this case, the utterance time *n*) – [*s*  $\circ$  *n*] – but this condition is triggered by the present tense of the auxiliary verb *to have*; the role of the auxiliary verb proper in this structure is to introduce the discourse referent *s*, and a condition stating the fact (actually, intrinsic to the concept of consequent state) that the consequent state of an eventuality *ev* immediately follows that eventuality – [*ev*  $\supset$  *s*]. Now, it is the combination of this abutment relation [*ev*  $\supset$  *s*] with the temporal location of *s* (as expressed by e.g. [*s*  $\circ$  *n*] or, more generally, [*s*  $\circ$  *TPpt*], where **TPpt** is a present, past or future temporal perspective point) that explains why the auxiliary verbs at stake end up temporally locating *ev* (by inference):

- (41) a. [*ev*  $\supset$  *s*]  $\wedge$  [*s*  $\circ$  *n*]  $\rightarrow$  [*ev*  $<$  *n*]  
 $\Sigma$  *has read*
- b. [*ev*  $\supset$  *s*]  $\wedge$  [*s*  $\circ$  *TPpt*]  $\wedge$  [*TPpt*  $<$  *n*]  $\rightarrow$  [*ev*  $<$  *TPpt*  $<$  *n*]  
 $\Sigma$  *tinha lido / had read*
- c. [*ev*  $\supset$  *s*]  $\wedge$  [*s*  $\circ$  *TPpt*]  $\wedge$  [*n*  $<$  *TPpt*]  $\rightarrow$  [*ev*  $<$  *TPpt*]     $\exists$ [*R* (*n*, *ev*)]<sup>19</sup>  
 $\Sigma$  *terá lido / will have read*

### 1.3.3.3. Temporal location associated with (morphologically unmarked) discourse relations

Finally, the third linguistic subsystem related to temporal location that was mentioned involves the concept of discourse connectedness, as embodied in the so-called discourse (rhetorical) relations.

<sup>18</sup> I ignore here the specificity of the present tense of the Portuguese auxiliary verb *ter*, which in combination with eventive and activity descriptions (but in general not with stative descriptions) expresses iteration, in the indicative mood (cf. Peres 1993 and p.c.).

<sup>19</sup> The eventuality of reading the book as a whole (*ev*) is not located with respect to the utterance time (*n*) – it may have started after the utterance time ([*n*  $<$  *ev*]), or be already going on at the utterance time ([*n*  $\circ$  *ev*]). Strictly speaking, it may have even culminated before *n* ([*ev*  $<$  *n*]), although this is probably an uncommon situation in a context where the future perfect is used.

It has long been noted that eventualities described in sequences of sentences with the same tense value (e.g. simple past) and without temporal adverbials often stand to each other in a sequential relation, their order of occurrence paralleling the one in which they are presented in the discourse. Observe the following examples, the first with mere juxtaposition of sentences, the second with clausal coordination:

- (42) a. O Paulo entrou no bar. Pediu uma cerveja. Sentou-se à mesa com os amigos.  
 Paulo entered the bar. He ordered a beer. He sat down with his friends.
- b. O Paulo entrou no bar, pediu uma cerveja e sentou-se à mesa com os amigos.  
 Paulo entered the bar, ordered a beer, and sat down with his friends.

Let us focus on the last two eventualities. The most natural interpretation of the sequences (42) is one according to which Paulo's ordering of the beer precedes his sitting down (and both precede his entrance in the bar), whereas, if we change the order of the last two clauses, the reversed order of these eventualities is assumed as the most natural.

- (43) O Paulo entrou no bar, sentou-se à mesa com os amigos e pediu uma cerveja.  
 Paulo entered the bar, sat down with his friends and ordered a beer.

What these simple examples show is that, apparently, eventualities may be temporally ordered (by precedence relations) as a mere result of the position the expressions describing them occupy in the discourse. In other words, temporal location relations can be expressed other than by time adverbials or tense, namely by means of a morphologically null "mechanism" that is made particularly evident in sequences of sentences.

The literature which studies these phenomena is already quite vast (a compelling reference being, among others, Asher 1993). It revolves around the basic idea that discourses are structured entities, regulated by a general well-formedness principle of "connectedness", which requires that certain (so-called) rhetorical relations can be established between the eventualities mentioned in that discourse. For the examples given above, a relation of *narration* (corresponding to the sequential occurrence of described eventualities) is often assumed (cf. e.g. Lascarides and Oberlander 1993: 14). Other rhetorical relations – e.g. background, explanation, elaboration – have a more or less predominant temporal component. For instance, if two sentences are related by explanation (a relation associated with the notion of causality), the temporal order may be the opposite of that associated with narration:

- (44) O Max caiu. O John empurrou-o.  
 Max fell. John pushed him. (Moens 1987: 92)

The study of the temporal aspects of discourse (rhetorical) relations is out of the scope of this dissertation. In subchapter 4.2.3.3, however, I will return to this issue in order to explore some possible interactions between rhetorical relations and the specific role of temporal locating adverbials.

### 1.3.4. Markers of frequency, number and duration

In this brief subsection, I will only illustrate some linguistic variations in the expression of frequency, number and duration, given that the study of these areas is relatively marginal in this dissertation.

With respect to **duration** and **frequency**, temporal adverbials are probably the most common markers, in languages like Portuguese or English (cf. examples given in the previous section).

The temporal adverbials that express duration are normally composed by a temporal preposition (e.g. *durante* / *for* or *em* / *in*) and a predicate of amounts of time – cf. examples (20a-b) above. However, the preposition may be omitted in some contexts:

- (45) Ficámos lá {durante / Ø} três meses.  
We stayed there {for / Ø} three months. (Quirk *et al.* 1985: 694)

The temporal adverbials that express frequency (pure or not) have a far more complex structure, as observed in 1.2.1.2. I will only note here that, in many cases, they can appear superficially as NPs – as in (46) – and that, for those cases, an analysis resorting to a null preposition has also been proposed (evinced the similarity between these expressions and the normal locating adverbials) – cf. e.g. Rothstein (1995: 17 ff.) :

- (46) O Paulo foi ao cinema Ø<sub>em</sub> todos os dias.  
Paulo went to the cinema Ø<sub>in</sub> every day.

The phenomenon of **temporal preposition suppression** will be considered in some detail in connection with temporal locating adverbials, in section 6. The cases illustrated here show that this phenomenon is widespread, involving temporal expressions of different conceptual domains – cf. (32), (45) and (46).

It must still be noted that measure and frequency phrases can occur in adnominal position, being marked by prepositional or adjectival modifiers:

- (47) a. um terramoto *de quarenta segundos* / *breve*  
a *forty-second* / *short* earthquake  
b. uma reunião *anual*  
an *annual* meeting

Finally, with respect to the expression of **number**, I will just note that it is typically associated with the noun *vez* / *time* (and adverbs like *once* and *twice* in English) in combination with different types of quantificational structures:

- (48) O Paulo casou duas vezes / três vezes / muitas vezes.  
Paulo got married twice / three times / many times.

Having made these brief presentation of the temporal domains and subsystems of natural language, and situated my dissertation with respect to them, let us now turn to a more detailed – though still quite superficial – analysis of the subsystems of aktionsart and tense, whose interaction with the temporal locating adverbials is particularly significant.



## Chapter 2

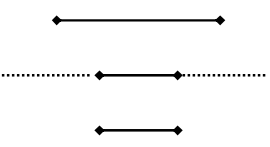
### Aktionsart and tense: two fundamental subsystems for the analysis of adverbial temporal location

In this chapter, I will briefly discuss the temporal subsystems of **aktionsart** and **tense**. This will be done in a relatively simplified way, focussing on the aspects which are more relevant to the analysis of temporal adverbials.

Here are two illustrative examples of how these subsystems interact with temporal locating adverbials, affecting the applicable location conditions:

- (49) a. O Paulo esteve em Lisboa no domingo. [aktionsart: atelic]  
Paulo was in Lisbon on Sunday.
- b. O Paulo casou no domingo. [aktionsart: telic]  
Paulo got married on Sunday.
- (50) a. O Paulo está no escritório desde o meio-dia. [tense: present]  
“Paulo IS in the office since noon”
- b. O Paulo esteve no escritório desde o meio-dia. [tense: past]  
“Paulo WAS in the office since noon”

The Portuguese and English sentences in (49) differ essentially in the aktionsart value of the eventuality described in the main clause: an atelic eventuality (state) in (49a) *vs.* a telic one in (49b). This, in turn, corresponds to differences in temporal location: while the atelic eventuality may hold over the whole mentioned Sunday, and even over some time before and/or after that Sunday, the telic eventuality is necessarily circumscribed to the mentioned Sunday. Schematically:

- (51)  locating interval – mentioned Sunday  
located eventuality in (49a) – Paulo be in Lisbon  
located eventuality in (49b) – Paulo get married

The Portuguese sentences in (50) differ essentially in the tense form: “presente” in (50a) *vs.* “pretérito perfeito simples” in (50b). A difference in temporal location is also observable here: while the eventuality described in the first sentence is assumed to hold over the whole period nailed down by the *desde*-adverbial, which stretches from noon up to (and including) the utterance time, the eventuality represented in the second sentence is assumed to have ceased (shortly) before the utterance time, and therefore does not cover the whole period nailed down by the *desde*-adverbial.

- (52)
- |             |   |
|-------------|---|
| ◆————◆      | locating interval – between noon and utterance time   |
| ◆————◆..... | located eventuality in (50a) – Paulo be in the office |
| ◆————◆      | located eventuality in (50b) – Paulo be in the office |

This type of contrasts will be thoroughly explored in Parts II and III of this dissertation. At this point, I will concentrate on a brief presentation of the two subsystems at stake, providing the basic elements for the discussion to be made later on.

## 2.1. Aktionsart

### 2.1.1. Introduction

It has long been acknowledged – specially after the work of Vendler (1967) – the importance of incorporating in the grammar a **classification of eventuality-denoting expressions** – particularly verbs, verb phrases and sentences<sup>20</sup> – based on some of their temporal properties, usually described as related to their “internal structure”.

“the starting point for a principled semantics of temporal expressions should be a study of the internal structure of events and the ways in which a language user can describe various subparts of events. (...) This will result in a taxonomy of event descriptions, reflecting the temporal profile of the event descriptions (...)” (Moens 1987: 38)

The relevance of this classification of eventuality-descriptions in so-called **aspectual classes** (or **categories**), or **aktionsarten**, is evinced by their different linguistic behaviour, as illustrated in the following English examples (based on Dowty 1979):

#### I. co-occurrence restrictions with time adverbials (cf. Dowty 1979: 56):

- (53) a. John walked for an hour.  
       b. \*John walked in an hour.
- (54) a. \*John painted a picture for an hour.  
               (ungrammatical without aktionsart shift – cf. fn. 21)  
       b. John painted a picture in an hour.

These pairs of sentences show the need to distinguish the expression representing the walking-eventuality in (53), which is compatible with measure adverbials headed by *for* but not by *in*, from the expression representing the painting-a-picture-eventuality in (54), whose compatibility with these adverbials is the reverse (in the relevant readings<sup>21</sup>). The

<sup>20</sup> Although, in the work of Vendler (1967) and others, emphasis is put on verbs (or verb phrases), it has been shown – cf. e.g. Verkuyl (1972) and many others – that the aspectual classification is relevant at the sentence level, given the possible interference of subject or object NPs, tense or temporal adverbials, for instance.

<sup>21</sup> The relevant readings are those where no aktionsart shift occurs (cf. section 2.1.2.2). (54a), for instance, is acceptable under the reading where only the preparatory phase (leading to the

first expression is said to be of the (aktionsart) type *atelic*, namely *activity*, whereas the latter is said to be of the (aktionsart) type *telic*, namely *accomplishment*.

Data in Portuguese is similar (with *durante* as the counterpart of *for*, and *em* as the counterpart of *in*):

- (53)' a. O John andou durante uma hora.
- b. \*O John andou numa hora.
- (54)' a. \*O John pintou um quadro durante uma hora.
- b. O John pintou um quadro numa hora.

**II.** co-occurrence restrictions with tense forms, or with temporal operators like the progressive (cf. Dowty 1979: 55):

- (55) a. \*John is knowing the answer.
- b. John is running.
- c. John is building the house.

This set of sentences shows the need to distinguish between the expression representing the knowing-the-answer-eventuality in (55a), incompatible with the progressive, from the expressions representing the running-eventuality in (55b) or the building-the-house-eventuality in (55c), which are compatible with it. The first expression is said to be of the (aktionsart) type *state*, whereas the second and third are said to be of the (aktionsart) type *non-state* – namely *activity* and *accomplishment*, respectively.

Data in Portuguese is similar (with the so-called aspectual auxiliary *estar a*, which takes an infinitival form of the verb as complement, as the counterpart of English *be*):

- (55)' a. \*O John está a saber a resposta.<sup>22</sup>
- b. O John está a correr.
- c. O John está a construir a casa.

**III.** differences in logical entailments (cf. Dowty 1979: 57):

- (56) a. John is (now) walking.
- John has walked.
- b. John is (now) painting the picture.
- John has not (yet) painted the picture.

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conclusion) of the painting is involved: “John spent an hour in a painting-a-picture activity” (cf. also example (70c) below).

<sup>22</sup> This sentence is acceptable in a scenario like the following (the corresponding reading being irrelevant here): at the moment the speaker utters the sentence, John is in a process of giving an answer to a long question (in an oral examination, for instance), and correctly addresses the various aspects of the question, as he speaks. In this reading, the sentence (55'a) is equivalent to *o John está a saber responder* (“John is knowing [how] to answer”). The expressions *saber a resposta* and *saber responder* are probably non-stative descriptions here.

These sentences show the need to distinguish the expression representing the walking-eventuality in (56a), which allows the entailment “x has  $\phi$ ed” from “x is (now)  $\phi$ ing”, from the expression representing the painting-the-picture-eventuality in (56b), which does not allow such entailment. The first expression is said to be of (aktionsart) type *activity*, whereas the latter is said to be of (aktionsart) type *accomplishment*.

Again, the Portuguese data is similar (with *estar a* as the counterpart of *be*, and the Portuguese “pretérito perfeito simples” as the counterpart of the English present perfect):

- (56)′ a. O John está a andar (neste momento).  
           → O John (já) andou.  
       b. O John está a pintar o quadro (neste momento).  
           → O John (ainda) não pintou o quadro.

Many different aktionsart taxonomies have been proposed since the classic Vendlerian four-class typology, which distinguishes **states**, **activities**, **accomplishments** and **achievements** – a terminology that I will, as a rule, adopt in this dissertation, together with the cover terms **atelic** (for states and activities) and **telic** (for accomplishments and achievements), from Garey (1957), and **eventuality** (for any aktionsart type), from Bach (1981). Some acknowledged landmarks in the literature on this subject are the works of Verkuyl (1972), Mourelatos (1978), Dowty (1979), Carlson (1981), ter Meulen (1983), Hoeksema (1984), Moens (1987) or Pustejowsky (1991), just to mention a few. Vendler’s work, on the other hand, evolves from a tradition of study which has Ryle (1949) and Kenny (1963) as important milestones, and which can be traced back as far as Aristotle, whose distinction between *kineseis* and *energiai* is comparable with the Vendlerian distinction between accomplishments and activities/states, respectively (cf. Dowty 1979: 52-53). There are many good overviews of the development of the aktionsart typologies in the literature (e.g. Dowty 1979, or Verkuyl 1993), and I will not attempt to do one here. Rather, I will focus only on some specific aspects that are particularly relevant for the analyses to be made in this dissertation.

## 2.1.2. Some basic questions about aktionsart

The analysis of the type of data presented in (53)-(56), and its association with an aspectual classification of eventualities, poses several problems. For the purposes of the present dissertation, the crucial aspects that should be mentioned are: (i) the general criteria to determine the aktionsart status of a given expression, and (ii) the possibility of aktionsart changes as a result of the combination with certain expressions or operators. I will very briefly address these aspects in the following two subsections.

### 2.1.2.1. On the criteria to define aktionsart categories

I will start with the basic question of the **status of the aktionsart categories**, and – connectedly – of the tests that are normally used to distinguish these categories. Looking at

the literature, one can see that the definition of aktionsart classes hovers between what can be termed an “ontological” definition and a “distributional” definition<sup>23</sup>.

The **ontological definition** is based on properties that the represented eventualities are conceived of as having, such as extendedness, homogeneity or nuclear structure (cf. below). It must be stressed that, as often observed, the properties at stake are not properties that the eventualities in the real world necessarily have, but rather properties that a natural language interpretation of the world attributes to such eventualities. In fact, the same real world eventuality can be described with different linguistic expressions, that we want to categorise differently with respect to their aktionsart:

“Our taxonomy is set up to be a classification of how people *describe* the world, rather than how the world itself is. One and the same state of affairs can be described in different ways, using expressions belonging to different categories and focussing on different aspects of the same state of affairs. Thus the sentences in (74) [(a) *I wrote two letters last night*, (b) *I wrote letters last night*, (c) *I was writing letters in my office*, (d) *I have written two letters*] could be describing one and the same “real world” state of affairs. Yet they all belong to different aspectual categories (...)” (Moens 1987: 43).

Among the properties of eventualities that establish aktionsart distinctions, the following three interrelated ones stand out:

### I. Temporal extendedness

Eventualities may be conceived of as **punctual** – i.e. occurring at an atomic moment of time (achievements) – or as **non-punctual**, or **temporally extended** – i.e. as extending over a period of time that can be divided into parts (states, activities, accomplishments).

### II. Homogeneity

This property has to do with whether or not the occurrence of an eventuality at a given interval **t** entails its occurrence at subintervals of **t**, and is commonly known as the “subinterval property” (cf. Bennett and Partee 1972). Eventualities may be conceived of as **homogeneous**, be it **totally homogeneous** (i.e. occurring at all subintervals of **t**, including the points – states) or **relatively homogeneous** (i.e. occurring at all subintervals of **t** that have a certain granularity – activities), or as **heterogeneous** (i.e. occurring at no subinterval of **t** – accomplishments and achievements)<sup>24</sup>.

### III. Nuclear structure

Eventualities may be conceived of as having different distinguished components, i.e. an “internal structure”. A tripartite structure (sometimes called “nucleus” – cf. Moens, 1987: 47), consisting of a preparatory phase (or preparatory process), a culmination

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<sup>23</sup> I borrow this binary opposition from João Peres (course notes, 1996). Peres (1998b) divides the criteria that have been used in the literature into three types: terminativity, homogeneity (both in the ontological sphere) and distribution.

<sup>24</sup> For this terminology, cf. Eberle (1998: 55).

and consequent state (or result state), is now widely used: “the meaning of all the categories in the aspectual network is associated with a complex entity consisting of a preparatory process, which can lead up to (without necessarily reaching) a culmination point, and this in turn has certain consequences attached to it” (*ibid.*). Eventualities are conceived of as having no distinguished nuclear components (states and activities), as having all three (accomplishments) or as having just a culmination, possibly attached to a consequent state (achievements), for instance.

The application of these ontological criteria results in a categorisation of eventualities and – in co-relation – of the expressions that represent them. For instance, the eventuality of somebody being ill can be conceived as being temporally extended, homogeneous and (redundantly) as having no distinguished “nuclear” components – i.e. a state; the linguistic form *be ill* that represents such state is consequently classified as a stative expression.

The **distributional definition** comes normally in combination with the ontological definition (in a sort of mixed distributional-ontological definition). It results from the observation that the linguistic expressions that represent the different kinds of aktionsarten (defined by ontological criteria) have linguistic properties in common, expressed in generalisations such as “states do not combine with the progressive”, “states and activities combine with *for*-adverbials but not with *in*-adverbials”, etc.:

“what is needed as a starting point is an aspectual classification of *verbs* (or the basic propositions they occur in) based on *linguistic* tests such as co-occurrence possibilities of the verb with certain adverbial expressions or with the progressive and perfect auxiliaries” (Moens 1987).

In some texts, these distributional properties seem to be taken not as a *consequence* of the ontologically-based aktionsart distinctions, but as the very *foundation* of the aktionsart distinctions. Quite often, the status of distributional properties – as opposed to the ontological ones – is not completely clear. In this dissertation, I will assume an ontologically-based definition, the linguistic distribution having merely the status of evidence for the relevance of certain distinctions, and not a foundational status. At any rate, this question is not crucial here, since most problems having to do with aktionsart distinctions – for instance, the (problematic) dividing line between states and activities – will be ignored in this dissertation. In fact, the linguistic data to be dealt with requires only a relatively coarse-grained typology, whose essential distinction is that between *atelic eventualities* (including states and activities) and *telic eventualities* (including accomplishments and achievements).

### 2.1.2.2. Aktionsart shift

A second basic question about aktionsart that I want to address here is the correspondence between linguistic constituents and aktionsart values. This involves the questions of **aspectual composition** and **aspectual** (or **aktionsart**) **shift**.

As already said, Vendler (1967) presented his four-class typology as a classification of verbs (although he included some VPs in the accomplishment class), but later works showed the need to consider the expression of aktionsart values at higher hierarchical structures, namely the verb phrase, and ultimately at the (highest) sentence level.

It is a common assumption nowadays that the aktionsart value of a sentence can be determined only *at the sentence level*, and is conditioned by a great number of linguistic factors, besides the basic aktionsart value of the verb head. Among these factors, tense (and temporal operators like the perfect or the progressive), negation, (certain) time adverbials, and NPs (specially depending on the quantifiers they contain) stand out as some of the most significant. Many pages could be written just to summarise what has been said about this issue in the literature. However, for the purposes of this dissertation, that does not seem crucial, and I will merely provide some illustrative examples of the aktionsart shift phenomenon (for a diagrammatic representation of some of these shifts, cf. Moens' (1987: 45) "aspectual network")<sup>25</sup>:

- (57) a. Anne *fut* triste. [accomplishment]
- b. Anne *était* triste. [state]

Swart (1998: 365) assumes, in line with Kamp and Rohrer (1983), that "sentences in the Passé Simple [as (57a)] describe events, and the ones in the Imparfait [as (57b)] refer to either states or processes" (*ibid.*).

- (58) a. Mary *met* the president. [achievement]
- b. Mary *has met* the president. [state]

Kamp and Reyle (1993) assume that a "perfect VP describes a state (...) which results from the occurrence of a certain event. When the underlying VP is non-stative, this is an event described by the non-perfect VP itself" (p. 568). The view that perfect sentences represent states is standard in the literature.

- (59) a. Mary *wrote* a letter. [accomplishment]
- b. Mary *is writing* a letter. [state]

Kamp and Reyle (1993) consider the progressive (just like the perfect) as an *aspectual operator* "which transform[s] the meaning of the underlying non-progressive (...) verb, verb phrase or sentence into that of its progressive counterpart" (p. 569), which is a stative description. This view is also common in the literature.

- (60) a. John *played* the sonata. [accomplishment]
- b. John *didn't play* the sonata. [activity]

According to Moens (1987: 55), "negated events behave like process expressions, free to co-occur with a *for*-adverbial".

- (61) a. John worked in the garden. [activity]
- b. John worked in the garden *for several hours*. [accomplishment]

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<sup>25</sup> Note that I use Vendler's terminology, rather than the terminology used by the authors mentioned in the comments to the examples.

Moens (1987: 50) shares with many authors in the literature (e.g. Bach 1981: 74, Nerbonne 1983: 59, Mittwoch 1988: 210, Swart 1998: 357) the view that *for*-adverbials (or their counterparts in other languages) act as aktionsart shifters that form event-descriptions (accomplishments).

- (62) a. Allen went to Nome. [accomplishment]
- b. Allen went to Nome *regularly*. [activity]

According to Vlach (1993: 251), “frequency adverbials create process sentences”.

- (63)a. She ate *sandwiches*. [activity]
- b. She ate *a sandwich*. [accomplishment]

The work of Verkuyl (1972) is an important landmark in the acknowledgement of the interaction between temporal and atemporal structures, in particular of the effect upon aktionsart of the quantifying structure of an NP (bare plural vs. single indefinite quantifier in the examples above) – cf. Verkuyl (1993: 47). Dowty (1979: 63) formulates the following principle: “If a sentence with an achievement verb contains a plural indefinite NP or a mass noun NP (or if a sentence with an accomplishment verb contains such an NP as object), then it has the properties of a sentence with an activity verb”.

The phenomenon of aktionsart shift is crucial for the analysis of temporal location by way of time adverbials, inasmuch as the aktionsart value (of the expressions with which the temporal locating adverbials combine) is one of the basic factors determining the applicable location conditions (cf. specially chapters 4 and 8). Following common terminology in the literature (cf. e.g. Vlach 1993), I will use the term **derived** – as opposed to **basic** – to classify an eventuality resulting from an aktionsart shift. The treatment of aktionsart shift in the semantic framework of DRT will be considered at the end of chapter 3.

### 2.1.3. The aktionsart typology adopted in this dissertation

As said before, in this dissertation I will basically adopt the typology (and terminology) of Vendler (1967) – distinguishing **states**, **activities**, **accomplishments** and **achievements** – and the cover terms **atelic eventualities** (for basic or derived states and activities) and **telic eventualities** (for basic and derived accomplishments and achievements). The following provisos must however be stressed:

- (i) I will, as a rule, ignore the difference between states and activities. For the purposes of the present dissertation, the macro-class of *atelic eventualities* (cf. Garey 1957) or *homogeneous eventualities* (cf. e.g. Swart 1998: 351, Eberle 1998: 55) appears to be sufficient. In general, I will pay more attention to states than activities (the latter being, in fact, very seldom specifically mentioned in this dissertation).
- (ii) Some data – that will only superficially be dealt with (in chapter 8) – seems to indicate the need to consider a more fine-grained typology of the class of achievements.

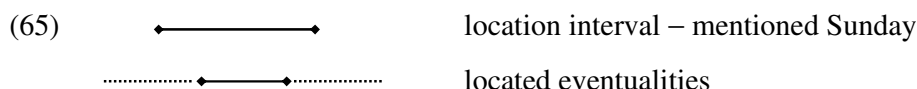


### 2.1.3.1. Atelic eventualities (states and activities)



As said, I will as a rule consider in this dissertation the macro-class of **atelic** (or **homogeneous**) **eventualities**, thereby avoiding the (quite intricate) problems involved in distinguishing between states and activities. This is mainly due to the fact that the differences in temporal location on which I will focus do not seem to vary within this macro-class. Here is an example:

- (64) a. O Paulo esteve em Lisboa no domingo. [state]<sup>26</sup>  
Paulo was in Lisbon on Sunday.
- b. Choveu no domingo. [activity]  
It rained on Sunday.
- c. O Paulo tocou piano no domingo. [activity]  
Paulo played the piano on Sunday.

In these sentences – with atelic descriptions – the temporal location is similar: the described eventualities *overlap* with the location time (the mentioned Sunday), with the possibility that they hold just on part of that period, over that whole period, or even extend beyond it.

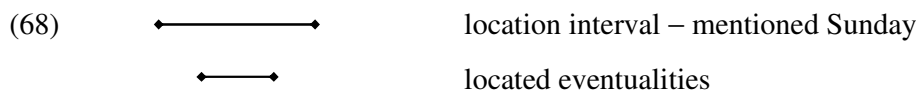


In some cases, the location of atelic eventualities is more restricted in that they are assumed to hold over the whole locating interval (with the possibility that they extend beyond it):

- (66) O Paulo esteve no escritório das 2 às 3 da tarde.  
Paulo was in the office from 2 to 3 p.m.
- (65)'  location interval – mentioned Sunday  
 located eventualities

This is in contrast with what happens with telic descriptions, where the described eventuality is always *included* in the location time, as in the following examples:

- (67) a. O filho do Paulo nasceu no domingo. [achievement]  
Paulo's son was born on Sunday.
- b. O Paulo escreveu uma carta à mãe no domingo. [accomplishment]  
Paulo wrote a letter to his mother on Sunday.



<sup>26</sup> I assume that this sentence contains a state description, not following Swart's (1998) assumption that the simple past creates an event-description – cf. (57a) above.

I assume a definition of the class of atelic eventualities on purely temporal terms, as given, for instance, in Eberle (1998), based in Vendler (1967), Bennett and Partee (1978) and Dowty (1986):

“*States* are temporally extended and homogeneous. They describe static situations, i.e. the validity of the state description is inherited by all subintervals  $t'$  of an interval  $t$  for which the statement is known to be valid (even by points if they are permitted by the logic)” (Eberle 1988: 55).

“*Activities* are temporally extended and relatively homogeneous (modulo some pauses and inheritance onto very short periods or points)” (*ibid.*).

Atelic eventualities are thus defined in terms of (temporal) homogeneity: they hold at all the subintervals of the stretch of time they “occupy” *up to a certain level of granularity* (which is maximal in the case of states). The concept of “granularity” is used by several authors, as for instance Vlach (1993), who designates atelic eventualities as **mass eventualities**, and defines them in terms of granularity:

“Going to church every Sunday is a process with fairly coarse *granularity*: one has to look at a period of some weeks to “see” the pattern of the process. Other processes have a much finer granularity (*run, laugh*), or even zero granularity (*grow*). All states have zero granularity” (p. 236).

According to this definition, the class of atelic eventualities includes not only the basic state and activity descriptions, but a whole range of descriptions which include, for instance, generic, habitual or (at least some) negative statements, which, in fact, exhibit a similar behaviour with respect to temporal location:

- |         |  |            |
|---------|--|------------|
| (69) a. | No ano passado, o Paulo fumava.                  | [habitual] |
|         | “last year, Paulo SMOKED <sub>IMPERFEITO</sub> ” |            |
| b.      | O Paulo não fumou ontem.                         | [negative] |
|         | Paulo did not smoke yesterday.                   |            |

In (69a), like in (64), the described eventuality – Paulo’s habit of smoking – can cover just part, or the whole, of the location time (the year preceding the one in which the utterance takes place), or can even extend beyond the location time – schema (65). In (69b), like in (66), the more restricted interpretation expressed in schema (65’), according to which the described eventuality – Paulo’s abstention from smoking – covers the whole location time (the day before the utterance time), seems preferred.

### 2.1.3.2. Telic eventualities (accomplishments and achievements)

In this dissertation, I will use the term **event** – together with **telic eventuality** – as a cover term for accomplishments and achievements. These are defined by Eberle (1998) in the following terms (which I adopt):

“*Accomplishments* are temporally extended and heterogeneous, i.e. if an accomplishment holds at an interval  $t$ , it does not hold at the subintervals of  $t$ ” (p. 55).

“*Achievements* are punctual” (*ibid.*).

Furthermore, these two types of eventualities are distinguished by their “nuclear structure”: while a basic accomplishment comprises a preparatory phase leading to a culmination (whence its extendedness in time), a basic achievement merely contains a culmination point (and is therefore conceived as instantaneous).

Aktionsart shift is also a common phenomenon for telic descriptions (cf. the “aspectual network” of Moens 1987: 45). Among the most common shifts are: (i) the transformation of achievements into accomplishments by addition of a preparatory phase – cf. (70a); (ii) the transformation of achievements into activities by iteration – cf. (70b); (iii) the transformation of accomplishments into activities by stripping off the culmination point – cf. (70c):

- (70) a. O alpinista atingiu o cume em menos de três horas.  
The mountaineer reached the top in less than three hours. (Moens 1987: 53)
- b. O Paulo bateu à porta durante alguns minutos.  
Paulo knocked on the door for a few minutes. (cf. Moens 1987: 51)
- c. O Paulo leu um romance durante alguns minutos.  
Paulo read a novel for a few minutes. (cf. Moens 1987: 45)

As often noted, a characteristic that puts accomplishments and achievements together, and distinguishes them from atelic eventualities, is the fact that their temporal location normally corresponds to an *inclusive condition* (“the described eventuality is included in the location time”) – cf. (68) – rather than to a merely *overlapping condition* (“the described eventuality overlaps with the location time”), as is often the case with atelic descriptions – cf. (65):

This seems to be a general property of event-sentences with temporal adverbials such as **on Sunday, yesterday, tomorrow morning** and many others: they assert that the event falls entirely within the time denoted by the adverb. (Kamp and Reyle 1993: 513)

For the case of punctual eventualities (achievements), though not for extended eventualities (accomplishments), mere overlap is tantamount to inclusion. However, I have found it useful to put together achievements and accomplishments, since – as we will see throughout this dissertation – they behave quite similarly with respect to temporal location.

At this point, I will not say anything else about temporal location of telic eventualities, which will be topic of chapter 9, and part of chapter 8. I will just add that the analysis of temporal locating adverbials seems to require a more fine-grained typology of achievements (even more fine-grained than Moens’ distinction between “culminations” and “points”), as shown by the following Portuguese examples, all with simple past (“pretérito perfeito simples”):

- (71) a. \*O Paulo partiu a perna desde que teve o acidente.  
 “Paulo broke (has broken) his leg since he had the accident”  
 b. \*O Paulo partiu a perna por três meses.  
 “Paulo broke his leg for three months”
- (72) a. \*O Paulo abriu a porta desde que a Ana lhe pediu.  
 “Paulo opened (has opened) the door since Ana asked him to”  
 b. <sup>OK</sup>O Paulo abriu a porta por cinco minutos.  
 “Paulo opened the door for five minutes”
- (73) a. O Paulo perdeu o medo de andar de avião desde que atravessou o Atlântico sem problemas.  
 “Paulo lost (has lost) his fear of flying since he crossed the Atlantic without problems”  
 b. ?O Paulo perdeu o medo de andar de avião por três meses.  
 “Paulo lost his fear of flying for three months”

In these examples, the described punctual achievements are associated with result states. In sentences *a*, a causal link is assumed to hold between the eventuality described in the main clause and the one represented in the subordinate temporal clause: the only reading that these Portuguese sentences can have (in fact, grammatical only in (73)) is one according to which the *result state* of the described achievement is assumed to extend between the time associated with the subordinate clause and the utterance time<sup>27</sup>. In the examples *b*, the duration of the *result state* of the described achievement is directly quantified via the *durante*-adverbial. The differences in grammaticality observed in these examples seem to indicate differences in the possibility/ease of associating consequent states with achievements of the type expressed by *partir a perna* (*break one’s leg*), *abrir a porta* (*open the door*), *perder o medo de andar de avião* (*lose one’s fear of flying*). This issue will be addressed – though not thoroughly explored – in chapter 8.

## 2.2. Tense

### 2.2.1. Reichenbach and the two-dimensional theory of tense

In his classical work of 1947, Reichenbach treats all tenses as expressing temporal relations between three distinguished times: **S** (speech time), **E** (event time) and **R** (reference time). He introduced the last concept in order to treat complex tenses like the past perfect – corresponding to Portuguese “pretérito mais-que-perfeito” – and then generalised it to the analysis of all tense forms. In fact, the interpretation of sentences with the past perfect seems to systematically involve three components: the event described in these sentences is located prior to a time *x* (Reichenbach’s “reference time”), which is itself prior to the utterance time:

<sup>27</sup> Portuguese *desde*-adverbials (contrary to *since*-adverbials) do not allow a simple inclusive reading, according to which an achievement described in a matrix structure is asserted to merely fall within the location time (in any part of it) – cf. chapter 9, for an extensive analysis of this fact.

- 
- A horizontal timeline with an arrow pointing to the right. Three vertical tick marks are placed along the line. Below the first tick mark is the letter 'E' and the text '(John's arrival)'. Below the second tick mark is the letter 'R'. Below the third tick mark is the letter 'S' and the text '(Speech time)'.

(75) a. Fred came in (at 5 o'clock). John had arrived.  
O Fred entrou (às cinco horas). O Paulo tinha chegado.

b. At 5 o'clock, John had arrived.  
Às cinco horas, o Paulo tinha chegado.

Reichenbach, whose system is often described as a **two-dimensional theory of tense**, organises the possible tense forms according to two different relations:

- This yields a set of **nine “fundamental forms”**, which Allen (1966: 142) represents with the following schema:

- 
- | Verb Form | Tense Name        |
|-----------|-------------------|
| E         | Anterior past     |
| R,E       | Simple past       |
| E         | Posterior past    |
| E         | Anterior present  |
| S,R,E     | Simple present    |
| E         | Posterior present |
| E         | Anterior future   |
| R,E       | Simple future     |
| E         | Posterior future  |

In this dissertation, I will assume a Reichenbachian approach to the treatment of tense, taking into account its adaptation in Kamp and Reyle (1993), and – for Portuguese – in Peres (1993, 1995). Accordingly, I will assume that verbal forms express two types of temporal information:

- (i) A relation between the utterance (or speech) time and a reference time. The latter will henceforth be designated, following Kamp and Reyle (1993), as Temporal Perspective Point (TPpt) – cf. definition of this term in chapter 3.

Following also Kamp and Reyle (1993), I will term this relation **TEMPORAL PERSPECTIVE**.

- (ii) A relation between the Temporal Perspective Point and the eventuality described in the sentence where the verb form occurs.

For this relation, I will use the term **TENSE LOCATION** (rather than simply **TENSE**, as in Kamp and Reyle 1993<sup>28</sup>).

Unless otherwise stated, I will use the term **tense** in this dissertation to refer generically to the expression of time in the verbal system, which I take to simultaneously involve the two relations mentioned above – temporal perspective and (tense) location. Thus, I will use phrases like **tense form** to refer to verb forms like Portuguese “presente”, “pretérito imperfeito”, or “pretérito mais-que-perfeito” (and their English counterparts) – which conjunctly express the two types of relations at issue – and **tense system** to refer to the system that incorporates all these tense forms. I will, furthermore, consider only tense values expressed in the indicate mood.

### 2.2.2. The English tense system (as described in Kamp and Reyle 1993)

Terminology aside (and the fact that Reichenbach’s “simultaneity” relation between E and R is more accurately expressed as an “overlapping” relation), Kamp and Reyle’s description of the English tense system is very similar to Reichenbach’s. There are however three differences that I would like to highlight at this point<sup>29</sup>:

The first difference concerns the fact that Kamp and Reyle only consider two positions for the temporal perspective point: past and non-past (= present), whereas Reichenbach distinguishes three: past, present and future (cf. Kamp and Reyle 1993: 597 – “neither the

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<sup>28</sup> Actually, in the final version proposed in Kamp and Reyle (1993), **TENSE** expresses a relation between the Temporal Perspective Point and the *location time* of the described eventuality, rather than directly between the Temporal Perspective Point and the described eventuality (cf. chapter 3). This option, which represents a divergence with Reichenbach’s system, will not be adopted in this dissertation (cf. discussion in section 4.2.2.3).

<sup>29</sup> A fourth difference, mentioned in the previous footnote, will be discussed later on (in chapter 3 and section 4.2.2.3).

simple future nor any other tense ever locates the TPpt in the future of the utterance time”)<sup>30</sup>.

One consequence of this two-valued option is that the simple future has only one interpretation: (77a) below. Reichenbach distinguishes another interpretation, which we could paraphrase as (77b) below:

- (77) a. ⟨TPpt coincides with utterance time; described eventuality after TPpt⟩
- b. ⟨TPpt after utterance time; described eventuality overlaps TPpt⟩

«Reichenbach points out that verb-clusters of the form *shall v* (and presumably, also, of the form *will v*) may express either of two different “meanings”: in a sentence like *Now I shall go*, “the simple future has the meaning “S,R-E”, but in a sentence like *I shall go tomorrow*, it has the meaning “S-R,E”.”» (Allen 1966: 144; the sequence in straight quotes is from Reichenbach 1947: 295)

The two possibilities in (77) are also admitted for Portuguese by Peres (1993). In fact, this author assumes – for Portuguese – a tripartite time-sphere analysis, like Reichenbach’s. I will do the same, without discussing this option (cf. however the observations about the future perfect below, specially footnote 32).

A second difference between Reichenbach and Kamp & Reyle is that the latter admit two possible interpretations for the simple past (whereas Reichenbach considers only one possibility – (78a) below):

- (78) a. ⟨TPpt before utterance time; described eventuality overlaps TPpt⟩
- b. ⟨TPpt coincides with utterance time; described eventuality before TPpt⟩

“we are led to maintain that the English simple past must be seen as semantically ambiguous. Its interpretation can locate the TPpt either *at* the utterance time or *before* it” (Kamp and Reyle 1993: 597).

This distinction seems adequate from a cross-linguistic perspective, if one considers, for instance, languages of the Romance family. In fact, the English simple past can apparently correspond to both the Portuguese “pretérito imperfeito” (or the French “imparfait”), where it behaves as in (78a), and the Portuguese “pretérito perfeito simples” (or possibly the French “passé simple”), where it often behaves as in (78b). I will therefore assume this ambivalent analysis of the simple past (cf. discussion of the “pretérito perfeito simples” below).

Finally, a substantial difference between Reichenbach’s and Kamp & Reyle’s systems concerns the treatment of perfective forms. The characterisation of the perfect tenses in Kamp and Reyle invokes a component – an aspectual value of perfectivity – that does not belong to the two-parameter tense system described above. Accordingly, in Kamp and Reyle’s system the same values for TEMPORAL PERSPECTIVE and TENSE LOCATION can be shared by simple tense forms and their corresponding perfect forms (unlike in

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<sup>30</sup> Kamp and Reyle (1993: 597, fn. 51) comment on some facts, concerning possible future-oriented uses of *now*, that might indicate the relevance of considering future TPpts.

Reichenbach's system). More specifically, and focussing just on some possible values of the mentioned tense forms<sup>31</sup> (cf. Kamp and Reyle 1993: 601):

- (79) a. simple present (*have, live*)  
           present perfect (*have lived, have read*)  
          $\Sigma$   $\langle$ TPpt coincides with utterance time; described eventuality overlaps TPpt $\rangle$
- b. simple past (*had, lived*)  
           past perfect (*had lived, had read*)  
          $\Sigma$   $\langle$ TPpt before utterance time; described eventuality overlaps TPpt $\rangle$
- c. simple future (*will have, will live, will read*)  
           future perfect (*will have lived, will have read*)  
          $\Sigma$   $\langle$ TPpt coincides with utterance time; described eventuality after TPpt $\rangle$
- d. past future (*would have, would live, would read*)  
           past future perfect (*would have lived, would have read*)  
          $\Sigma$   $\langle$ TPpt before utterance time; described eventuality after TPpt $\rangle$

The non-perfect forms and the corresponding perfect ones are distinguished by the aspectual feature  $[\pm PERF]$ . With respect to their strictly temporal value, i.e. the features TEMPORAL PERSPECTIVE and TENSE LOCATION, they are identical. In order to better understand the implications of this statement, we must recall Kamp and Reyle's treatment of the perfect (partially described in 1.3.3.2).

In a perfect VP, the auxiliary verb and the remaining part of the VP (which includes a past participle) must be distinguished. Following Kamp and Reyle, let us call the remaining part "underlying non-perfect VP", and the eventuality it represents "underlying non-perfect eventuality (state or event)". Kamp and Reyle assume that a perfect VP refers to (i) the result state of the underlying non-perfect eventuality, in the case of events, and (ii) the result state of *the beginning of* the underlying non-perfect eventuality, in the case of states (cf. *ibid.*: 568). In the second case, the result state and the underlying non-perfect eventuality (a state) obviously coincide (at least with respect to their beginning).

Now, it is obvious that the values of TEMPORAL PERSPECTIVE and TENSE LOCATION mentioned in (79) for the perfective forms are values associated with the *result states* and not with their underlying eventualities (the distinction being possibly immaterial for stative descriptions, as said, but not for events). In other words, the "described eventuality" mentioned in (79) is, for the perfect forms, always the result state (witness the constant association of the feature  $[+ STAT]$  with these forms, in Kamp and Reyle's table of p. 601). Morphologically, the temporal features of the perfect forms in (79) are associated with the auxiliary verb: *have* (simple present) / *had* (simple past) / *will have* (simple future) / *would have* (past future) [*lived / read*].

The "relative location" between the underlying eventuality and the TPpt associated with these tense forms *is not* expressed as in (79), but as:

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<sup>31</sup> I ignore here the complications resulting from the ambiguous interpretation of the past perfect (cf. Kamp and Reyle 1993: 598-599).



- (80) a. present perfect (*has read*)  
 $\Sigma$   $\langle$ TPpt coincides with utterance time; *underlying* eventuality before TPpt)  
 b. past perfect (*had read*)  
 $\Sigma$   $\langle$ TPpt before utterance time; *underlying* eventuality before TPpt)  
 c. future perfect (*will have read*)  
 $\Sigma$   $\langle$ TPpt after utterance time; *underlying* eventuality before TPpt)<sup>32</sup>

Notice that the anteriority value “underlying eventuality before TPpt” (which is taken by Peres 1995 as the specific independent contribution of the past participle) is constant here. Note also that these relations in (80) are precisely those mentioned in Reichenbach’s characterisations of perfect tenses: (a) present perfect expresses [E < R = S], (b) past perfect [E < R < S], and (c) future perfect [S < E < R]. This is so because Reichenbach’s Event time (**E**) is, in these cases, precisely the “underlying non-perfect eventuality” and not the associated result state. In other words, Kamp and Reyle’s feature “TENSE” (= RELATIVE LOCATION) and Reichenbach’s relation between **E** and **R** are distinct.

### 2.2.3. The Portuguese tense system (as described in Peres 1993)

In Peres’ (1993) description of the Portuguese tense system, which I basically adopt here, the features TEMPORAL PERSPECTIVE and TENSE LOCATION can have three different values each (like in Reichenbach, modulo terminology differences, and the mentioned overlapping / simultaneity substitution)<sup>33</sup>:

- (81) a. TEMPORAL PERSPECTIVE: past, present, future.  
 b. TENSE LOCATION: anteriority, overlapping, posteriority.<sup>34</sup>

In Portuguese, it is possible to differentiate by means of (simple or compound) tense forms **eight** out of the nine possible combinations of these values. Observe the following table (adapted from Peres 1993), where the compound forms occur in shaded cells<sup>35</sup>:

<sup>32</sup> If the TPpt coincided with utterance time in these cases (as Kamp and Reyle claim), the underlying event would have to be described as *undefined with respect to TPpt* (cf. fn. 19, in 1.3.3.2). As will be seen in the next subsection, the Portuguese counterpart of the future perfect is taken to always involve a future TPpt. I hypothesise that the same analysis is appropriate for the English future perfect.


<sup>33</sup> For other views of the Portuguese tense system, cf. e.g. Mateus *et al.* (1989) and Oliveira & Lopes (1994).

<sup>34</sup> Peres (1993) uses the term RELATIVE LOCATION.

<sup>35</sup> In the selection of the forms in Table 2, I adopt the following view:

“On semantic grounds, it makes sense to put together the eight non-periphrastic forms of the indicative and the simple form of the conditional, disregarding, on one side, all the periphrastic forms, which will certainly in most cases require a modal approach, and, on the other, the compound conditional [cf. English past future perfect], which is semantically closer to the hypothetical value that is usually associated with the subjunctive mood” (Peres 1993: 15).

**Table 2. The Portuguese tense system (“indicativo” + “condicional”)**

		TENSE LOCATION		
		ANTERIORITY	OVERLAPPING	POSTERIORITY
TEMPORAL PERSPECTIVE	PAST [TPpt := o] [o < n]	pretérito mais-que-perfeito simples	pretérito imperfeito	condicional presente (futuro do pretérito)
		pretérito mais-que-perfeito composto		
	PRESENT [TPpt := n]	pretérito perfeito simples	presente	futuro imperfeito
		pretérito perfeito composto	◇ ?	
	FUTURE [TPpt := o] [n < o]	futuro perfeito	futuro imperfeito	

The value POSTERIOR TO A FUTURE is inexpressible in Portuguese by mere tense morphemes and/or temporal auxiliaries. The value ANTERIOR TO A FUTURE is only expressed by compound verb forms, which means – according to what was said before – that it can only involve “underlying eventualities”. The value ANTERIOR TO A PAST can be expressed both by a single verb form and by a compound one, the first one being more formal, and mainly used in written discourse; apart from this fact, there are apparently no significant differences between the simple and the compound forms. The value POSTERIOR TO THE PRESENT and OVERLAPPING WITH A FUTURE are expressed by the same verb form: “futuro imperfeito”. This is similar to what happens with the English simple future, according to Reichenbach’s observations mentioned in the previous section. The values ANTERIOR TO THE PRESENT and OVERLAPPING WITH A PAST – which, according to Kamp and Reyle’s analysis mentioned above, are expressed in English by the same form (the simple past) – are associated with two different single forms in Portuguese: “pretérito perfeito simples” and “pretérito imperfeito” respectively<sup>36</sup>. Note that, depending on the linguistic context, an English simple past may be translated into one or both of these forms, as can be seen in the

<sup>36</sup> If frame adverbials act as frames for TPpts, as is often assumed, then we have to consider that the “pretérito perfeito simples” is also compatible with a past TPpt. This is namely the case in sequences like (82a), with “pretérito perfeito simples” (*o Paulo VIVEU em Amsterdão em 1980*), if we take the TPpt to be (some time within) 1980 – cf. also the possibility of a sentence-initial frame adverbial, that indicates perhaps more clearly that the perspective point can be (in) the past year of 1980: *em 1980, o Paulo VIVEU em Amsterdão*.

Portuguese examples below, with *viveu* (“pretérito perfeito simples”) and/or *vivia* (“pretérito imperfeito”)<sup>37</sup>:

- (82) a. Paulo LIVED in Amsterdam in 1980.  
O Paulo VIVEU / VIVIA em Amsterdão em 1980.
- b. Paulo LIVED in Amsterdam twice in the eighties.  
O Paulo VIVEU / \*VIVIA em Amsterdão duas vezes na década de 80.
- c. At that time, Paulo LIVED in Amsterdam.  
Nessa altura, o Paulo \*VIVEU / VIVIA em Amsterdão.

I take this data to be an indication that the English simple past is genuinely ambiguous. The question is however complex, and I will not discuss it here.

The value ANTERIOR TO THE PRESENT can also be associated with a compound form – “pretérito perfeito composto” – which has some similarities with the English present perfect (and some remarkable differences as well). According to Peres’ (1993, 1995) analysis, the interpretation of this compound form varies according to the aktionsart of the participial phrase (which roughly corresponds to Kamp and Reyle’s “underlying non-perfect VP”):

(i) with stative participial phrases, the “underlying states” may be interpreted as having ended before the utterance time (unlike what is normal for the English present perfect), or extend up to it, the interpretation being open – cf. sentences below, from (Peres 1993: 26); the associated result states obviously overlap with the utterance time:

- (83) a. O Paulo TEM ESTADO muito doente. Não sei se agora já estará recuperado porque não falo com ele há dois dias. (undetermined w.r.t. continuation)  
\*Paulo has been very sick. I don’t know if he has already recovered, because I haven’t talked to him in the last couple of days.
- b. O Paulo TEM ESTADO muito doente. Olha como está pálido.  
(obvious continuation)  
Paulo has been very sick. See how pale he looks.

(ii) with activity and eventive participial phrases: the “underlying activities or events” generally get an iterative interpretation (the exceptions being the subjunctive mood and some restricted instances of the indicative); this is an idiosyncrasy of the “Portuguese present perfect” that has no counterpart in other Romance languages for morphologically comparable expressions<sup>38</sup>.

- (84) O Paulo TEM VISITADO a Ana e nunca a ouviu queixar-se. (Peres 1993: 26)  
Paulo has been visiting Ana, and he never heard her complaining.

I will end this brief description of the Portuguese tense system with some examples, involving the stative verb *morar* (live), in simple forms – in (85) – or in compound ones – in (86):

<sup>37</sup> For an analysis of the Portuguese “pretérito imperfeito”, cf. Oliveira (1986).

<sup>38</sup> In fact, the use of these forms in French, Spanish and Italian has some other remarkable differences from Portuguese, but their consideration is irrelevant here.

- (85) a. O Paulo MOROU em Lisboa.
- Traditional tense name: “pretérito perfeito simples”.
- Proposed name for the tense form in Peres (1993): “anterior a presente”  
(anterior to the present).
- Present Temporal Perspective Point: [TPpt := n].
- Described eventuality anterior to TPpt: [ev < TPpt].
- b. O Paulo MORA em Lisboa.
- Traditional tense name: “presente”.
- Proposed name for the tense form in Peres (1993): “sobreposto a presente”,  
or “presente” for short (overlapping with the present).
- Present Temporal Perspective Point: [TPpt := n].
- Described eventuality overlapping with TPpt: [ev ○ TPpt].
- c. O Paulo MORARÁ em Lisboa.
- Traditional tense name: “futuro imperfeito”. Ambivalent form:
- (i)
- Proposed name for the tense form in Peres (1993): “posterior a presente”  
(posterior to the present).
- Present Temporal Perspective Point: [TPpt := n].
- Described eventuality posterior to TPpt: [TPpt < ev].
- (ii)
- Proposed name for the tense form in Peres (1993): “sobreposto a futuro”  
(overlapping with a future).
- Future Temporal Perspective Point: [TPpt := o], [n < o].
- Described eventuality overlapping with TPpt: [ev ○ TPpt].
- d. O Paulo MORARA em Lisboa.
- Traditional tense name: “pretérito mais-que-perfeito simples”.
- Proposed name for the tense form in Peres (1993): “anterior a passado”  
(anterior to a past).
- Past Temporal Perspective Point: [TPpt := o], [o < n].
- Described eventuality anterior to TPpt: [ev < TPpt].
- e. O Paulo MORAVA em Lisboa.
- Traditional tense name: “pretérito imperfeito”.
- Proposed name for the tense form in Peres (1993): “sobreposto a passado”  
(overlapping with a past).
- Past Temporal Perspective Point: [TPpt := o], [o < n].
- Described eventuality overlapping with TPpt: [ev ○ TPpt].

- f. O Paulo MORARIA em Lisboa.
- Traditional tense name: “condicional presente” (Portuguese terminology) or “futuro do pretérito” (Brazilian terminology).
- Proposed name for the tense form in Peres (1993): “posterior a passado” (posterior to a past).
- Past Temporal Perspective Point:  $[TPpt := o], [o < n]$ .
- Described eventuality posterior to TPpt:  $[TPpt < ev]$ .
- (86) a. O Paulo TEM MORADO em Lisboa.
- Traditional tense name: “pretérito perfeito composto”.
- Composition: auxiliary verb in “presente” + “particípio passado” (past participle).
- The compound form expresses: “sobreposto a presente” (overlapping with the present), with respect to the result state, and “anterior a presente extensível” (extendable anterior to the present) – cf. Peres 1993 –, with respect to the underlying eventuality.
- Present Temporal Perspective Point:  $[TPpt := n]$ .
- Described result state **ev'** overlapping with TPpt:  $[ev' \circ TPpt]$ .
- Underlying state **ev** anterior to TPpt:  $[ev < TPpt]$  (but may extend up to TPpt:  $[ev \circ TPpt]$ ).
- b. O Paulo TINHA MORADO em Lisboa.
- Traditional tense name: “pretérito mais-que-perfeito composto”.
- Composition: auxiliary verb in “pretérito imperfeito” + “particípio passado”.
- The compound form expresses: “sobreposto a passado” (overlapping with a past), with respect to the result state, and “anterior a passado” (anterior to a past), with respect to the underlying eventuality.
- Past Temporal Perspective Point:  $[TPpt := o], [o < n]$ .
- Described result state **ev'** overlapping with TPpt:  $[ev' \circ TPpt]$ .
- Underlying state **ev** anterior to TPpt:  $[ev < TPpt]$ .
- c. O Paulo TERÁ MORADO em Lisboa.
- Traditional tense name: “futuro perfeito”.
- Composition: auxiliary verb in “futuro imperfeito” + “particípio passado”.
- The compound form expresses: “sobreposto a futuro” (overlapping with a future), with respect to the result state, and “anterior a futuro” (anterior to a future), with respect to the underlying eventuality.
- Future Temporal Perspective Point:  $[TPpt := o], [n < o]$ .
- Described result state **ev'** overlapping with TPpt:  $[ev' \circ TPpt]$ .
- Underlying state **ev** anterior to TPpt:  $[ev < TPpt]$ .



# Chapter 3

## Discourse Representation Theory: a formal framework for analysis

Discourse Representation Theory, a semantic theory for natural language developed in the beginning of the eighties by Hans Kamp (1981), provides – in the version presented in Kamp and Reyle (1993), which I take as a basis for this dissertation – one of the most comprehensive treatments of temporal phenomena available in the literature, incorporating the basic insights of the works of Reichenbach (1947), Vendler (1967), Davidson (1967) and Link (1983). It is not my purpose to make here an extensive presentation of this semantic theory. Rather, I will merely underline, in a schematic way, some of its aspects that are particularly relevant for the issues to be tackled in this dissertation. It must also be noted that I will not discuss, in this chapter, the adaptations and extensions of this framework that I will propose (in Parts II and III of this dissertation), although I will point out some of them.

### 3.1. Some basic general aspects

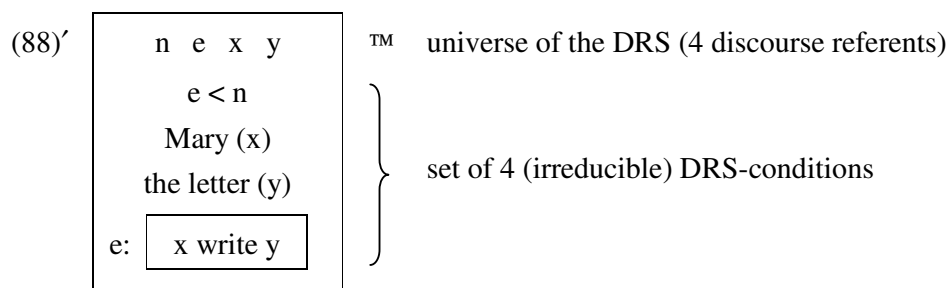
In DRT, “interpretation – i.e. the identification of meaning – involves a two stage process: first, the construction of semantic representations, referred to as Discourse Representation Structures (DRSs) from the input discourse and second, a model-theoretic interpretation of those DRSs” (FraCaS 1994: 11). I will focus here on some particularly relevant aspects of the first of these two stages.

The algorithm for DRS-construction presented in Kamp and Reyle (1993: 86) is as follows:

(87)	<div>DRS-Construction Algorithm</div> <div> <p><b>Input:</b> a discourse <math>D = S_1, \dots, S_i, S_{i+1}, \dots, S_n</math> the empty DRS <math>K_0</math></p> <p><b>Keep repeating for</b> <math>i = 1, \dots, n</math>:</p> <ul style="list-style-type: none"> <li>(i) add the syntactic analysis <math>[S_i]</math> of (the next) sentence <math>S_i</math> to the conditions of <math>K_{i-1}</math>; call this DRS <math>K_i^*</math>. Go to (ii).</li> <li>(ii) Input: a set of reducible conditions of <math>K_i^*</math> Keep on applying construction principles to each reducible condition of <math>K_i^*</math> until a DRS <math>K_i</math> is obtained that only contains irreducible conditions. Go to (i).</li> </ul> </div>
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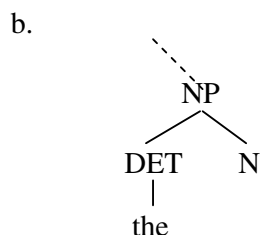
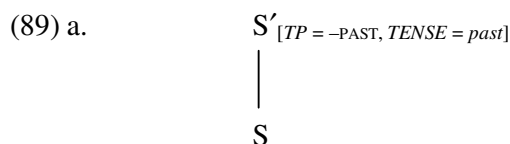
A DRS is a structure, resulting from the application of this algorithm, which consists of two components: (i) a set of **discourse referents**, called the *universe* of the DRS, and (ii) a set of **DRS-conditions**. DRSs are often represented in the so-called *box notation*, where the universe is displayed at the top of the box, and the set of DRS-conditions below it. Let us look at a simplified example (where the information about the location time is omitted), from Kamp and Reyle (1993: 516):

(88) Mary wrote the letter.



Discourse referents are “formal representatives” in the DRT-language of the entities the discourse talks about; in this example, **x** represents Mary, **y** the written letter, **e** the writing event and **n** the utterance time. DRS-conditions are formulas containing discourse referents which indicate the predications made in the discourse – e.g. [Mary (x)] (**x** is the bearer of the name Mary), [e < n] (the writing event precedes the utterance time).

DRSs are obtained from the successive application of **DRS-construction rules**, which take as input **triggering configurations** (resulting from a syntactic analysis of the discourse), as for instance (89a), whose processing introduces the condition [e < n]<sup>39</sup>, or (89b), whose processing introduces the condition [the letter (y)]:



<sup>39</sup> This is slightly different in Kamp and Reyle’s final proposal, where this step introduces the condition [t < n], and a further step, at the VP’-level, introduces the condition [e ⊆ t], whence [e < n] can be inferred. This difference is however immaterial at this moment.



Construction rules may involve different types of **operations**, among which:

- (i) **Introduce** elements, namely discourse referents and DRS-conditions, in the DRS.
- (ii) **Replace** elements of the DRS – e.g. replace configurations by discourse referents or replace some triggering configurations by others.

In a replacement operation, it is possible to **pass down** information from one syntactic node to another, which is hierarchically lower. This procedure is used, for instance, to pass down the argumental discourse referents of verbs from the S' (or VP') level to the V-level (cf. Kamp and Reyle 1993: 532). Together with the mechanism that allows semantic features to **percolate up** the syntactic trees (cf. next subchapter), this procedure provides a quite flexible (top-down) algorithm, where the semantic information can, as it were, “flow up and down” the relevant configurations.

- (iii) **Choose** elements required for the semantic interpretation – e.g. temporal perspective points, reference points, or suitable antecedents for pronouns.

Observe the following example of a (preliminary) DRS-construction rule, involving the three different types of operations just mentioned (Kamp and Reyle 1993: 122):

CR.PRO	
<b>Triggering configuration</b> $\gamma \subseteq \gamma' \in \text{Con}_K$ :	<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <math display="block">  \begin{array}{c}  S \\  \swarrow \quad \searrow \\  \text{NP}_{\text{Gen}=\beta} \quad \text{VP}' \\    \\  \text{PRO} \\    \\  \alpha  \end{array}  </math> </div> <div style="margin: 0 10px;"> <math>\left\{ \begin{array}{c} \text{or:} \\ \end{array} \right.</math> </div> <div style="text-align: center;"> <math display="block">  \begin{array}{c}  \text{VP} \\  \swarrow \quad \searrow \\  \text{V} \quad \text{NP}_{\text{Gen}=\beta} \\    \\  \text{PRO} \\    \\  \alpha  \end{array}  </math> </div> </div>
<b>Choose suitable antecedent <math>v</math>,</b>	such that $v$ is accessible and $\text{Gen}(v) = \beta$
<b>Introduce in <math>U_K</math>:</b>	new discourse referent $u$
<b>Introduce in <math>\text{Con}_K</math>:</b>	new conditions $u = v$ , $\text{Gen}(u) = \beta$ :
<b>Substitute in <math>\gamma'</math>:</b>	<div style="display: flex; align-items: center;"> <math>u</math> <span style="margin: 0 10px;">for</span> <div style="text-align: center;"> <math display="block">  \begin{array}{c}  \text{NP}_{\text{Gen}=\beta} \\    \\  \text{PRO} \\    \\  \alpha  \end{array}  </math> </div> </div>

The diversity of operations that can be carried out in the DRS-construction process clearly shows that “DRT provides a **dynamic conception of meaning** which is based on the observation that a human recipient of a discourse is able to process discourse on-line in an incremental fashion and the fact that new pieces of discourse are interpreted against the context established by already processed discourse” (FraCaS 1994: 11, my emphasis). In sum, this framework assumes that “the meaning of a linguistic expression consists both in its update potential and its truth-conditional import in the resulting representation” (*ibid.*).


To end up this introductory subsection, it is still worth making some observations about certain types of DRS-conditions. As said above, the final representation of a sentence or discourse resulting from the application of the DRS-construction algorithm – called a *completed DRS* – contains only **irreducible conditions**, i.e. conditions that cannot be decomposed any further. This is the case of the four conditions presented in (88’). However, in the process of DRS-construction, before the completed DRS is achieved, many intermediate stages produce **reducible conditions**, i.e. conditions which contain a triggering configuration for some construction rule (cf. algorithm described in (87)). Reducible conditions, it is important to note, are processed in a top-down fashion, in Kamp and Reyle’s system:

“A reducible condition  $\gamma$  must be reduced by applying the appropriate rule to its *highest* triggering configuration, i.e. that triggering configuration  $\tau$  such that the highest node of  $\tau$  dominates the highest node of any triggering configuration that  $\gamma$  contains” (Kamp and Reyle 1993: 87).

However, the order of reduction is indeterminate whenever two reducible conditions are “incomparable”, i.e. do not stand to each other in a hierarchical relation:

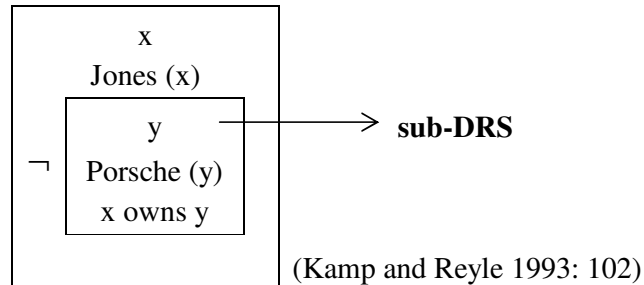
“Where a DRS contains two or more [reducible] (...) conditions (...) it is indeterminate which of these is to be reduced first. (...) this [order] indeterminacy is intentional. It is needed because which of the two reducible conditions is to be processed first may vary from case to case” (*ibid.*: 88).

Finally, it is important to distinguish two types of irreducible conditions (cf. *ibid.*: 110): (i) **complex conditions**, i.e. conditions that contain one or more DRSs – called **sub-DRSs** – as components; (ii) **simple** or **atomic conditions**, i.e. those that do not contain sub-DRSs, like the relatively simple conditions we encountered in (88’). Complex conditions occur in association with negation, conditionals, disjunction, or quantifiers (Q) like *all*, *most* or *every*, for example. They are illustrated in the formulae below (where  $K_i$  stands for a sub-DRS):

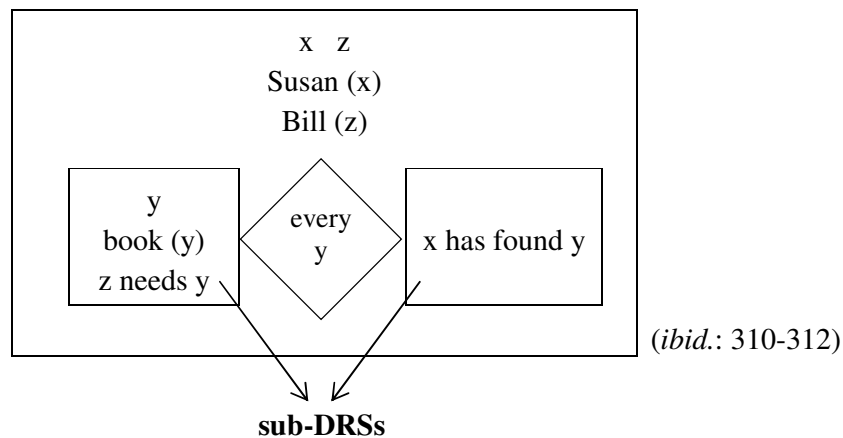
- (90) a.  $\neg K_1$   
 b.  $K_1 \Rightarrow K_2$                       implicative condition (cf. p. 144)  
 c.  $K_1 \vee \dots \vee K_n$                 disjunctive condition (cf. p. 185)  
 d.       duplex condition (cf. p. 311)

Observe the following (simplified) representations that include this type of DRS-conditions:

- (91) a. Jones does not own a Porsche.



- b. Susan has found every book which Bill needs.



These internal boxes stand in a *subordination relation* to the DRS in which they are included. This relation plays a central role in DRT, since it is crucial for determining the *accessibility* of discourse referents to pronouns looking for an antecedent, thus providing the basic tools for the DRT account of anaphoric links (cf. Kamp and Reyle 1993: 154-155).

Finally, it is important to note that the semantic import of discourse referents may vary according to their structural position:

“discourse referents in the top box of a DRS are endowed with existential force” (FraCaS 1994: 12)

«Discourse referents have a double function. On the one hand they serve as antecedents for anaphoric expressions such as pronouns, on the other hand they act as the bound variables of a quantification theory. This second function entails that discourse referents must be able to stand to each other in certain scope relations. To mark these relations we must introduce the concept of a “SubDRS”» (ibid.: 13).

### 3.2. Basic ingredients of the DRT temporal analysis (in the version of Kamp and Reyle 1993)

In this subchapter, I will present a schematic overview of the basic elements of Kamp and Reyle's analysis of temporality, focussing on the following aspects: (i) different ontological categories incorporated in the system, (ii) aspects pertaining to the treatment of plurality, (iii) distinguished times, (iv) temporal features, (v) aspectual features, (vi) temporal functors, (vii) temporal relations and (viii) treatment of the aktionsart shift.

#### A. ONTOLOGICAL CATEGORIES

The basic ingredients of the temporal ontology of Kamp and Reyle's system are **eventualities** (states and events), **times** and **amounts of times**. Besides these entities, the model contains the set of "ordinary individuals", **U**.

##### I. times

The DRT version of Kamp and Reyle (1993) includes two interdependent structures: the structure of instants  $T$ , and the structure of intervals  $Int(T)$ . The instant structure (or time structure) is taken to be an irreducible primitive and an essential component of the model. It is a linear ordering –  $\langle T, < \rangle$  – and has the structural properties of the set of real numbers:

"[we propose to] adopt time as a primitive category (...), [and] stipulate that it has the structural properties of **IR** (...)" (Kamp and Reyle 1993: 671).

The interval structure is derived from the instant structure:

"intervals are readily defined from instants, viz. as the *convex* subsets of instants, i.e. as those instant sets  $X$  such that if  $i_1, i_2 \in X$  and  $i_1 < i_3 < i_2$ , then  $i_3 \in X$ .

Given any instant structure  $T = \langle T, < \rangle$ , we let  $Int(T)$  be the interval structure *derived from*  $T$ , i.e. the structure  $\langle \mathbf{Int}, <_p, \circ_p \rangle$  where **Int** is the set of convex subsets of  $T$  and  $<_p$  and  $\circ_p$  are defined as [follows:]

(...) Let  $X, Y$  be intervals of an instant structure  $T = \langle T, < \rangle$ . Then

- (i)  $X <_p Y$  iff for all  $i_1 \in X$  and  $i_2 \in Y$ ,  $i_1 < i_2$ .
- (ii)  $X \circ_p Y$  iff  $X \cap Y \neq \{ \}$ .
- (iii)  $X \subseteq_p Y$  iff for every instant  $i \in X$ ,  $i \in Y$ " (*ibid.*: 668).

The time structure is related to structure of eventualities via the function LOC (cf. **F.I** below).

##### II. eventualities (states and events)

In Kamp and Reyle's DRT, eventualities – both states and events – are taken as ontologically irreducible entities (cf. pp. 672-674). The authors opt for this approach after discussing ontologies that do not have events and/or states as primitive entities (cf. specially pp. 500-510 and 664 ff.). The set of eventualities **EV** is assumed to be the reunion of two subsets: that of events (**E**) and that of states (**S**).

Other DRT-based works, like Smith (1991) or Swart (1998: 381), use similar models, but with more sorts of basic eventualities. Swart, for instance, distinguishes three basic categories – states, processes and events – and two “supercategories” – homogeneous eventualities and dynamic eventualities:

“The model  $M$  is a structure consisting of: (...)

A set  $\mathcal{E}_M$  of eventualities such that  $\mathcal{E}_M = S_M \cup P_M \cup E_M$  where  $S_M$  is the set of states,  $P_M$  is the set of processes, and  $E_M$  is the set of events,  $S_M \cup P_M$  constitutes the supercategory of homogeneous eventualities.  $P_M \cup E_M$  constitutes the supercategory of dynamic eventualities (...)” (Swart 1998: 381).

As said in the previous section, in this dissertation I will use, as a rule, a two-sort classification of eventualities, consisting namely of atelic eventualities (corresponding to Swart’s supercategory of homogeneous eventualities) and telic eventualities, or events.

### III. amounts of times

Amounts of time are conceived of as equivalence classes of intervals of equal duration, as defined by the equivalence relation ‘ $\equiv$ ’ (which is an essential component of the model):

«There is one more ontological category which our models must accommodate. This is the category of amounts of time. (...) we proposed to identify amounts of times with equivalence classes of intervals of “equal duration”» (Kamp and Reyle 1993: 674).

‘ $\equiv$ ’ is defined as an equivalence relation on the interval structure –  $Int(T)$  – which satisfies the following two postulates (*ibid.*: 675):

- (92) a. For any intervals  $\mathbf{a}, \mathbf{b}$  either there is an interval  $\mathbf{f}$  such that  $\mathbf{a} \equiv \mathbf{f} \subseteq \mathbf{b}$   
or there is an interval  $\mathbf{g}$  such that  $\mathbf{b} \equiv \mathbf{g} \subseteq \mathbf{a}$ .
- b. If  $\mathbf{a} \subseteq \mathbf{b} \equiv \mathbf{c} \subseteq \mathbf{d} \equiv \mathbf{a}$  then  $\mathbf{a} \equiv \mathbf{b}$ .

The different sorts of entities included in the model are represented in the DRT-language by **different sorts of discourse referents**, typographically distinguished as follows (cf. Kamp and Reyle 1993: 676):

- (93) a. ordinary individuals:  $x_1, x_2, \dots$
- b. times:  $t_1, t_2, \dots$
- c. events:  $e_1, e_2, \dots$
- d. states:  $s_1, s_2, \dots$
- e. amounts of times:  $mt_1, mt_2, \dots$

In this dissertation, I will follow these representational conventions, with some minor adaptations<sup>40</sup>. In particular, I will use the discourse referents  $\mathbf{e}_1, \mathbf{e}_2, \dots$  for achievements and

<sup>40</sup> Like Kamp and Reyle (1993), I will sometimes use the following notational variants: (i) primes instead of numerical subscripts to distinguish discourse referents of the same type (e.g.  $t', t'', t''', \dots$ ); (ii) different letters

accomplishments, but not for activities. This is motivated essentially by the fact that activities, as was observed in the previous chapter, seem to behave like states and unlike telic eventualities in many aspects that concern temporal location. I may also, in some contexts, use the discourse referents  $s_1, s_2, \dots$  to represent not only states but also activities (i.e. any type of atelic eventualities). Finally, for simplification, I will also use the discourse referents  $ev_1, ev_2, \dots$  as a cover typographic notation for any sort of eventuality (irrespective of its aktionsart type):

- |         |  |                     |
|---------|--|---------------------|
| (94) a. | states and activities (atelic eventualities):    | $s_1, s_2, \dots$   |
| b.      | achievements and accomplishments (events):       | $e_1, e_2, \dots$   |
| c.      | eventualities (irrespective of aktionsart type): | $ev_1, ev_2, \dots$ |

## B. PLURALITY

DRT incorporates the algebraic approach to the study of plurality devised in the work of Link (1983). In Kamp and Reyle's system, the domain of ordinary individuals (in particular) has a lattice structure, allowing a distinction between atomic and non-atomic (or plural) entities. At the level of discourse representation, the former are marked by **atomic discourse referents**, associated with the condition (95a) below, and the latter by **non-atomic discourse referents**, associated with the condition (95b):

- (95) a. [at (x)]  
b. [non-at (x)]

The interpretation of these conditions is done according to the following definitions (where  $M$  is a model, and  $f$  an embedding function, as described in Kamp and Reyle 1993: 425 ff.):

- (96) a.  $M \models_f \mathbf{at}(\mathbf{x})$  if  $f(\mathbf{x})$  is an atom of  $M$   
b.  $M \models_f \mathbf{non-at}(\mathbf{x})$  if  $f(\mathbf{x})$  is a non-atomic entity of  $M$  (*ibid.*: 426)

Moreover, representations may include **neutral discourse referents** that can represent either type of entities. For notational simplification, Kamp and Reyle resort to lower and upper case letters to distinguish atomic and non-atomic discourse referents (thus avoiding the insertion of condition of type (95) in the DRS's): "we will (...) make use of lower and upper case letters, but only as convenient shorthands for neutral discourse referents with [the conditions [at (x)] and [non-at (x)], where  $\mathbf{x}$  is a neutral discourse referent] (...) attached" (p. 332). I will also use these notational conventions, and will furthermore use Greek letters (as the authors also sometimes do) to represent neutral discourse referents:

- (97) a.  $\mathbf{x}$  – atomic individual discourse referent  
b.  $\mathbf{X}$  – non-atomic individual discourse referent  
c.  $\chi$  – neutral (atomic / non-atomic) discourse referent

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(x, y, z,...) instead of numerical subscripts to distinguish discourse referents for ordinary individuals; (iii) discourse referents with no subscript (e.g. e, t, mt,...).

The inclusion of plural entities in the model also directly affects the denotation of predicates. Accordingly, the DRT-language includes an operator – “\*” – that transforms predicates of atomic individuals (i.e. expressions that denote sets of atoms) into predicates of both atomic and non-atomic individuals:

“We follow Link in using the operator ‘\*’ to transform a predicate  $P$  of individuals into one which is true not only of those individuals, but also of all collections consisting exclusively of such individuals. In other words, if  $\mathbf{X}$  is a set of atoms of some upper semilattice  $U$ ,  $\mathbf{X}^*$  will be the set of all elements  $\mathbf{a}$  of  $\mathbf{U}$  such that  $(\forall \mathbf{b} \subset \mathbf{a})$   $(\text{At}(\mathbf{b}) \rightarrow \mathbf{b} \in \mathbf{X})$ ” (Kamp and Reyle 1993: 406)<sup>41</sup>.

The DRT-language still contains representations of several operators or relations which are directly associated with the treatment of plurality. The following four (defined in Kamp and Reyle 1993: 426) are particularly important:

### I. summation: “ $\oplus$ ”

Atoms of the universe can be combined to form plurals entities by way of a summation operation, expressed by the symbol “ $\oplus$ ”. Thus, a condition of the form (98a) below, interpreted according to (98b)<sup>42</sup>, expresses that the collective entity  $\mathbf{X}$  is formed by the two atoms  $x_1$  and  $x_2$ :

- (98) a.  $[X = x_1 \oplus x_2]$   
 b.  $M \models_f \mathbf{x} = \mathbf{y}_1 \oplus \dots \oplus \mathbf{y}_n$  iff  $f(\mathbf{x}) = f(\mathbf{y}_1) \oplus_M \dots \oplus_M f(\mathbf{y}_n)$

### II. abstraction: “ $\Sigma$ ”

An individual sum  $\mathbf{X}$  may represent the set of all individuals  $\mathbf{x}$  that satisfy a given condition or set of conditions  $\gamma$ . This is represented by a condition of the form (99a) below (where  $\mathbf{K}'$  is a sub-DRS containing  $\mathbf{x}$ , in its universe, and the set of conditions  $\gamma$ ), interpreted according to (99b):

- (99) a.  $[X = \Sigma_{\mathbf{x}} \mathbf{K}']$   
 b.  $M \models_f \mathbf{x} = \Sigma_{\mathbf{z}} \mathbf{K}'$  iff  $f(\mathbf{x}) = \bigvee \{\mathbf{b} : \mathbf{b} \in U_M \text{ \& } M \models_{f \cup \{ \langle \mathbf{z}, \mathbf{b} \rangle \}} \mathbf{K}'\}$ <sup>43</sup>

<sup>41</sup> In the discourse representations, the star operator occurs not only with predicates that apply to non-atomic discourse referents – e.g.  $[\text{book}^*(X)]$  – but also with those that apply to atomic discourse referents – e.g.  $[\text{book}^*(x)]$ . Nevertheless, for notational simplification, conditions of the latter type are often represented without the star operator, i.e. as  $[\text{book}(x)]$  – cf. Kamp and Reyle (1993: 338). I will use this notation as well.

<sup>42</sup> There are differences in notation between (98a) and (98b): the first is in accordance with the conventions concerning lower and upper case letters adopted here; the second is in accordance with the original formulation in Kamp and Reyle (1993: 426). The same applies to parallel cases presented below for abstraction, the part-of relation and cardinality.

<sup>43</sup> I replaced the summation symbol “ $\oplus$ ” (occurring in Kamp and Reyle 1993: 426) by the supremum symbol “ $\bigvee$ ” (as in FraCaS 1994: 25).

### III. (atomic) part-of relation: “ $\epsilon$ ”

The fact that a given atom  $\mathbf{x}$  is part of an individual sum  $\mathbf{X}$  is expressed via a condition of the form (100a), interpreted according to (100b):

- (100) a.  $[x \in X]$   
b.  $M \models_f \mathbf{x} \in \mathbf{y}$  iff  $f(\mathbf{x})$  is an atom of  $M$  and  $f(\mathbf{x}) \subset_M f(\mathbf{y})$   
(where  $\subset$  is a partial order as described in Kamp and Reyle 1993: 401 ff.)

### IV. cardinality: “ $l \dots l$ ”

The cardinality of a sum  $\mathbf{X}$ , i.e. the number of its atomic members, is expressed via conditions of the form (101a) below (where  $n$  is a natural number), interpreted according to (101b):

- (101) a.  $[|X| = n], [|X| \geq n], [|X| < n], \dots$   
b.  $M \models_f |\mathbf{x}| = v$  iff  $|\{\mathbf{b} \in U_M : \mathbf{b} \text{ is an atom of } M \ \& \ \mathbf{b} \subset_M f(\mathbf{x})\}| = v$

Kamp and Reyle (1993) use a Boolean structure essentially for the domain of ordinary individuals. As we will see in more detail later on, it is crucial for the semantic analysis of temporal locating adverbials that this lattice-theoretical approach is extended to the domain of eventualities (an algebraic structure of this domain being today currently assumed in the literature – cf. Bach 1986) and to the domain of times. Accordingly, and using the notational conventions alluded to before, I will make distinctions as the following, for instance:

- (102) a. **e** – atomic event discourse referent  
b. **E** – non-atomic event discourse referent  
(103) a. **t** – atomic time discourse referent  
b. **T** – non-atomic time discourse referent

## C. DISTINGUISHED TIMES

In Kamp and Reyle’s temporal system, some times have a special status. I will mention four of them: (i) the utterance time, (ii) the temporal perspective point, (iii) the reference point, and (iv) the location time.

### I. utterance time: “ $n$ ”

This is the time when the utterance takes place. Its status – as a punctual or a non-punctual interval – is disputable:

“the utterance time *is* conceived as punctual, just as the time denoted by the word **now**”<sup>44</sup> (Kamp and Reyle 1993: 539), even though: “(...) utterances take time; they last

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<sup>44</sup> Some facts about Portuguese *agora* (the counterpart of English *now*) seem to indicate that the time denoted by this expression is not punctual; rather, it is “big enough” to cover the (present)



through many moments, and not for a single ('big') indivisible one. So utterances present themselves as intervals, not instants" (*ibid.*: 501).

The utterance time is represented in Kamp and Reyle (1993) by a special discourse referent **n**, which is assumed to be part of the context DRS before the processing of the first sentence of any discourse:

"The discourse referent **n** will be assumed to be part of the context DRS even before the processing of its first sentence has started. In other words the initial DRS is never empty" (*ibid.*: 517, fn. 15).

## II. temporal perspective point: "TPpt"

Kamp and Reyle (1993) adopt a Reichenbachian view of tense, incorporating a notion that is close to Reichenbach's *reference time*. However, these authors distinguish between the "reference time" needed to account for complex tenses like the past perfect ( $E < R < S$ : Event Time before Reference Time before Speech Time) and the "reference time" needed to account for narrative progression, for instance, in "extended flashbacks" with Past Perfect (cf. observations about Rpt below). The first "reference time" is called **temporal perspective point**, the second **reference point**:

"there are two distinct *notions* of reference time, which play entirely different roles. It is crucial that we keep these two notions apart. (...) We propose to retain the term *reference point*, or *Rpt*, for the type of reference time which accounts for narrative progression. (...) For reference times that arise in the two-dimensional analysis of the past perfect, we will use the term *temporal perspective point*, or *TPpt*" (Kamp and Reyle 1993: 594-595).

The TPpt is a notion crucially associated with the tense form of the verb, and therefore involved in the temporal location of eventualities. As was already said in the previous chapter, in the system devised by Kamp and Reyle, the TPpt is involved in two different types of relations (cf. *ibid.*: 598):

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utterance time and some short period around it – both in its past and in its future – within which non-present events described in sentences with *agora* are said to take place. In fact, on the one hand, Portuguese *agora* can combine with the "pretérito perfeito simples", provided that the event described happened right before, or shortly before, the utterance time:

- (i) O Paulo saiu agora (mesmo). / "Paulo left (right) now"
- (ii) Percebi agora o que se passava. / "I understood now what was happening"

On the other hand, *agora* can combine with futurate forms ("presente", the periphrastic form "*ir* + INFINITIVE" or, less commonly, "futuro imperfeito"), provided that the event described is bound to happen right after, or shortly after, the utterance time:

- (iii) O Paulo {sai / vai sair / sairá} agora.  
"Paulo {leaves / is going to leave / will leave} now"

- (i) Relation with the utterance time: **R (TPpt, n)**.

This is called *TEMPORAL PERSPECTIVE* and corresponds to Reichenbach's relation between **R** (reference time) and **S** (speech time).

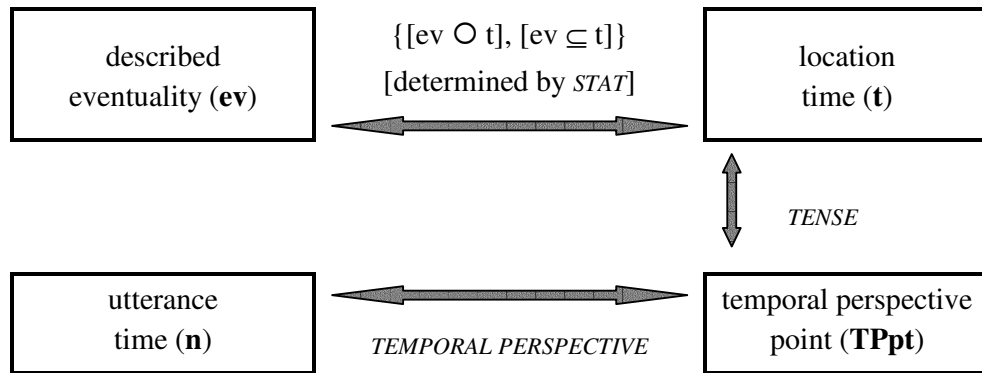
- (ii) Relation with the location time of the described eventuality: **R' (TPpt, t)**.

This is called *TENSE* and is comparable to – though different from (cf. 2.2) – Reichenbach's relation between **R** (reference time) and **E** (event time).

Note that Kamp and Reyle opt (in the final formulation of their system) for a direct relation between the TPpt and the *location time* of the described eventuality, rather than directly with the described eventuality, that is, *TENSE* expresses **R (TPpt, t)** rather than **R (TPpt, ev)**:

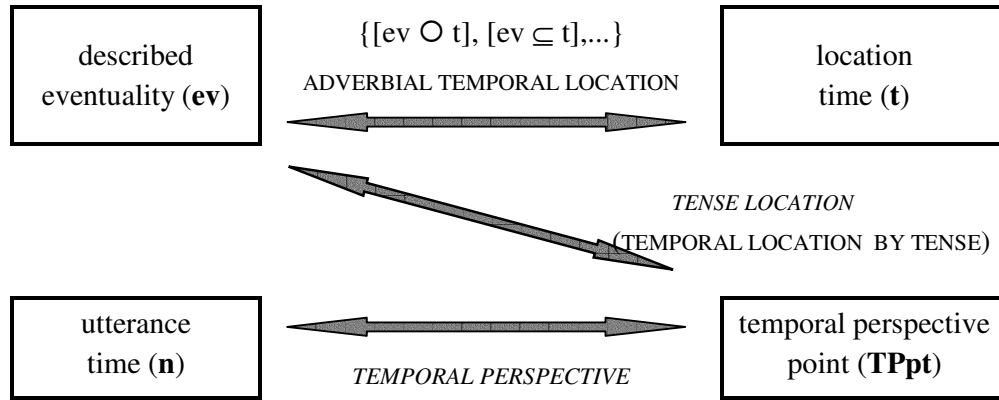
“[we adopt the option of] expressing the temporal relation between described eventuality and utterance time (...) indirectly, by relating the location time of the eventuality to **n** and relating the eventuality to its location time” (Kamp and Reyle 1993: 515-516).

This indirect relation, via the location time, makes their system slightly different from Reichenbach's. Observe the following schema that includes the two mentioned relations, plus the relation between the location time and the described eventuality (which is essentially determined by the aktionsart of the described eventuality in Kamp and Reyle 1993 – cf. pp. 543, 554):



**Figure 1. Temporal relations in the sentence (Kamp and Reyle 1993)**

As I will show in the next chapter (section 4.2.2.3), Kamp and Reyle's indirect relation between the described eventuality (**ev**) and the TPpt proves hardly compatible with the data provided by temporal adverbials. I will therefore drop it and assume a direct relation between these two entities, which expresses, in sum, the temporal location by the tense form of the verb. This – as expressed in Figure 2 – is closer to Reichenbach's system (as we can see from the description made in the previous chapter). Furthermore, I will also advocate (in section 4.2.2.1) that the relation between **ev** and **t** should be directly associated with the temporal locating adverbial (though with a sensitivity to the aktionsart values of the sentence). Therefore, the system I will adopt looks more like the following (cf. also Figure 3, on page 99).



*Figure 2. Temporal relations in the sentence (adopted version)*

### III. reference point: “Rpt”

As mentioned above, Kamp and Reyle distinguish two “notions of reference time”. One, the TPpt, is, as described above, directly involved in the treatment of verb tenses. The other, the Rpt, is more closely connected with the concept of narrative progression, as illustrated in the following example, given by the authors:

- (104) Fred arrived at 10. He had got up at 5; he had taken a long shower, had got dressed and had eaten a leisurely breakfast. He had left the house at 6:30.  
(Kamp and Reyle 1993: 594)

In this sentence, all the perfect clauses have the time of Fred’s arrival as TPpt. However, these clauses form a narrative sequence, with the described events following each other in the order they are presented. In other words, as Kamp and Reyle put it, «each clause provides a “reference time” for the clause following it – a time which the eventuality described by the second clause must follow or overlap» (*ibid.*: 594). It is this type of “reference time” that Kamp and Reyle term **reference point**.

Given that in this dissertation I focus on single sentences, the questions pertaining to narrative progression and the notion of Rpt will be ignored, as a rule.

### IV. location time: “t”

In Kamp and Reyle’s system, the processing of every new sentence, with or without a temporal locating adverbial, triggers the introduction of a time discourse referent **t** – called **location time** – which represents the interval involved in the location of the eventuality **ev** described in the sentence (cf. construction rules in Kamp and Reyle 1993: 543, 610). The temporal location condition, which relates **t** and **ev**, varies essentially according to the aktionsart of the described eventuality:  $[ev \subseteq t]$  (if **ev** represents an event) or  $[ev \cap t]$  (if **ev** represents a state).

The discourse referent **t** is typically affected, in Kamp and Reyle's system, by two operators in the sentence: the tense of the main clause and the temporal locating adverbials (whenever they occur). In particular: (i) the tense of the main clause imposes conditions such as [t < TPpt] (past), [t = TPpt] (present) or [t > TPpt] (future) – cf. p. 610; (ii) a temporal adverbial **Adv** introduces a condition [Adv (t)], which records the “constraint which the adverb imposes on the location time” (p. 516). I will follow Kamp and Reyle in neither of these two assumptions. This issue will be discussed in chapter 4.

#### D. TEMPORAL FEATURES

As already mentioned, Kamp and Reyle's system incorporates two temporal features, which express distinguished relations between times: *TENSE* and *TEMPORAL PERSPECTIVE* (*TP*):

“Since our revised theory of tense is two-dimensional, we need two temporal features rather than one, one feature to indicate the relation between TPpt and utterance time and one to indicate the relation between the location of the described eventuality and the TPpt” (Kamp and Reyle 1993: 598).

These temporal features, just like the aspectual ones (cf. **E** below), are attached to syntactic nodes, and can percolate up the syntactic configurations:

«We will assume that these aspects can “percolate up” the tree so that they are available at the nodes where they are needed and that they are given in the form of “feature assignments”» (*ibid.*: 512).

#### I. TEMPORAL PERSPECTIVE (*TP*)

As said before, in Kamp and Reyle's system, the utterance time is directly related to the TPpt, supplying a past or non-past “temporal perspective” for the sentence:

“The [feature] (...) T(emporal) P(erspective) (...) determines the relationship between TPpt and utterance time. It has two values, *+PAST* (meaning that TPpt lies before utterance time) and *–PAST* (meaning that TPpt and utterance time coincide)” (Kamp and Reyle 1993: 598).

As we saw in the previous chapter, in Peres' (1993) analysis of the Portuguese tense system, which I adopt, this feature has three (rather than two) values: *PAST*, *PRES* and *FUT*.

#### II. *TENSE*

As also said, in Kamp and Reyle's system, the TPpt is related directly with the location time of the described eventualities (and indirectly with the described eventualities themselves). The feature expressing this relation is called *TENSE* and has three values: *past*, *pres*, and *fut*.

“The (...) feature which determines the relation between the location time of the described eventuality and the TPpt will be called *TENSE*” (Kamp and Reyle 1993: 598).

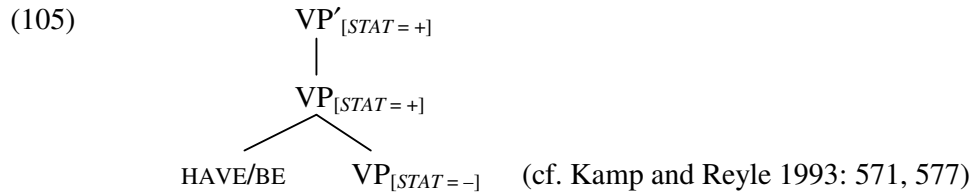
Once more in Peres (1993), which I follow, this feature – which I term *TENSE LOCATION* – has three (parallel) values: *anterior* (ANT), *overlapping* (OVERL) and *posterior* (POST).

## E. ASPECTUAL FEATURES

Kamp and Reyle (1993) make use of two aspectual features: *STAT* and *PERF*.

### I. *STAT*

The feature *STAT*, which distinguishes states ( $[STAT = +]$ ) from events ( $[STAT = -]$ ), is crucial for adverbial temporal location. In Kamp and Reyle's system, the presence of this feature determines the inclusion in the DRS of the relation between the described eventualities and the location time: (i) inclusion, for events  $[e \subseteq t]$ ; (ii) overlapping, for states  $[s \circ t]$  (cf. pp. 543, 554). As an aktionsart feature, its value in a given sentence is determined basically by the verb, and may be affected by other elements in the structure, which may operate aktionsart shifts. For instance, the auxiliary verbs *have* (perfect) and *be* (progressive), transform event-describing expressions into stative descriptions:



The use of this feature, and its association with temporal location conditions in structures with time adverbials, will be discussed in more detail in chapter 4.

### II. *PERF*

A second aspectual feature incorporated in Kamp and Reyle's algorithm is *PERF*, which indicates the presence ( $[PERF = +]$ ) or absence ( $[PERF = -]$ ) of the perfect auxiliary verb *have* in the structure.

In this dissertation, I will use Kamp and Reyle's feature-percolation mechanism (for the four temporal-aspectual features in **D** / **E** above). Furthermore, in chapter 9, I will also use this mechanism for a quantificational feature that directly interacts with the adverbial temporal location.

## F. TEMPORAL FUNCTORS

The vocabulary of the DRT-language includes four function symbols that are particularly relevant in the analysis of temporal expressions: (i) **loc**, (ii) **beg**, (iii) **end**, (iv) **dur**.

## I. loc

**loc** represents a function (LOC) that maps each eventuality on the smallest (closed) interval that contains it, therefore relating the structure of eventualities with that of instants and intervals:

“We postulate that  $E$  and  $T$  are related by a function LOC which assigns to each event  $e$  of  $E$  a closed interval of  $T$ , which would be thought of as the smallest closed interval which temporally includes  $e$ , and which satisfies the following conditions:

- (a) if  $e < e'$ , then LOC preserves  $<$  in the sense that LOC( $e$ ) entirely precedes LOC( $e'$ ) in the order of  $T$
- (b) if  $e \circ e'$ , then  $\text{LOC}(e) \cap \text{LOC}(e') \neq \emptyset$
- (c) for every  $i \in I(E) \cap \{\text{LOC}(e) : e \in i\} \neq \emptyset$ ” (Kamp and Reyle 1993: 671).

$E$  and  $T$  are the event structure and the time structure of the model, respectively, which, as said, are considered irreducible primitives.  $I(E)$  is an instant structure derived from  $E$  which is taken to be a substructure of  $T$  (cf. *ibid.*: 670-671).

Consequently:

- (106) If  $\pi$  is a discourse referents for eventualities, **loc** ( $\pi$ ) is a term for times.

## II. beg / end

**beg** and **end** represent functions which map (i) eventualities on the (punctual) event that consists of its beginning or end, respectively, or (ii) intervals on the (punctual) interval that corresponds to its beginning or end, respectively<sup>45</sup>. Consequently:

- (107) a. If  $\pi$  is a discourse referents for eventualities,  
**beg** ( $\pi$ ) and **end** ( $\pi$ ) are terms for events (more precisely, achievements).  
b. If  $\pi$  is a discourse referents for times,  
**beg** ( $\pi$ ) and **end** ( $\pi$ ) are terms for times.

## III. dur

**dur** represents a “function which maps intervals and eventualities on the amounts of times they last” (Kamp and Reyle 1993: 648). It is defined with the help of the function LOC and the equivalence relation “ $\equiv$ ” (two fundamental components of the model structure):

«the function which should interpret **dur** in  $\mathbf{M}$  is the one which assigns each interval  $t$  the amount  $[t]^{\equiv}$  and each eventuality  $e$  the amount  $[\text{LOC}(e)]^{\equiv}$  » (Kamp and Reyle 1993: 675).

<sup>45</sup> In the model presented in Kamp and Reyle (1993: 664 ff.) – as well as in that presented in FraCaS (1994: 26) – **beg** and **end** are described as functors operating only on eventualities. However, in many of the representations presented in their work, **beg** and **end** are also applied to time discourse referents (cf. e.g. representations on pages 659-663).

Consequently:

- (108) If  $\pi$  is a discourse referent for eventualities or times,  
**dur** ( $\pi$ ) is a term for amounts of times.

#### F. SPECIAL TEMPORAL PREDICATES

The basic temporal relations involving time and eventuality discourse referents are the following four:

- I. **precedence:**  $<$
- II. **overlapping:**  $\circ$
- III. **abutment:**  $\supset\subset$
- IV. **inclusion:**  $\subseteq$

The first two relations are crucial for structuring the domain of eventualities (cf. Kamp and Reyle 1993: 667). They are mutually exclusive, in the sense that if an event precedes another, they do not overlap:  $[e_1 < e_2 \rightarrow \neg e_2 \circ e_1]$  (*ibid.*: 667). Abutment is a special case of precedence, where one of the two relevant entities immediately precedes the other<sup>46</sup>, and inclusion is a special instance of overlapping.

When combined with two discourse referents for times, events or states, these predicates form DRS-conditions like the following, for instance:

- (109) a.  $[e_1 < e_2]$  the event  $e_1$  precedes the event  $e_2$   
b.  $[e_1 \circ e_2]$  the events  $e_1$  and  $e_2$  overlap  
c.  $[s \circ t]$  the state  $s$  overlaps the interval  $t$   
d.  $[e \supset\subset s]$  the event  $e$  ends at the very moment  $s$  starts  
e.  $[e \subseteq t]$  the event  $e$  is included in the interval  $t$   
f.  $[t \subseteq s]$  the state  $s$  covers the whole interval  $t$

Furthermore, two discourse referents of the same type may be related by an **identity relation**, forming conditions like the following:

- (110) a.  $[t_1 = \text{end}(t_2)]$  the end of the interval  $t_2$  is the interval  $t_1$   
b.  $[e = \text{beg}(s)]$  the beginning of the state  $s$  is the achievement  $e$

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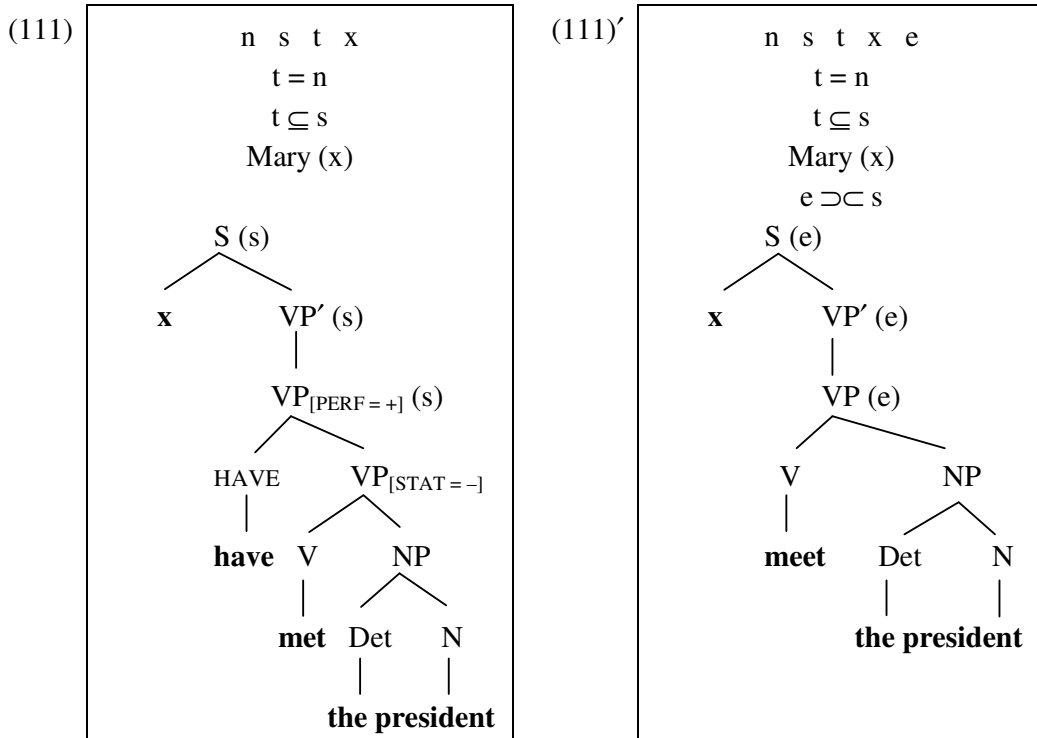
<sup>46</sup> Kamp and Reyle (1993) are not very explicit about this relation, merely saying that if an eventuality starts at the very moment another one begins, the two eventualities abut (cf. p. 573). In Kamp and Schiehlen (1998), however, we find a more explicit definition according to which abutment excludes overlapping:

«An important relation between periods is that of “abutment”:  $p_2$  *abuts*  $p_1$  iff (i)  $p_1$  is entirely before  $p_2$ , but at the same time (ii)  $p_1$  and  $p_2$  “touch”, i.e. there is no  $p_3$  such that  $p_1$  is entirely before  $p_3$  and  $p_3$  is entirely before  $p_2$ » (p. 4).

## G. AKTIONSART SHIFT

In the system of Kamp and Reyle (1993), aktionsart shifts are tackled by the mechanisms of (i) percolation of the aspectual feature *STAT*, and (ii) passing down of discourse referents from higher to lower nodes (cf. p. 532). For instance, it may be the case that a given V-node has a value for the feature *STAT* and its dominating VP-node, or S-node, has a different value (if some aktionsart shifter is present in the structure)<sup>47</sup>. Concomitantly, the processing of a node with value [*STAT* = +] (which is associated with a state discourse referent *s*), for instance, may insert a triggering configuration in the DRS with a value [*STAT* = -] (which is associated with an event discourse referent *e*). In sum, in one and the same sentence different aktionsart values, associated with different constituents (e.g. verb, verb phrase, sentence), may be present.

In connection with what was just said, observe, for instance, the following processing step (extracted from Kamp and Reyle 1993: 572-573), which shows an aktionsart shift associated with the perfect:



<sup>47</sup> Actually, Kamp and Reyle (1993) do not give examples of representations where an aktionsart shift from V to VP – resulting from the presence of a bare plural, for instance – occurs, but I think that my account in the spirit of the authors' proposal.



## Part II

### Defining the concept of temporal locating adverbial

This part of the dissertation deals with the concept of temporal location as expressed by time adverbials. The main issue to be addressed will be the dividing line between the class of **temporal locating adverbials** and two others, which are closely related to it: (i) the class of temporal measure adverbials, and (ii) the super-class of time-denoting expressions, which includes predicates of times and names of times<sup>48</sup>. The relevance of this task comes essentially from the fact that some expressions seem to have a mixed behaviour as elements of two of these classes, therefore leading to divergent classifications. Two groups of these **apparently ambivalent expressions** will be analysed in some detail:

- (i) expressions that seem to work simultaneously as temporal measure and temporal locating adverbials, such as Portuguese *durante os últimos três anos*, in a *Mary morou em Amsterdão durante os últimos três anos*, and its English counterpart *for the last three years*, in *Mary has lived in Amsterdam for the last three years* (cf. e.g. Bennett and Partee 1978, or Kamp and Reyle 1993).

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<sup>48</sup> Inspired by Kripke's theory of proper names, Kamp and Reyle (1993: 246 ff.) treat proper names as direct representations of individuals, not as predicates denoting singletons. Their system distinguishes between **predicates**, which denote sets of entities (via the function  $PRED_M$ ), and **names**, which stand in a direct relation (via the function  $NAME_M$ ) to elements of the universe  $U$  (cf. p. 677). On the temporal domain, a similar distinction can be conceived of, between **predicates of times**, i.e. expressions that denote sets of intervals, and **names of times**, i.e. expressions that directly represent stretches of the time axis. Expressions like *weekend* or *Sunday* in sentences such as *John did not marry on a Sunday/weekend* would belong in the first class; referring expressions like *1980* or *April fifth, 1992* would belong in the second. On drawing the dividing line between these two (sub)classes of expressions, one has to take into account that some expressions which apply to more than one portion of time (i.e. predicates) may act in context as descriptions of particular portions of time (i.e. names); this is the case of what Kamp and Reyle call "context-dependent calendar terms" – e.g. *Sunday*, in *Mary wrote the letter on Sunday*, where *Sunday* is a description of the particular Sunday that precedes the utterance time (on this question, see Kamp and Reyle 1993: 613 ff., and Kamp and Schiehlen 1998). For the main purposes of the discussion in this text, the differences between predicates and names is not crucial. Hence, I will from now on ignore them and consider a super-class that includes both types of expressions, which – following a suggestion by Hans Kamp (p.c.) – I will designate as **time-denoting expressions**. Note however that, if we considered that expressions like proper names denoted singletons, the designation **predicates of times** could be used as a synonym.

- (ii) expressions that may occur as simple time-denoting expressions in some contexts, and seem to behave as temporal locating adverbials (or as time-denoting expressions and temporal locating adverbials, simultaneously) in some other contexts, as e.g. Portuguese *antes da guerra* – in *este edifício data de antes da guerra* and *o Paulo morreu antes da guerra*, respectively – and its English counterpart *before the war* – in *this building dates from before the war* and *Paulo died before the war*, respectively.

Here, I will advocate a categorisation of temporal expressions that does not contain mixed classes, say, temporal measure/temporal locating adverbials, for the cases in (i), or time-denoting expressions/temporal locating adverbials, for the cases in (ii). In fact, I will argue that expressions of type (i) are mere temporal locating adverbials (the information about duration of the relevant eventuality being inferentially supplied), and that expressions of type (ii) are mere time-denoting expressions (the information about temporal location being associated, in the relevant cases, to a null locating operator with a value close to that of Portuguese *em*, or English *in*).

This part of the dissertation contains four chapters. In chapter 4, which is introductory, I will start by shortly referring – in section 4.1 – to some classifications of (English) time adverbials presented in the literature (obviously, without aiming at exhaustiveness): Bennett and Partee (1978), Quirk *et al.* (1985), Smith (1991), Vlach (1993) and Kamp and Reyle (1993). These are quite varied, differing namely in the number and type of classes considered. Furthermore, they show that no consensus exists among authors with respect to the composition of each class (in particular, of the class of temporal locating adverbials), thus evincing the relevance of the categorisation issue.

I will proceed – in section 4.2 – by stating some basic assumptions on temporal location that are crucial for the discussion of this issue. These will concern basically: (i) the conceptual distinction between temporal location and temporal measurement; (ii) the conceptual distinction between temporal location and time denotation; (iii) the main aspects of the semantic contribution of temporal locating adverbials, with reference to their role in defining both location relations and location times. The basic assumptions to be presented closely follow the proposals of Kamp and Reyle (1993), with some differences that will be pointed out.

Chapters 5 and 6 will be devoted to the two disputable cases mentioned above. In chapter 5, I will consider a group of expressions that raise the issue of where to draw the dividing line between temporal measure and temporal locating adverbials. The expressions to be analysed are essentially those that contain predicates of amounts of time (which, arguably, are the most problematic), such as Portuguese *os últimos três anos*, or *os três anos em que a Ana viveu em Amsterdão*, and their English counterparts *the last three years* or *the three years Ana lived in Amsterdam*. Expressions sometimes called “durative adverbials” – a group that includes e.g. (at least some occurrences of) *since*, *until* and *from...to* adverbials in English – will also be shortly considered in this chapter.

In chapter 6, I will consider a group of expressions that raise the issue of where to draw the dividing line between time-denoting expressions and temporal locating adverbials. The expressions I will focus on are mainly those headed by temporal operators

like Portuguese *antes*, *depois*, *entre*, *quando* or *haver* (*há*), and their English counterparts *before*, *after*, *between*, *when* or *ago*, for which I will advocate an analysis as mere (complex) time-denoting expressions.

Finally, I will devote chapter 7 to a subclass of expressions that illustrate a curious interaction between the subsystems of temporal location and temporal quantification (be it time measurement, expressed by predicates of amounts of time, or counting of temporally ordered entities). This subclass is namely formed by (what I will consider as) “time-denoting expressions that define intervals via an operation of measurement, or counting of ordered entities, from an anchor point”, which includes sequences like Portuguese *há três* {*horas* / *fins-de-semana*} or *três* {*horas* / *fins-de-semana*} *antes da festa*, and English *three* {*hours* / *weekends*} *ago* or *three* {*hours* / *weekends*} *before the party*. The aim of this chapter is to provide an (as much as possible) integrated view of this particularly complex subclass, that, as far as I know, is lacking in the literature, and which contributes to a more thorough understanding of some of the hypotheses advocated in this second part of the dissertation. In particular, the expressions mentioned above will be compared with others that include deictical or anaphorical adjectives (like Portuguese *último*, *anterior* and *próximo* and their English counterparts *last*, *previous* and *next*), and *antes* / *before* and *depois* / *after* phrases not modified by predicates of amounts of time.



## Chapter 4

### Introduction

#### 4.1. Some conflicting classifications of time adverbials

The classifications of time adverbials presented in the literature are quite varied and even contradictory to each other, in some points. If we ignore all the adverbials having to do with the expression of frequency or number of events, which are not directly taken into account in this dissertation, we are still left with a quite mixed and heterogeneous ensemble, around the two semantic concepts of location (in the time axis) and duration (or temporal measure). I will start with the classification of Kamp and Reyle (1993), which I will use as a basis for comparison with the other typologies. The main reason to distinguish this classification is that I will very closely follow it (with some differences to be mentioned later on) and adopt, in their essence, the assumptions upon which it is based.

**Kamp and Reyle (1993)** distinguish two basic classes of temporal adverbials (besides the class of “adverbs of temporal quantification”, which I ignore here): temporal locating adverbials and temporal measure adverbials. In simple words, the first relate eventualities to intervals of the time axis, whereas the second determine the amount of time eventualities last, irrespective of their position on the time axis:

“Semantically, locating adverbials and measure adverbials play quite different roles. Locating adverbials help to locate the described eventuality in time, measure adverbials like **for an hour** or **in an hour** specify the duration of the eventuality but do not locate it” (p. 647).

According to these authors, the class of temporal measure adverbials includes expressions with the prepositions *in* and *for* in combination with predicates of amounts of times (e.g. *in an hour*, *for an hour*); adverbials headed by other temporal prepositions or conjunctions, in particular *in* [plus a time-denoting expression], *on*, *before*, *after*, *since*, *until*, *from*, *when* or *while* are classified as temporal locating adverbials. Matters are not that simple, though, as the authors point out. The question of telling the two classes apart is complicated by the existence of cases of (at least apparent) overlapping of functions in one single expression: location and temporal measurement of a given eventuality. Kamp and Reyle briefly discuss prepositional phrases containing a combination of a deictic adjective and a predicate of amounts of time, as *for the last three years*, and conclude: “their ambivalence seems to be unresolvable: they are locating phrases and measure phrases all in one; belonging to both categories at once, they defeat the possibility of a clear division between those categories” (p. 650). More generally, these authors assume that “there are (...) *adverbs which simultaneously serve as location and as measure of the described eventuality*” (pp. 612-613, my italics) and, therefore, that “it is not easy to draw a sharp dividing line between locating adverbs and measure adverbs” (p. 613). In sum, Kamp and

Reyle adopt a bipartite typology, or rather, a tripartite typology, if we consider a class of mixed locating-measure adverbials, in accordance with the observations above.

Kamp and Reyle's typology closely resembles the one put forward in the classical work of **Bennett and Partee (1978)**. According to these authors, two "different kinds" of temporal adverbial phrases are also to be considered (once more, ignoring the class of "adverbial phrases of number and frequency"), to wit: frame adverbial phrases and durative adverbial phrases. To these, we must add a "mixed class" of adverbials that "serve both as durative and as frame adverbial phrases". There is a clear parallel between these three classes and Kamp and Reyle's classes of temporal locating adverbials, temporal measure adverbials and "mixed" locating-measure adverbials, respectively. There are however some differences between these two classifications, which I will point out below.

According to Bennett and Partee, "frame adverbial phrases refer to an interval of time within which the described event is asserted to have taken place"<sup>49</sup> (p. 22), that is, they apparently coincide quite straightforwardly with Kamp and Reyle's temporal locating adverbials. The examples given by the authors to illustrate this class show this coincidence. Bennett and Partee's frame adverbials include: (i) adverbials headed by operators *in* [plus a time-denoting expression] (*in 1848*), *on* (*on Monday*), *at* (*at three o'clock*), *within* [plus a time-denoting expression] (*within the last week*), *since* (*since yesterday*), *before* (*before three o'clock*), *ago* (*an hour ago*) or *from* (*ten hours from now*) – notice that the last two include predicates of amounts of time (I will return to this subtype of expressions in chapter 7); (ii) adverbials with operator *in* plus a predicate of amounts of time, such as *in ten minutes* in sentences like *John will finish eating a fish in ten minutes* – note that in this illustrative sentence the adverbial expresses the distance between the TP<sub>pt</sub> and the described punctual event (and obviously not the duration of this event)<sup>50</sup>; (iii) expressions that lack a preposition or prepositional-like operator, such as *yesterday*, *today*, *this morning*, or *last week*.

Bennett and Partee consider that "durative adverbial phrases [are those that] indicate the duration of the described event by specifying the length of time that it is asserted to take". The authors seem to include in this class only expressions that specify the duration of atelic eventualities (i.e. adverbials with *for* plus a predicate of amounts of time) – cf. "durative adverbial phrases do not go with nonstative, nonsubinterval verb phrases which are not in the progressive form" (p. 30). Expressions with *in* plus a predicate of amounts of time that specify the duration of accomplishments – as [*Mary wrote a letter*] *in ten minutes* or [*John built a house*] *in seven months* (in their most natural interpretation) – are therefore not considered part of this class<sup>51</sup>, even though they seem to correspond to

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<sup>49</sup> Several semantic aspects, such as indexicality and punctuality, allow further subclassification within this group. I do not consider these aspects here.

<sup>50</sup> The classification of this type of adverbials is disputable. In Kamp and Reyle's system, I think they also qualify as temporal locating. For the time being, I will ignore this subtype of expressions (but will return to it in chapter 7).

<sup>51</sup> There are several homonym *in*-adverbials – formed by *in* plus a simple predicate of amounts of time – that should not be confused. In particular, it is important to distinguish: (a) those that

Bennett and Partee's definition of durative adverbial phrases (quoted above). In fact, Bennett and Partee (1978) do not directly refer to them. In this aspect, the typologies of Kamp & Reyle and Bennett & Partee diverge.

When describing the class of durative adverbial phrases, Bennett and Partee observe that "in some cases an adverbial phrase serves both as durative adverbial phrase and as a frame adverbial phrase" (p. 30), that is, these authors also seem to consider the existence of a "mixed class": frame-durative adverbials. However, as we will see now, this class appears to be larger than Kamp and Reyle's locating-measure adverbials. In fact, both "mixed classes" include expressions with *for* that contain a predicate of amounts of time and involve reference to a given sector of the time axis – e.g. *for the last/next several hours*, *for the entire day*; nevertheless, contrary to Kamp and Reyle, Bennett and Partee also include in this group expressions headed by operators like *since*, *until* or *from...to*, when they are used to assert that the described eventuality *ev* occurs all through the location time *t* (formally:  $[t \subseteq ev]$ ) – [*John has been building a boat*] *since yesterday*, [*John will be in Paris*] *until tomorrow*, [*John walked*] *from two to three o'clock*<sup>52</sup>. Note by the way that, in many sentences with *since*, a reading in which the described eventuality is asserted to have taken place somewhere within the location time ( $[ev \subseteq t]$ ) is also possible; in this case, according to Bennett and Partee, the *since*-phrase does not qualify as a mixed durative-frame adverbial, but rather as a simple frame adverbial; in other words, their categorisation of time adverbials seems to be dependent on the interpretation of the sentences. The different composition of the class of "mixed adverbials" is a major distinction between the typologies of Kamp & Reyle and Bennett & Partee. This issue will be analysed in more detail in chapter 5.

A brief look over some other classifications of time adverbials in the literature reveals even more diverging points between authors, and shows, I think, that this is an area where concepts are sometimes not absolutely clear, or at least unanimously defined. Let us look at some illustrative examples.

Quirk *et al.* (1985) are a good example of a typology where the concepts of temporal location and temporal measure appear somehow mixed up, resulting, in my opinion, in an unclear classification. These authors distinguish five "semantic roles expressed by time adjuncts" (p. 528 ff.): time position (*on Monday*, *in the fourteenth century*), forward span (*till Thursday*), backward span (*since the war*), duration (*for two hours*) and relationship ([*he had confidence in her*] *up to that time*). I will make only some brief remarks to this classification, in order to illustrate the point at stake. First, their concept of "duration"

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specify the duration of the described eventuality (referred to here, and analysed in chapter 5), and (b) those that specify the distance between an anchor point and the described eventuality (referred to in (ii) of the previous paragraph, and analysed in chapter 7). Symptomatically, these adverbials have different counterparts in many languages, as in European Portuguese, for instance, where (a) corresponds to *em*-adverbials, and (b) corresponds to *dentro de*, or *daqui a* adverbials.

<sup>52</sup> In fact, Kamp and Reyle (1993: 650) also suggest that other adverbials, namely *since*-phrases, may be analysed as ambivalent: "Once we think of **the last three years** as a measure phrase, a similar reassessment suggests itself for *since*-phrases". This issue is however not pursued, and the authors treat *since*-adverbials in the subchapter (5.5.1) dedicated to "locating adverbials".

seems hard to grasp: initially, they link duration with temporal measure – “the concept of measure is as important to the consideration of time as it is to space, and temporal measure is seen as duration” (p. 481); later on, they appear to restrict the domain of duration to “measures of time that are not confined to future or past” (as aspect which distinguishes duration adjuncts from span adjuncts) (p. 540); even with this restriction, it is hard to see how the *during*-adverbial in *I have some time off during the week*, or *far into the night* in *Toshiko works far into the night at her thesis*, qualify as duration adjuncts, not to mention expressions like *always*, or (some occurrences of) *lately* and *recently*, which are also included in this class (cf. p. 540). Secondly, as a result of gathering in the class of span adjuncts all the expressions involving temporal measurement associated to some future or past time, some adverbials that are uniformly classified as temporal measure adverbials in most typologies – namely (the relevant cases of) *for*-adverbials – appear spread all over three classes: *for*-adverbials are duration adjuncts in *she writes for an hour every day* (p. 540), but forward span adjuncts in *can you stay for a month?* (p. 535), and backward span adjuncts in *Mary was writing that play for three years*, or *he has worked in the same office for two years* (p. 537); moreover, their inclusion in a given class seems to be determined only contextually. Thirdly, the dividing line between time position adjuncts and span adjuncts seems also unclear; *before*-adverbials, for instance, are classified in both groups: they are considered time position adjuncts in sentences like *I left the factory before the strike*, or *The Prime Minister announced her resignation before the votes were counted fully* (p. 531) (note that Quirk *et al.* consider that “position adjuncts typically serve as a response to a potential *when* question” – p. 530); however, they are considered forward span adjuncts in sentences like *I have to leave before midday* (which can also serve as a response to a potential *when* question!), and backward span adjuncts in *she never kissed a man before*. Fourthly, as we can easily see, the unifying concept of time location (which, assuming a definition along the lines of Kamp and Reyle’s, would include time position adjuncts, and some forward and backward span adjuncts) seems also not to be considered in Quirk *et al.*’s classification; on the contrary, “adjuncts of span” (that contain several clearly locating adverbials – [*I shall be away*] *by that time*, p. 535; [*she has got married*] *since you saw her in June*, p. 538) are put together with those of duration in a sort of macro-class of “adjuncts of span and duration”.

Smith (1991) distinguishes three “main types of temporal adverbials” relevant for this discussion (cf. p. 155 ff.): locating adverbials (*at noon*, *yesterday*, *before Mary left*), durative adverbials or adverbials of duration (*for an hour*, *from 1 to 3 p.m.*) and completive adverbials (*in an hour*, *within an hour*). The author associates her class of locating adverbials to Bennett and Partee’s “frame adverbials” – «locating adverbials are also known as “frame adverbials” (Bennett and Partee 1978)» (p. 155). Some differences are notwithstanding noticeable: (i) adverbials with *in* plus a predicate of amounts of time that Bennett and Partee would classify as frame adverbials, like [*she knocked on the door*] *in ten minutes* (cf. Bennett and Partee’s example: [*John will finish eating a fish*] *in ten minutes*), are classified by Smith as completive, not as locating; they illustrate what the author calls the “ingressive interpretation” – “Adverbials of the interval, completive type



are ingressive when they locate instantaneous events. As ingressives, the adverbials indicate an interval at the end of which the event occurs” (p.157); (ii) adverbials like *from 1 to 3 p.m.*, which Smith classifies merely as durative, are considered by Bennett and Partee as “serving both as durative and frame adverbial phrases”. Smith’s typology also has some noticeable differences from Kamp and Reyle’s. Kamp and Reyle’s temporal measure adverbials are included by Smith in two different classes – durative and completive – each of which containing other expressions that in their system qualify as temporal locating: (i) Smith’s class of durative adverbials contain the subgroup of measure adverbials that determine the duration of atelic eventualities (i.e. *for*-adverbials); besides, it contains adverbials that do not directly quantify the duration of eventualities, but rather assert their occurrence all through a given location time – e.g. *from-to*-adverbials (which are locating adverbials in Kamp and Reyle’s typology and mixed frame-durative adverbials in Bennett and Partee’s); (ii) Smith’s completive adverbials contain the subgroup of measure adverbials that determine the duration of accomplishments (e.g. [*Mary wrote a sonnet*] in *five minutes*), which the author does not associate to the concept of duration or temporal measurement, but rather to a concept closer to that of frame, i.e. location – “completive adverbials locate an event at an interval, during which the event is completed” (p. 157); besides, as I said before, her completive adverbials include several instances of what the author calls “ingressives”, illustrated in the following three sentences: (i) *they reached the top in ten minutes*, (ii) *he won the race in ten minutes*, (iii) *she knocked on the door in ten minutes*; the analysis of these illustrative examples (given by the author) is not simple, and in my opinion they do not involve exactly the same type of interpretation<sup>53</sup>; clearly, however, at least the third does not involve temporal measurement of the described eventuality, or of any part of it (viz. its preparatory phase), and would therefore not qualify as temporal measure in Kamp and Reyle’s system. The inclusion of all these adverbials in the same class illustrates once more, in my opinion, a case where classifications do not clearly distinguish the concepts of location and temporal measurement.

Finally, **Vlach (1993)** also distinguishes three “classes of temporal adverbials” relevant for this discussion (cf. p. 250 ff.): punctual (*at 3:15:20*), inclusive (*on Thursday, in June, yesterday, last week, in the last three days*) and durative (adverbials headed by *for*,

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<sup>53</sup> In footnote 51, I mentioned the existence of (in my opinion) several homonym *in*-adverbials formed by *in* plus a simple predicate of amounts of time, viz. (a) those that specify the duration of the described eventuality, and (b) those that specify the distance between an anchor point and the described eventuality. Smith’s example *she knocked on the door in ten minutes* seems to include an adverbial of type (b); Smith’s examples *they reached the top in ten minutes*, and *he won the race in ten minutes*, may have either this interpretation (cf. Portuguese counterparts: *eles atingiram o topo da montanha DAÍ A dez minutos*, and *ele ganhou a corrida DAÍ A dez minutos*), or an interpretation, which is a (sort of) variant of (a), involving the duration of the preparatory phase of the described achievement (cf. Portuguese counterparts: *eles atingiram o topo da montanha EM dez minutos*, and *ele ganhou a corrida EM dez minutos*). In an integrated analysis of this type of adverbials (that I will not attempt to do in this dissertation), it would probably be revealing to compare *in* and *within* phrases, and to consider yet another type of temporal relation expressible by (at least) *within* adverbials: the mere inclusion of the described eventuality in an interval of length *x* lying right after the anchor point (cf. *within the next ten minutes*).

*since, until, from-to, or during* – cf. p. 245). According to this author, some adverbials can belong to more than one class – e.g. both *since 1960* and *in 1987* can be durative or inclusive (cf. p. 256). His classification shows well, in my opinion, how the typologies of temporal adverbials (and the criteria to define them) differ from author to author. Vlach’s classification of adverbials is closer to a classification of modes of temporal location, his inclusive / durative distinction paralleling the following distinction in temporal location relations: “an eventuality occurs *within* an interval” ( $[ev \subseteq t]$ ) / “an eventuality occurs *all through* an interval” ( $[t \subseteq ev]$ ).

As we can see, Vlach (1993) – like Smith (1991) – puts together the strictly temporal measure *for*-adverbials (which state directly the duration of eventualities) and the adverbials that express the occurrence of eventualities all through a given location time, as [*Mary walked*] *from 2 to 3 p.m.* Notice that, in the second case, the duration of the eventuality is not directly quantified but can be inferred: if Mary walked from 2 to 3 p.m., she walked for (at least) one hour. The discrepancy in the semantic computation of these expressions (which Kamp and Reyle, for instance, keep separate) illustrates, in my opinion, the importance of distinguishing between two concepts: asserted duration of eventualities *vs.* inferred duration of eventualities. To this I will return in detail in chapter 5.

These few examples of time adverbial classifications show the lack of unanimity in what concerns the definition – which is the main goal of this part of the dissertation – of a class that we could term “temporal locating adverbials”. Furthermore, they evince the need to clearly define the basic concepts and assumptions upon which a system can be build. To this I turn now.

## 4.2. Some basic notions and assumptions about temporal location, temporal measurement and time denotation

### 4.2.1. Temporal location *vs.* temporal measurement

#### 4.2.1.1. General aspects

In this dissertation, I follow the view expressed in Kamp and Reyle (1993) that **temporal location of eventualities** involves the association of eventualities with intervals of the time axis, while **temporal measurement of eventualities** involves the determination of the amount of time they last, irrespective of their position on the time axis:

«Semantically, locating adverbials and measure adverbials play quite different roles. Locating adverbials help to locate the described eventuality in time, measure adverbials like **for an hour** or **in an hour** specify the duration of the eventuality but do not locate it” (p. 647); “phrases [like *in an hour* or *for an hour*] are not locating adverbs in any sense. Their function is not to locate the described eventuality along the temporal axis, but to determine its duration, its “temporal size”» (p. 612).

At this point, it is important to remind that eventualities may be described not only by sentential means (in tensed main clauses, for instance), but also by nominal constituents,

and that also in these cases temporal location and temporal measurement can be expressed. Observe, for instance, the following structures, involving temporal locating expressions – (112) – and temporal measure expressions – (113):

- (112) a. o casamento do Paulo *em 1980*  
Paulo's wedding *in 1980*
- b. a restauração de vários edifícios históricos *desde o início do ano*  
the restoration of several historical buildings *since the beginning of the year*
- (113) a. a presença de tropas no território *durante seis meses*  
the presence of troops in the territory *for six months*
- b. a construção da ponte *em menos de dois meses*  
the construction of the bridge *in less than two months*
- c. um terramoto *de trinta segundos*  
a *thirty-second* earthquake

The structures in (112) illustrate cases where no tense operators are involved in the temporal location. They are of special interest, since they permit an evaluation of the specific contribution of time adverbials to temporal location (a contribution which in tensed clauses, as is well known, interacts with that of the tense operators, and may be hard to distinguish clearly).

It is also important to remind that both temporal location and temporal measurement may apply to intervals. **Temporal measurement of intervals**, which involves a relation between intervals and the amount of time that corresponds to their extent<sup>54</sup>, is included in Kamp and Reyle's system, where the functor **dur** can apply to time discourse referents (cf. section 3, and quotations below), although the authors do not treat expressions where a temporal measure phrase directly applies to a time predicate, as:

- (114) um período *de cinco minutos*  
a period *of five minutes*

**Temporal location of intervals**, which is not analysed in Kamp and Reyle (1993), is exemplified in the following (nominal) structures:

- (115) a. um fim-de-semana *em 1980*  
a weekend *in 1980*
- b. a maior parte dos fins-de-semana *antes das eleições*  
most (of the) weekends *before the elections*
- c. todos os fins-de-semana *desde que o Paulo chegou*  
all the weekends *since Paulo arrived*

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<sup>54</sup> A note on terminology is due here. For perspicuity, in this dissertation, I will talk about the *duration* of eventualities and the *extent* or the *size* (rather than the *duration*) of intervals, although, in the formal language, these concepts will be expressed by the application of the same functor – **dur** – either to eventuality or to time discourse referents. Similarly, I will say that eventualities (but not intervals) *last* a given amount of time, and that intervals *have a given extent or size*, which corresponds to a given amount of time.

These structures show that intervals can be located in time by way of the same adverbials that locate eventualities (with possibly some differences that I will disregard here). Although I will concentrate primarily on the temporal location of eventualities, I will sometimes also take into account the temporal location of intervals, since it proves important for a more comprehensive understanding of the semantic behaviour of the adverbials under scrutiny (note that in (115), like in (112) above, the contribution of the locating adverbial is not affected, within the relevant constituent, by tense operators).

In accordance with Kamp and Reyle (1993), and with minor adaptations resulting from taking into account the temporal location of intervals, the formal difference between temporal location and temporal measurement can be established as follows:

### I. Temporal measurement

It involves a one-place functor **dur**, which “maps intervals and eventualities  $[\pi]$  on the amounts of time  $[mt]$  they last” (Kamp and Reyle 1993: 648). This functor occurs in DRS-conditions such as **[dur ( $\pi$ ) R mt]** (where  $R \in \{=, <, \leq, >, \geq\}$ ). Formally, amounts of time – one year, three months, ten seconds, etc. – are (or may be) conceived of as «equivalence classes of intervals (and/or eventualities) under some suitable relation of “equal duration”» (*ibid.*)<sup>55</sup>.

### II. Temporal location

It involves the association of a given entity  $\pi$  (an interval or an eventuality), described in a matrix structure, with a given interval of the time axis  $t$ , called “location time”. This location time is defined in many cases by adverbial means (these being the only cases I will consider in this dissertation)<sup>56</sup>. The location relation may take different forms – e.g. inclusion ( $[\pi \subseteq t]$ ,  $[t \subseteq \pi]$ ) or overlapping ( $[\pi \circ t]$ ) – and is affected, among other things, by (i) the aktionsart of the eventuality to be located (in the case of temporal location of eventualities), and (ii) the temporal operator that heads the locating adverbial (cf. Figure 5, on page 362).

#### 4.2.1.2. Modes of temporal location and the distinction between duration and durative location

For the purposes of the discussion in this second part of the dissertation, the distinction between the subtypes of temporal relations in Table 3 below seems of particular relevance. A more detailed analysis of the modes of temporal location and of the linguistic factors that affect this location will be made in part III (cf. Table 11, on page 273):

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<sup>55</sup> Cf. similar analysis in Dowty (1979: 332 ff.): “I will treat phrases like **an hour** and **six weeks** as basic expressions denoting sets of intervals; that is, **six weeks** denotes, at any index, the set of intervals that have exactly six weeks’ duration” (p. 333).

<sup>56</sup> I will not consider structures with tense and no temporal adverbials, such as *o Paulo saiu / Paulo left*. On the interaction between temporal adverbials and tense, cf. section 4.2.2.3.

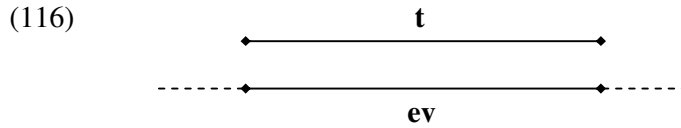
**Table 3. Some basic modes of temporal location of eventualities**

	mode of temporal location	associated condition
	neutral durative / non-durative location (of atelic eventualities), sub-dividable in <b>A</b> and <b>B<sub>1</sub></b> :	$[ev \circ t]$
<b>A</b>	durative location (of atelic eventualities)	$[t \subseteq ev]$
<b>B<sub>1</sub></b>	non-durative location (of atelic eventualities)	$[ev \circ t] \wedge [\neg[t \subseteq ev]]$
<b>B<sub>2</sub></b>	non-durative location (of telic eventualities)	$[ev \subseteq t]$

**A. durative location (of atelic eventualities):  $[t \subseteq ev]$**

The described eventuality (**ev**) occurs all through the location time (**t**).

This location mode only applies to atelic eventualities, i.e. states and activities.



Examples in Portuguese and English<sup>57</sup>:

(117) O Paulo está em Paris *desde segunda-feira*.  
“Paulo is in Paris since Monday”

(118) a. Paulo has been ill *for the last two days*.<sup>58</sup>  
b. Paulo will be president of this company *until the end of the year*.

**B. non-durative location,**

with a slight variation for atelic and telic eventualities

**B<sub>1</sub>. non-durative location (of atelic eventualities):  $[ev \circ t]$  and  $[\neg[t \subseteq ev]]$**

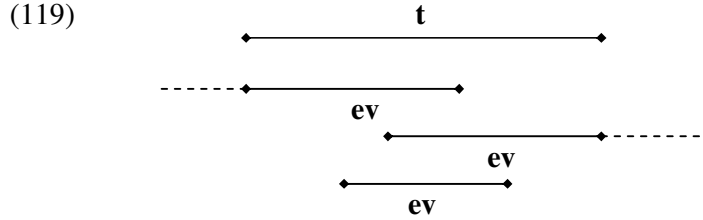
The described eventuality (**ev**) overlaps with the location time (**t**), but does not occur all through it; it may exceed one of the borders of the location time (cf. Kamp and Reyle 1993: 513).

<sup>57</sup> Whereas in combination with descriptions of simple atelic eventualities Portuguese *desde* and English *for* and *until* normally involve a durative location, the same does not occur with their counterparts English *since* and Portuguese *durante* and *até*, respectively. In fact, the following sentences, which are a possible translation of the sentences above, may have both a durative and a non-durative reading:

- (i) Paulo has been in Paris *since Monday*. (cf. (117))
- (ii) O Paulo esteve doente *durante os últimos dois dias*. (cf. (118a))
- (iii) O Paulo será presidente desta empresa *até ao final do ano*. (cf. (118b) and (128) below).

The different properties of the temporal expressions involved will be considered in different parts of this dissertation (see, specially, chapter 9 for *desde* vs. *since*, and chapter 5 for *durante* vs. *for*).

<sup>58</sup> I take this *for*-adverbial to be a temporal locating rather than a temporal measure adverbial. About this issue, cf. chapter 5.



As examples, we have one possible interpretation of the following Portuguese and English sentences<sup>59</sup> :

- (120) a. Choveu *durante o fim-de-semana*.  
 b. It rained *during the weekend*.  
 (121) a. O Paulo esteve doente *durante as férias*.  
 b. Paulo was ill *during his holidays*.

These sentences are compatible both with a durative and a non-durative location. Sentences (120), for instance, can be used both in a situation where it rained throughout the whole mentioned weekend (durative location) and in one where it rained only in some part of it (non-durative location).

It is interesting to notice that, at least in languages like Portuguese and English, there seems to be an asymmetry in the linguistic marking of the durative and the non-durative location of atelic eventualities. In fact, whereas the first can be imposed by some prepositional operators (e.g. Portuguese *desde*, as in (117), or English *for* and *until*, as in (118)), there seems to be no Portuguese or English temporal operator that necessarily determines the second. What happens quite often is a context-selection of the relevant reading, that is, in a sentence with an operator that merely determines a neutral durative/non-durative relation  $[ev \circ t]$  (e.g. Portuguese *durante* or *em*, and English *during* or *in*) the discourse or situational context may impose either a durative or non-durative interpretation. In the following sentences, for instance, a non-durative interpretation is induced by an explicit statement, in (122a), or is pragmatically induced, in (122b):

- (122) a. O Paulo viveu em Paris na década de 40, mas só depois da guerra.  
 Paulo lived in Paris in the forties, but only after the war.<sup>60</sup>  
 b. O faraó Tutankhamon viveu no segundo milénio antes de Cristo.  
 Pharaoh Tutankhamon lived in the second millennium BC.

Formally, it is possible to represent the location condition associated with adverbials like *durante* and *during* via a single condition –  $[ev \circ t]$  – which subsumes the durative and the non-durative interpretation. The strategy of not distinguishing the two readings in the representation is adopted, for instance, in Kamp and Reyle (1993) – cf. their analysis of

<sup>59</sup> The verb form of the Portuguese sentences in (120)-(121) is the “pretérito perfeito simples”. I will not discuss here the hypothesis (cf. Swart’s 1998 analysis of French “passé simple”) that this tense form acts as an aktionsart shifter, converting basic atelic descriptions into a telic (or telic-like) ones.

<sup>60</sup> Cf. the following example of Kamp and Reyle (1993: 513):

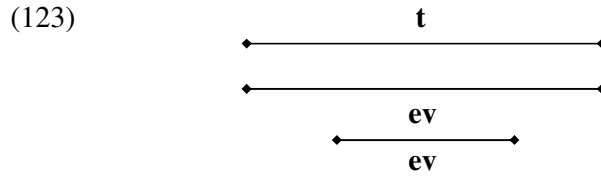
(i) Mary was ill on Sunday. But by Sunday night she had recovered.

on Sunday (p. 513 ff.). Here, I tell apart the two modes of temporal location, since it is relevant for some issues to be considered later on, in chapter 5 (namely, the different inferences associated with each mode of temporal location). This does not mean, however, that I am committed to an analysis of sentences like (120) or (121) as ambiguous sentences. A uniform (underspecified) overlapping condition  $[ev \circ t]$  may be inserted in the DRS, with the possibility that the context further specifies it, determining one of the two major possibilities (durative –  $[t \subseteq ev]$  – or non-durative –  $[\neg[t \subseteq ev]]$ ).

**B<sub>2</sub>. non-durative location (of telic eventualities):  $[ev \subseteq t]$**

The described eventuality (**ev**), an achievement or an accomplishment, is completely included in the location time (**t**). In the limit case, **ev** and **t** may temporally coincide.

For this subcase, but not for **B<sub>1</sub>**, I will also use the term **inclusive location**.



Examples in Portuguese and English:

(124) a. O Paulo escreveu um livro *em* 1980.

b. Paulo wrote a book *in* 1980.

(125) a. O Paulo passou várias horas no Louvre *durante a sua visita a Paris*.

b. Paulo spent several hours in the Louvre *during his visit to Paris*.

As can be seen, I clearly separate the concept of **duration** – temporal extent of a given eventuality – from that of **durative location** – occurrence of an eventuality all through a given stretch of the time axis. An adverbial that expresses the first concept will be termed temporal **measure** adverbial, as *durante duas horas* / *for two hours*, in *o Paulo trabalhou durante duas horas* / *Paulo worked for two hours*; an adverbial that expresses the second one will be classified as temporal **locating** adverbial, as *das três às cinco* / *from 3 to 5 p.m.*, in *o Paulo trabalhou das três às cinco* / *Paulo worked from 3 to 5 p.m.* Of course, in this second case an information about the duration of the working-eventuality is obtained, but, as I will claim, this is only *inferentially supplied* and not directly asserted by the adverbial expression. As we saw in the previous section, many classifications of time adverbials do not keep these two concepts (clearly) apart. This is the case of Smith (1991) and Vlach (1993), whose class of **durative adverbials** contains expressions headed by *for*, and also by operators like *from-to*, *since*, *until* or *during*, which, according to the distinctions made here, should be grouped in two different classes (as in Kamp and Reyle 1993): “temporal measure adverbials” and “temporal locating adverbials”<sup>61</sup>.

<sup>61</sup> The term **durative** is used in different (sometimes conflicting) ways in the literature. Firstly, it is used to qualify different entities and expressions, including (at least): (i) events, or event-descriptions (cf. e.g. Heinämäki 1974 or Smith 1991), (ii) time adverbials (cf. e.g. the same authors and Vlach 1993), (iii) temporal prepositions (cf. e.g. Vlach 1993), and (iv) interpretations of sentences (cf. e.g. Vlach 1993). Secondly, the meaning of “durative” often varies from author to

## 4.2.2. Temporal location

### 4.2.2.1. Source(s) of the information about the location relation

At the end of 4.2.1.1, I observed that the location relation associated with a time adverbial may take different forms and is affected, among other things, by the aktionsart of the eventuality to be located and the temporal operator that heads the time adverbial. This assertion brings up the question of the source(s) of the information about the location relation, which is crucial for the discourse construction algorithm. More formally, in DRT terms, this question can be put in the following terms: what is the triggering configuration whose processing introduces the condition that relates the located eventuality *ev* and the location time *t*? Or still: may more than one triggering configuration, in the same derivation process, introduce a location condition (in which case two – necessarily non-conflicting – relations are asserted)? Let us briefly consider this question.

The indisputable role of the aktionsart value of the located eventuality (in particular, the distinction telic / atelic) in determining the location relation is illustrated in the following pair of sentences:

- (126) a. O Paulo viveu em Paris em 1980. [state]  
Paulo lived in Paris in 1980.  
b. O Paulo casou em 1980. [event]  
Paulo got married in 1980.

These sentences illustrate an often described asymmetry in the temporal location of states and events: while normally states are only required to overlap location times (Paulo may have lived in Paris during the whole year of 1980, or just in part of it, in (126a)), events have to be completely included in location times (cf. e.g. Kamp and Reyle 1993: 513 ff.). The DRS-construction algorithm proposed in Kamp and Reyle (1993) “pays homage” to this dependence of temporal location on aktionsart. In their construction rule of page 543,

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author, even when applied to the same class of entities. I give just an example: in Smith (1991: 28), an eventuality is “durative” if it has a duration, i.e. if it is temporally extended (as opposed to instantaneous) – she classifies states, activities and accomplishments as “durative events”, as opposed to e.g. achievements; in Heinämäki (1974), an eventuality is “durative” if it combines with *for*-adverbials – she classifies as durative only states and activities; however, for both authors the term “durative” applies to *for*-adverbials, but not to *in*-adverbials that state the temporal extent of accomplishments (in the case of Smith, this is not in accordance with the use of term when applied to eventualities).

In order to avoid terminological confusions, I will not use the term “durative” to classify eventualities or eventuality descriptions; instead, I will use the common Vendlerian designations, or the opposition atelic/telic eventualities. I will use the term “durative”, however (inspired by Vlach 1993), to classify the *interpretation* of a sentence in which the described eventuality is said to last all through a given time span (the location time), rather than occurring somewhere within that span; by extension, I will also use it to qualify (i) the type of *temporal location relation* involved, and (ii) the subtype of *temporal locating adverbials* and *temporal locating prepositions* associated with this relation, e.g. *until*-adverbials and *until*. Accordingly, *for*-adverbials like *for two hours* will not be termed “durative”, since they are temporal measure – and not temporal locating – adverbials.



the location relations  $[e \subseteq t]$  and  $[s \circ t]$  are introduced at the  $S'$ -level and depend on the value of the (aktionsart) feature STAT: states ( $[STAT = +]$ ) introduce the condition  $[s \circ t]$ ; non-states ( $[STAT = -]$ ) introduce the condition  $[e \subseteq t]$ . In their revised rule of page 554, the same basically applies, with the difference that the location condition is now introduced only at the  $VP'$ -level.

There are, however, many pieces of evidence showing that the aktionsart value of the described eventuality is not the only factor determining the relevant location relation. In particular, the **temporal locating operator** certainly plays a crucial role too. This is illustrated in the following pair of English sentences:

- (127) a. John will live in Paris *in* the year 2004.  
       b. John will live in Paris *until* the year 2004.

In (127a), with the preposition *in*, a mere overlapping between the described state and the location time is required, i.e.  $[s \circ t]$ ; in (127b), however, with the preposition *until*, the relation is more restricted: the state has to fully cover the location time<sup>62</sup>, i.e.  $[t \subseteq s]$ . These location restrictions seem to be a property of the temporal prepositions, and may vary across different languages for (otherwise) close counterparts. For instance, whereas English *until* (in combination with state descriptions) imposes the durative condition  $[t \subseteq s]$ , its Portuguese counterpart *até* doesn't. In fact, in combination with state descriptions, *até* allows an "ingressive reading"<sup>63</sup>, involving the (inclusive) location of the beginning of the described state ( $[\text{beg}(s) \subseteq t]$ ):

- (128) a. O Paulo será presidente desta empresa *até* ao final do ano.  
       b. Paulo will be president of this company *until* the end of the year.

Contrary to the English sentence (128b), Portuguese (128a) allows a reading according to which the state of Paulo being president is bound to start some time between the utterance time and the end of the current year, and therefore does not cover the whole location time (cf. English sentence: *Paulo will be president of this company BY the end of the year*).

Another example: in combination with state descriptions, Portuguese *desde* imposes the durative condition  $[t \subseteq s]$ ; its English counterpart *since* doesn't:

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<sup>62</sup> The location time associated with *until*-phrases is an interval stretching between the time described in the complement of this preposition and a given point (to be defined in the discourse context) in its past; in the most natural interpretation of (127b), this point is the utterance time (cf., however, the following examples, where the lower bound of the location time is set by the previous sentence: *John moved to Paris last year and will live there until the year 2004*; *John will move to Paris next year and will live there until the year 2004*). I will return to the locating properties of *until* in chapter 8.

<sup>63</sup> Note that the term "ingressive" is not used here with the same meaning as in Smith (1991: 157), quoted in 4.1: "ingressives (...) indicate an interval at the end of which the event occurs".

- (129) a. O Sam {está / esteve} em Boston *desde* as sete horas.<sup>64</sup>  
 b. Sam has been in Boston *since* 7.00. (Heny, 1982: 147)

Contrary to the Portuguese sentence (129a), English (129b) allows a non-durative reading, according to which the state of Sam being in Boston occurs some time between the utterance time and the preceding seven o'clock (and therefore does not cover the whole location time).

In general, we observe that some temporal operators, when combined with descriptions of states (and possibly also activities), impose the condition  $[t \subseteq s]$  (durative location), which is a subtype of the general overlapping condition –  $[s \circ t]$  – normally associated with the location of states (cf. Kamp and Reyle 1993). This seems to be the case of, for instance, English *until* and Portuguese *desde*, as we saw above; Portuguese *de...a* and *ao longo de* and English *from...to* and *throughout* possibly also belong in this category.

The formal consequence of the facts just described is that the location condition  $[t \subseteq s]$  can only be introduced in the DRS at the level where the temporal locating preposition is processed (unless some mechanism for percolating the information about the form of the temporal preposition is adopted, a possibility that I will not consider here). We face two choices then: either (i) we introduce the general condition  $[s \circ t]$  at the  $S'$ -level and the further restriction (which makes the previous condition redundant)  $[t \subseteq s]$  at the level of the temporal PP, in which case we admit that different nodes may independently contribute to the temporal location, or (ii) we introduce only the condition  $[t \subseteq s]$  at the level of the temporal PP (and no condition at the  $S'$ -level). Note that, in any case, the rule for processing the temporal locating PP has to be sensitive to the aktionsart value of the eventuality to be located (which requires some “passing down” of the information about this aktionsart value; cf. construction rules in 4.2.2.5). If we adopt the second procedure, one may be tempted to overgeneralise and consider that the location relation is always (and only) introduced at the level of the temporal locating PP, being nevertheless sensitive to the aktionsart value of the described eventuality. The algorithm I will propose in this dissertation adopts this perspective (in a way that will be made precise – and discussed – later on). It is predominantly for methodological reasons that I adopt it, namely in order to make the algorithm simpler, and because it gives the right results for the structures I analyse. This does not mean, however, that further investigation will not show the need for a revision of this procedure.

Besides the above-mentioned restriction on the location of states, inherent to some temporal prepositions, there are other linguistic facts that seem to favour a **direct association of the temporal location condition(s) with the temporal locating PP** (dependent essentially on the preposition that heads it). I will mention two of them:

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<sup>64</sup> The sentence with “presente” (*está*) involves overlapping of the described state with the utterance time; the sentence with “pretérito perfeito simples” (*esteve*) is only acceptable in a reading where the described state has ceased to hold at a time close to the utterance time; cf. subchapter 9.2, for a more thorough discussion of these structures with *desde* and *since*.

**I.** The use of temporal locating prepositions is obligatory in many constructions.

Observe the following pairs of sentences:

- (130) a. \*O Paulo casou 1980.  
          \*Paulo got married 1980.  
      b. O Paulo casou *em* 1980.  
          Paulo got married *in* 1980.

Given (130b), the relevant question to ask is what triggers the introduction of the inclusive condition  $[e \subseteq t]$ . If it is simply the aktionsart value of the sentence ( $[STAT = -]$ ), at the S'-level, then the operators *em* and *in* should be redundant, and omissible (which is not the case), unless (i) they have some other semantic role<sup>65</sup> or (ii) they are required on purely syntactic grounds (being a kind of case markers without any semantic import). It is of course well-known that temporal prepositions (specially those like Portuguese *em* and English *in*, *on* or *at*) can – or even have to – be omitted in some structures<sup>66</sup> (which seems to go against the case marker hypothesis):

- (131) a. O Paulo casou a semana passada  
          Paulo got married last week.  
      b. <sup>OK</sup>O Paulo casou *na* semana passada.  
          \*Paulo got married *in* last week.

I will return to this issue of the omission of temporal prepositions later on in this chapter. At this point, suffice it to say that a uniform analysis of sentences like (130) and (131) seems to require that an empty preposition is postulated in sentences like (131a) (as has in fact been proposed by many authors – cf. e.g. Kamp and Reyle 1993: 623) and that this insertion is semantically motivated. I will consider that the more plausible – and, furthermore, intuitive – function these operators have is to inclusively locate the eventuality described in the matrix structure.

**II.** Some time adverbials, depending on the operator that heads them, can be the triggers of an aktionsart shift, and thus affect directly the applicable location conditions.

A good illustration of this fact is provided by Portuguese time adverbials headed by *até* and *desde*, which, when combined with certain descriptions of achievements, locate not (only) this achievement but (also) its result state:

- (132) a. O Paulo emprestou-me este livro até amanhã.  
          “Paulo lent me this book until tomorrow”

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<sup>65</sup> A possibility would be that the preposition simply equates the location time  $t$  with the interval represented by its complement  $t_c$  ( $[t = t_c]$ ) – cf. next subsection. Under this hypothesis, the differences between some closely related operators, such as e.g. Portuguese *em* and *durante*, and English *in* and *during*, which intuitively have to do with differences in temporal location, are hard to account for.

<sup>66</sup> In German, for instance, sentences with names of years, like (130), are normally used without the temporal preposition.

- b. O Paulo deixou de jogar futebol desde que foi operado à perna.  
 “Paulo has quit playing football since he had his leg operation”

The Portuguese sentence (132a), given the presence of the *até*-phrase and the “pretérito perfeito simples”, does not express mere inclusion of the lending-event in the location time; rather, this event plus its “intended” consequent state are assumed to cover the whole location time. A similar situation (with some differences having to do with the causal connections in the sentence) occurs with the Portuguese sentence (132b). Its meaning is paraphrasable by “Paulo quit playing football when he had his leg operation and has not played [result state] ever since (up to the utterance time)”<sup>67</sup>. I will return to these two types of constructions in chapter 8.

In connection with the role of aktionsart in temporal location, it must still be noted that, as we saw above, temporal adverbials may also be used to locate intervals, i.e. entities with no aktionsart value. Here are two of the examples in (115), renumbered:

- (133) a. um fim-de-semana em 1980  
 a weekend in 1980  
 b. todos os fins-de-semana desde que o Paulo chegou  
 all the weekends since Paulo arrived

Let us take the English example (133a), for instance. In this sequence, with the preposition *in*, an inclusive condition applies:  $[t' \subseteq t]$  (where  $t'$  is the discourse referent introduced by *weekend*, and  $t$  the discourse referent associated with *1980*). In this case, the inclusive condition is obviously not triggered by any aktionsart value. If we associate it with the operator *in*, and furthermore have uniformity of semantic treatment (whenever possible) as a desirable goal of the semantic analysis, this may be taken as a motivation for postulating the same association in sentences involving location of eventualities, like *Paulo got married in 1980*. Of course, it is possible to say that these located intervals ( $t'$ ) are bounded entities, and that the inclusive condition applies to any bounded entity, be it an eventuality (accomplishment or achievement) or an interval, a generalisation which seems in fact to be valid. Then, the occurrence of temporal locating adverbials in structures with no aktionsart value cannot be taken as an argument in favour of a direct association of the location conditions with the locating PP, but rather merely as evidence to consider the aktionsart role in temporal location in a broader perspective, together with the role of boundedness.

Besides the temporal locating preposition and the aktionsart/boundedness value of the located entities, other linguistic factors interfere in temporal location (expressed by adverbial means). Among them, I will underline the existence of causality relations between located and locating eventualities (cf. chapter 8, and 4.2.3.3) and the presence of quantificational elements that determine a mode of location that I will term “full-scanning inclusive location” (cf. chapter 9). At this point, however, I will not say anything about the interference of these linguistic factors in temporal location, leaving it for analysis in the mentioned parts of the dissertation.

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<sup>67</sup> *desde* does not allow for a simple inclusive reading of achievements ( $[e \subseteq t]$ ) – cf. chapter 9.

#### 4.2.2.2. Building location times out of the times of the complements of temporal locating operators

As already said, temporal location by way of time adverbials has three main ingredients: (i) the located entity  $\pi$  (an eventuality or an interval); (ii) the location time  $t$ ; and (iii) the location relation, i.e. the relation between  $\pi$  and  $t$ . Normally, the location time can be fully determined by the temporal adverbial used in the structure or, to put it differently, the location time can be totally construed out of the time expressed in the temporal locating PP<sup>68</sup> – cf. Kamp and Reyle’s view that these adverbials are “explicit specifiers of location times, whose presence [obviates] (...) the need to reconstruct the location time of the described eventuality from the antecedent context” (pp. 611-612).

It is important to notice that the location time (as specified by temporal locating adverbials) *may or may not* coincide with the intervals represented by the (nominal or sentential) complements of the temporal operators<sup>69</sup>. Compare, for instance, the following sentences:

- (134) a. O Paulo viveu em Paris em 1980.  
Paulo lived in Paris in 1980.
- b. O Paulo viveu em Paris até 1980.  
Paulo lived in Paris until 1980.

In (134a) 1980, the interval represented by the complement of the temporal operator, coincides with the location time of the state represented in the main clause (Paulo live in Paris), but in (134b) it doesn’t. There, it just marks the upper bound of the location time. Therefore, two different concepts are at stake:

- (i) the **location time** proper ( $t$ )
- (ii) the interval(s) represented by the complement(s) of the temporal operators ( $t_c$ )

I will henceforth represent the latter as  $t_c$ , mnemonic for “time of the complement(s)”, while I keep Kamp and Reyle’s convention of using  $t$  without sub or superscripts for the location time proper<sup>70</sup>.

<sup>68</sup> Contrary to Kamp and Reyle (1993), I will assume here that, as a rule, the tense of the verb does not impose direct restrictions on the location time  $t$ , this interval being normally defined by the temporal adverbials alone (cf. next subsection). However, on a particular case of tense (possibly) interfering in the definition of the location time, cf. observations in 9.2.1 about the combination of *desde*-adverbials with atelic descriptions and “pretérito perfeito simples”.

<sup>69</sup> Cf. e.g. Kamp and Reyle (1993):

“What is the time “denoted by” the adverb **on Sunday**? (...) On the one hand there is the denotation – in the given context – of the noun phrase **Sunday**. On the other hand, the adverb **on Sunday** might be thought of as imposing a constraint on the location time of the described eventuality. In the case of **on Sunday** the difference between these two times is not so easily perceived. But with an adverb like **before Sunday** the distinction is perfectly transparent: here the location time and the time denoted by **Sunday** cannot be the same, because the former must (...) precede the latter” (p. 515).

<sup>70</sup> However, in structures that involve more than one location time, I will use numerical indices –  $t_1, t_2, t_3, \dots$  – to distinguish the different location times (cf. also footnote 81).

Accordingly, I will assume, in line with Kamp and Reyle (1993), that the location time is represented in all cases *only at the level of the time adverbial as a whole* (not in subordinate levels), and that the definition of this interval is dependent on the two elements that normally compose the time adverbial, viz. the temporal operator and its complement(s). More precisely, the temporal operator establishes a relationship between the location time and the time of the complement that defines the former out of the latter<sup>71</sup>. In fact, this relationship may be considered one of the major contributions of the temporal operator to the semantics of the sentence (together with its role in determining the relationship between the described eventuality and the location time). This is assumed in Kamp and Reyle (1993):

“We are already committed to a two-step interpretation procedure, in which the condition containing the prepositional phrase **on Sunday** (**t**) is decomposed into a condition **t = t'** which accounts for the contribution made by the preposition **on** and a condition **Sunday** (**t'**), which expresses that the new discourse referent **t'** represents the day which the NP **Sunday** is taken to denote” (p. 618).

“The NP **April fifth, 1992** acts as a proper name, which rigidly designates one particular date. The preposition **on** relates this date to the location time of the described eventuality. We will assume that the relation it expresses is that of coincidence” (p. 614).

With respect to the relationship location time / time of the complement(s) – **R (t, t<sub>c</sub>)** – temporal operators may be grouped into at least three different subclasses, according to Table 4 below<sup>72</sup>. In structures with **direct temporal locating operators**, the location time coincides with the interval represented by the complement of the temporal operator (cf. example (134a), and Kamp and Reyle’s quotations above). In structures with **single-boundary temporal locating operators**, the location time starts or ends, depending on the operator, within the interval represented by the complement of the operator, which then defines explicitly only one of the boundaries of the location time (cf. example (134b)), even though more or less restrictive conditions may be determined for the non-explicitly defined boundary as well (e.g., in most cases, Portuguese *desde* and English *since* impose the condition [end (t) = TPpt] – cf. chapter 9). Finally, in structures with **double-boundary temporal locating operators**, the location time stretches between the two intervals (**t<sub>c1</sub>** and **t<sub>c2</sub>**) represented by the complements of the temporal operator, which then explicitly define the lower and the upper bound of the location time.

<sup>71</sup> In view of this semantic dependence, the intervals represented by the complements of the temporal operators could also be designated **subordinating intervals** (relative to the location time).

<sup>72</sup> Many operators mentioned in Table 4 have homonyms that obviously do not belong here. This is the case of: (i) Portuguese *em* and *durante* and English *in* and *for* as heads of temporal measure adverbials (cf. chapter 5); (ii) English *in* and *from* and Portuguese *a* that define intervals via an operation of time measurement (or a comparable operation) from a given anchor point (cf. chapter 7) – e.g. [*Mary will arrive*] *in five minutes, two months from now, a dois dias das eleições* (*two days from the elections*). The Portuguese locating *a*-adverbials are those occurring in sequences like *a 13 de Março de 1980* (*on March 13, 1980*), or *às três horas* (*at 3 p.m.*).

**Table 4. Subclasses of temporal locating operators with respect to the relationship location time / time of the complement(s)<sup>73</sup>**

	associated condition	Portuguese examples	English examples
<b>direct temporal locating operators</b>	$[t = t_c]$	<i>em, a, durante, ao longo de, enquanto</i>	<i>in, on, at, for<sup>74</sup>, over, during, throughout, as long as, while</i>
<b>single-boundary temporal locating operators</b>	$[\text{beg}(t) \subseteq t_c]$	<i>desde, a partir de</i>	<i>since, from</i>
	$[\text{end}(t) \subseteq t_c]$	<i>até</i>	<i>until, till, up to, by</i>
<b>double-boundary temporal locating operators</b>	$[\text{beg}(t) \subseteq t_{c1}] \wedge [\text{end}(t) \subseteq t_{c2}]$	<i>de...a, de...até, desde...até</i>	<i>from...to, from...until</i>

Note that temporal operators such as Portuguese *antes, depois, entre, quando* and *haver*, and their English counterparts *before, after, between, when* and *ago* were, purposely, left out of this classification. In fact, the analysis I will advocate in this dissertation is that these operators cannot be paired with any of those mentioned in Table 4 because they do not directly define the location time  $t$ . In a nutshell, the main idea is that they are simply the head of (structurally complex) time-denoting expressions, and always depend – when in adverbial position – on a temporal locating operator belonging to one of the three classes defined above, with the following proviso: when the temporal locator belongs to the class of direct temporal locating operators (the class of *em* and *in*), a null, instead of an explicit, preposition is obligatorily used (with possibly some exceptions<sup>75</sup>).

In accordance with what has been assumed in subsections 4.2.2.1 and 4.2.2.2, I take the semantic contribution of **temporal locating operators** to be twofold:

- (i) They define the location time  $t$  out of the time  $t_c$  represented in their complement –  $\mathbf{R}(t, t_c)$ : e.g.  $[t = t_c]$ ,  $[\text{beg}(t) \subseteq t_c]$ ,  $[\text{end}(t) \subseteq t_c]$  (cf. Table 4 above).
- (ii) They determine – or, at least, affect – the relation between this location time  $t$  and the located entities  $\pi$  (eventualities or times) described in the matrix structure –  $\mathbf{R}'(t, \pi)$ . When  $\pi$  is an eventuality  $ev$ , a relatively wide range of location relations is possible, depending (among other factors) on the aktionsart of the located

<sup>73</sup> Accordingly, I will term the adverbials headed by the operators in Table 4 *direct*, *single-boundary* and *double-boundary* temporal locating expressions, respectively.

<sup>74</sup> I will consider that *for* is a temporal locating operator, and not the head of a temporal measure phrase, when it is combined with time-denoting expressions (which normally contain a predicate of amounts of time as a constituent), as in sequences like *for the last two hours* (cf. chapter 5, for a discussion of this issue).

<sup>75</sup> For instance, in the Northern Portuguese dialects, the sequence *em antes* (literally “in before”) is commonly used; in English, the sequence *in between* occurs in some contexts (cf. ungrammaticality of Portuguese *em entre*).

eventuality: e.g.  $[t \subseteq ev]$ ,  $[ev \subseteq t]$ ,  $[t \circ ev]$  (cf. Table 3, on page 81, and chapter 8); when  $\pi$  is an interval  $t'$ , an inclusive condition  $[t' \subseteq t]$  seems to always apply.

#### 4.2.2.3. Location times associated with temporal locating adverbials are unaffected by tense

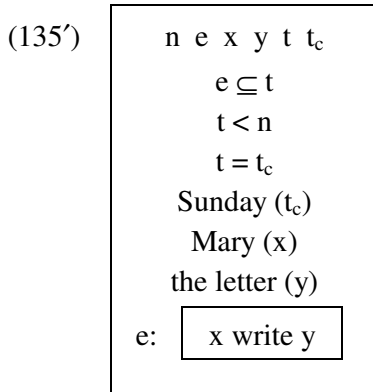
In Kamp and Reyle's (1993) system, a discourse referent for the "location time of the described eventuality" –  $t$  – is introduced during the processing of every new sentence, with or without temporal locating adverbial. As already said, this referent, which represents the interval involved in the location of the eventuality  $ev$  described in the main clause, appears in conditions, triggered by the aktionsart feature  $[\pm \text{STAT}]$ , such as  $[ev \subseteq t]$  (for events) or  $[ev \circ t]$  (for states). In the mentioned system, the discourse referent  $t$  is typically affected by two elements of the sentence: the tense of the main clause, and the temporal locating adverbials (whenever they occur). More specifically:

- (i) The tense of the main clause imposes conditions such as  $[t < \text{TPpt}]$  for past,  $[t = \text{TPpt}]$  for present, or  $[t < \text{TPpt}]$  for future (cf. Kamp and Reyle 1993: 610).
- (ii) A temporal adverbial **Adv** introduces a condition  $[\text{Adv}(t)]$ , which records the "constraint which the adverb imposes on the location time" (cf. Kamp and Reyle 1993: 516, 610).

I will follow Kamp and Reyle in neither of these two assumptions. I will explain my position with respect to (i) now, and with respect to (ii) in the next subsection.

In order to assess the interference between the tense of the verb and the location time of the sentence, let us look at a simple example, analysed in Kamp and Reyle (1993), and the associated DRS (where the notational conventions regarding  $t$  and  $t_c$  mentioned in the previous section are being used).

- (135) Mary wrote the letter on Sunday. (cf. Kamp and Reyle 1993: 517-519)  
A Mary escreveu a carta no domingo.





In simple event-describing sentences like (135), the temporal information is processed as follows (in Kamp and Reyle 1993): (i) the tense value [*TENSE* = *past*] introduces the condition [*t* < *n*] (or rather, [*t* < TPpt], where [TPpt := *n*], as results from the value of the feature TEMPORAL PERSPECTIVE) and (ii) the aktionsart value [*STAT* = –] introduces the location condition [*ev* ⊆ *t*]. As we can see, the information that the described eventuality *ev* precedes the utterance time is not directly asserted, via a condition of the form [*ev* < *n*], but is rather inferred from the two mentioned conditions:

$$(136) \quad [t < n] \wedge [ev \subseteq t] \rightarrow [ev < n]$$

This fact results from Kamp and Reyle’s (1993) choice, mentioned in chapters 2 and 3, to take the temporal feature TENSE (LOCATION) to express a relation between the TPpt and the *location time* of the described eventuality (*t*), rather than directly between the TPpt and the described eventuality (*ev*):

“there are (...) two ways of expressing the temporal relation between described eventuality and utterance time: either directly as a relation between the eventuality discourse referent and *n* (...) or indirectly, by relating the location time of the eventuality to *n* and relating the eventuality to its location time. (...) we adopt the second option” (pp. 515-516).

For the type of structures considered in Kamp and Reyle (e.g. (135)), similar results are obtained with the two strategies, viz. (i) taking TENSE (LOCATION) to express **R** (TPpt, *ev*) – let us call this the “direct approach” – or (ii) taking it to express **R** (TPpt, *t*), where from **R**’ (TPpt, *ev*) is inferable. However, this is not the case with all types of constructions. I will mention two cases that clearly seem to favour the “direct approach”, which is actually more in accordance with Reichenbach’s seminal conception (cf. his relation between **R** – reference time – and **E** – event time), and which I assume in this dissertation<sup>76</sup>.

**1.** Cases involving temporal adverbials associated with intervals that include the TPpt (the utterance time, or some past or future TPpt), such as *hoje* / *today*, *esta semana* / *this week*, *este ano* / *this year*.

- (137) a. O Paulo casou *hoje*.  
           Paulo got married *today*.  
       b. O Paulo casará *hoje*.  
           Paulo will get married *today*.  
       c. Visitei o Paulo no dia 20 de Junho do ano passado. Ele tinha casado  
           *nesse dia*.  
           I visited Paulo on June 20 last year. He had got married *that day*.

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<sup>76</sup> Kamp and Reyle’s main motivation to resort to the “indirect approach” has to do with their analysis of negative sentences (cf. pp. 516 and 546 ff.). I will not try to make the “direct approach” compatible with the treatment of negation (since negation is out of the scope of this dissertation), but hypothesise that such compatibility can be achieved (cf. suggestion on page 105).

In these sentences, the location time of the wedding-eventualities seems not to be the whole day represented by the italicised expressions, but rather the *part of* that day that overlaps with the sector of the time axis compatible with the tense used, viz.: in (137a), with past tense, the part of that day before the utterance time; in (137b), with future tense, the part of that day after the utterance time; in (137c), the part of the mentioned June 20 before the moment of the speaker's visit to Paulo (TPpt). If Kamp and Reyle's construction rule, where tense and temporal adverbials affect the same discourse referent (cf. p. 610), were applied to these structures, contradictory conditions would be obtained. Consider (137a), for instance. The representation would include  $[e \subseteq t]$  (the wedding is included in the location time  $t$ ), where  $t$  is characterised by  $[t < n]$  (contribution of the past tense) and  $[today(t)]$  (contribution of the adverbial)<sup>77</sup>. Obviously,  $t$  cannot at the same time satisfy the descriptive content of *today* and be prior to  $n$ !

In order to solve the problem raised by these sentences, we could try to adapt Kamp and Reyle's construction algorithm, preserving the "indirect approach", i.e. the assumption that TENSE (LOCATION) relates the TPpt with a given locating interval, rather than directly with the described eventuality. For instance, we could define the location time of a sentence – say  $t_{\text{SENTENCE}}$  – as "the intersection of the time associated with the temporal adverbial –  $[t_{\text{ADVERBIAL}}]$  – and the set of times compatible with the tense used –  $[t_{\text{TENSE}}]$ " (e.g. the whole past in the case of the past tense), and adapt the construction rule accordingly: TENSE and locating adverbials would introduce different time discourse referents ( $[t_{\text{TENSE}}]$  and  $[t_{\text{ADVERBIAL}}]$ ), the relevant intersection condition would be inserted at an appropriate level, and the temporal location condition would take into account this intersection (e.g.  $[e \subseteq t_{\text{SENTENCE}}]$ ). This more complex strategy, involving three rather than one interval, could in turn be generalised for simpler cases, like *Paulo got married in 1980*, where the intersection at stake coincides with the time associated with the temporal adverbial (1980, in this case) alone. However, as we will promptly see, this move turns out to be inadequate to deal with some cases, like (138) below.

Alternatively, a simpler solution for cases like (137), which I adopt here, is to assume the "direct approach", i.e. to consider that TENSE (LOCATION) directly expresses a relation between the described eventuality  $ev$  and the TPpt, a return to Reichenbach's original proposal. By doing this, the clash observed in cases like (137) does not arise.

Let us observe this move in more detail: in (137a), for instance, like in (135) for that matter, the condition directly associated with the value  $[TENSE = \textit{past}]$  (or  $[TENSE\ LOCATION = \textit{anterior}]$ ) is  $[ev < n]$  (or rather:  $[ev < TPpt]$ , where  $[TPpt := n]$ ), i.e. a direct assertion that the described eventuality precedes the utterance time. The introduction of the location condition  $[ev \subseteq t]$  and of  $[today(t)]$  does not result in a clash, since the information conveyed by tense does not affect  $t$ . Furthermore, with this strategy, two conditions (rather than one) directly involve the discourse referent for the described eventuality  $ev$  (cf. Figure 2, on page 63):

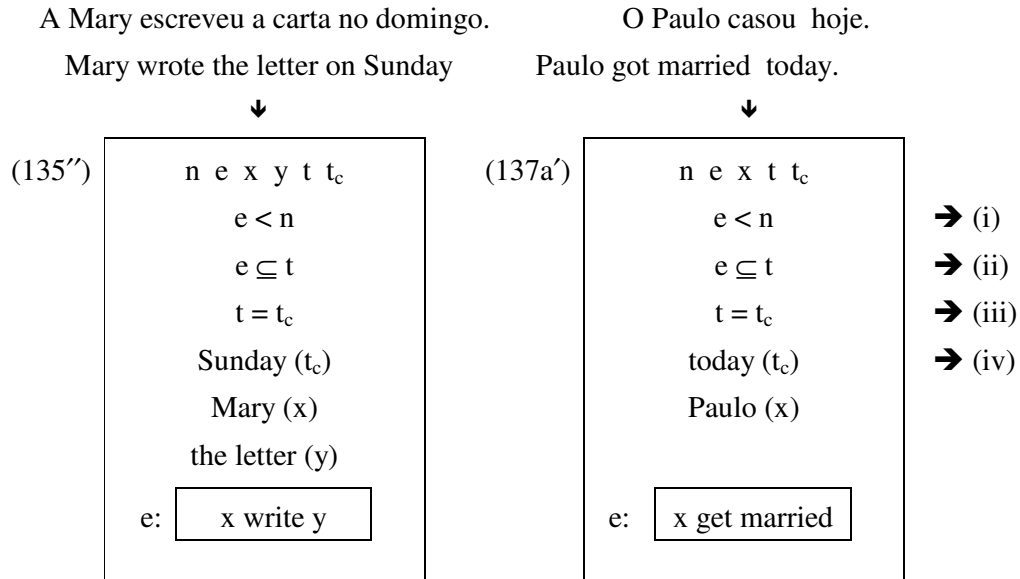
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<sup>77</sup> Or equivalently:  $[t = t_c]$  (contribution of null *em / in*) and  $[today(t_c)]$  (contribution of *today*).

- (i)  $[ev < n]$  → assertion that the described eventuality falls in the past of the utterance time  
It exemplifies **temporal location by tense**.
- (ii)  $[ev \subseteq t]$  → assertion that the described eventuality falls within the day where the utterance takes place  
It exemplifies **adverbial temporal location**.

As a result of the conjunctive association of these two conditions in the DRS, the right truth conditions emerge: the sentence is true only if the described eventuality satisfies the two conditions, i.e. if it happens within the part of “today” that is in the past of the utterance time.

Hence, the DRSs associated with (135) and (137a) are as follows (identical for Portuguese and English, modulo the lexical differences):



The conditions (i)-(iv) in the two DRSs above are contributed by different linguistic components, as follows:

- (i) contribution of [TENSE = *past*] (or [TENSE LOCATION = *anterior*]) and [TEMPORAL PERSPECTIVE = -PAST] (or [TEMPORAL PERSPECTIVE = PRES])
- (ii) contribution of [STAT = -] in Kamp and Reyle's system
- vs. contribution of the temporal locating preposition, which is null in the case of *hoje* / *today*, taking into account the STAT value of **ev**, in the version I propose (cf. discussion in the previous chapter, and construction rules in 4.2.2.5)
- (iii) contribution of the temporal locating preposition

- (iv) contribution of the complement of the temporal locating preposition, which is a time-denoting expression – *domingo / Sunday, hoje / today*

2. Cases involving tense forms that express overlapping with the TPpt (e.g. simple present, as in the examples below, or “pretérito imperfeito”)

(138) a. O Paulo está em Paris {hoje / esta semana}.  
Paulo is in Paris {today / this week}

b. O Paulo está em Paris desde segunda-feira.  
\*Paulo is in Paris since Monday.  
(cf. French: *Paulo est à Paris depuis Lundi.*)

In Kamp and Reyle (1993), it is assumed that

“The present tense, in its most common use, is governed by the interpretation principle (...) [that] The location time of a present tense sentence is the utterance time **n**” (p. 536).

In other words, the “set of times compatible with” the present tense is taken to be just the utterance time – cf. condition  $[t = n]$ , triggered by the present tense in Kamp and Reyle (1993: 543). Therefore, if Kamp and Reyle’s construction rule, where tense and temporal locating adverbials affect the same time discourse referent, is applied to structures like (138a), a similar problem to the one observed before arises: tense and temporal locating adverbial are associated with contradictory conditions, namely: (i)  $[t = n]$  (from the present tense); (ii)  $[today / this week (t)]$  (from the temporal locating adverbial).

Note, furthermore, that the solution proposed above, involving the definition of the location time of a sentence as “the intersection of the time associated with the temporal adverbial and the set of times compatible with the tense used”, would not be of much help here. For cases like (138a), for instance, this intersection would coincide with the utterance time alone, and, consequently, the use of temporal expressions like *today* or *this week* should be redundant, no difference in location existing between the sentences with *today* and those with *this week*, which does not seem to be the case.

In order to try and “save” the “intersection solution”, one could still hypothesise that the problem lies in the assumption that the present tense is associated with the (very restrictive) condition  $[t = n]$ . Instead of this condition equating the location time and the utterance time, a weaker overlapping condition –  $[t \circ n]$  – could be postulated for the present tense. This would be in keeping with the data in (138), where the present tense combines with descriptions of extended location times: *hoje / today, esta semana / this week, desde segunda-feira (since Monday)*. Now, this change does not seem to provide a solution either. In fact, though it solves the contradiction mentioned above, it creates a new problem, to wit: from the new condition associated with the present tense –  $[t \circ n]$  – and the location condition –  $[ev \circ t]$  –, it cannot be inferred that the described eventuality (state) overlaps the utterance time (a problem that did not arise with the old condition  $[t = n]$  – cf. (139b)):

- (139) a.  $[t \circ n] \wedge [s \circ t] \not\rightarrow [s \circ n]$   
 b.  $[t = n] \wedge [s \circ t] \rightarrow [s \circ n]$

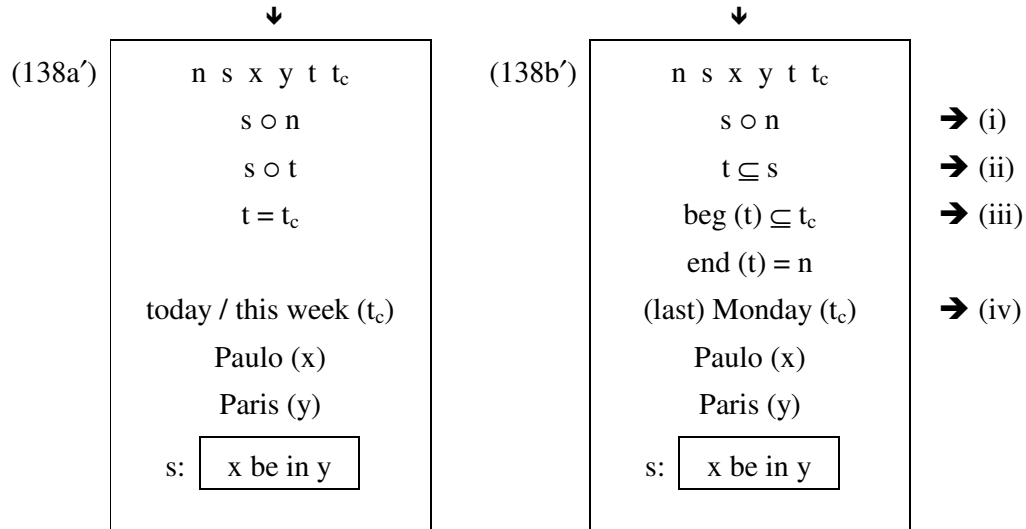
In other words, under the assumption at stake, it would be possible for a sentence like (138a) to be true, in the canonical reading of the present tense<sup>78</sup>, even if Paulo was not in Paris at the time of utterance. This is certainly an undesired result.

Once more, the “direct approach”, i.e. taking TENSE (LOCATION) to express directly **R (TPpt, ev)**, deals unproblematically with sentences like (138): (i) the present tense is taken to directly assert that the described eventuality overlaps with the utterance time, via  $[ev \circ TPpt]$ , from the feature TENSE (LOCATION), and  $[TPpt := n]$ , from the feature TEMPORAL PERSPECTIVE; (ii) the temporal adverbial expresses that there is an interval **t**, characterised by *today*, *this week*, etc., to which the described eventuality overlaps –  $[ev \circ t]$ . These conditions are not contradictory, and each makes its independent contribution for the location of the eventuality; note, for instance, that a more restrictive durative location –  $[t \subseteq ev]$  – can normally be assumed for (138a), meaning that Paulo’s stay in Paris covers the whole utterance day or week. Accordingly, the DRSs for (138a-b) are as follows<sup>79</sup>:

O Paulo está em Paris {hoje / esta semana}.      O Paulo está em Paris desde segunda-feira.

Paulo is in Paris {today / this week}.

“Paulo IS in Paris since Monday”



<sup>78</sup> The futurate reading of the present tense (“schedule reading”), according to which the sentences in (138a) mean “Paulo *is bound to be* in Paris today / this week” (although he is not there at the utterance time) is irrelevant here.

<sup>79</sup> In the case (138a), representations are equal for Portuguese and English, modulo the lexical differences. In the case (138b), only Portuguese is relevant, given that the English counterpart of *desde* (*since*) does not combine with the simple present; the Portuguese lexical items are translated in (138b') in order to facilitate the reading of the representation.

The conditions (i)-(iv) in the two DRSs above are contributed by different linguistic components, as follows:

- (i) contribution of [TENSE = *pres*] (or [TENSE LOCATION = *overlapping*]) and [TEMPORAL PERSPECTIVE = -PAST] (or [TEMPORAL PERSPECTIVE = PRES])
- (ii) contribution of [STAT = +] in Kamp and Reyle's system
- vs. contribution of the temporal locating preposition, which is null in the case of *hoje / today* and *esta semana / this week*, taking into account the STAT value of **ev**, in the version I propose (cf. discussion in the previous chapter, and construction rules in 4.2.2.5)

Note that Portuguese *desde* (unlike English *since*) only allows a durative reading in combination with stative descriptions ( $[t \subseteq s]$ ).

- (iii) contribution of the temporal locating preposition

Note that the null preposition  $\emptyset_{intem}$ , a “direct temporal locating operator”, introduces the condition  $[t = t_c]$ , whereas *desde*, a “single (lower) boundary temporal locating operator” introduces the condition  $[beg(t) \subseteq t_c]$ . It is a special property of *desde* (and also of its English counterpart, *since*), having to do with its intrinsic deictic behaviour, that the upper bound of the location time is taken to be the utterance time:  $[end(t) = n]$ .

- (iv) contribution of the complement of the temporal locating preposition, which is a time-denoting expression – *hoje / today*, *esta semana / this week*, *segunda-feira (Monday)*

With respect to the “direct approach” (in the treatment of tense), it should be noted that one of its characteristics is that tense does not affect the discourse referent for the location time **t**. Now, this – rather than being a disadvantage – turns out to be a uniformity factor, since there are many structures in which this is necessarily the case, namely those where time adverbials occur adnominally:

- (140) a. o casamento do Paulo em 1980  
Paulo's wedding in 1980
- b. todos os fins-de-semana desde o início do ano  
all the weekends since the beginning of the year

These examples illustrate cases where the contribution of the temporal locating adverbial is independent from that of tense.

Finally, it must be stressed that, from what was said so far, it cannot be concluded that tense is assumed not to contribute to the temporal location of eventualities. Quite on the contrary, as we have seen. What instead is to be concluded is merely that the contribution of tense and that of locating adverbials should be kept apart, that is, in other words, that the construction rule should not have tense and temporal adverbials to impose conditions on the same time discourse referent. Observe the following diagram, where the two types of location – by tense and by adverbials – are represented:

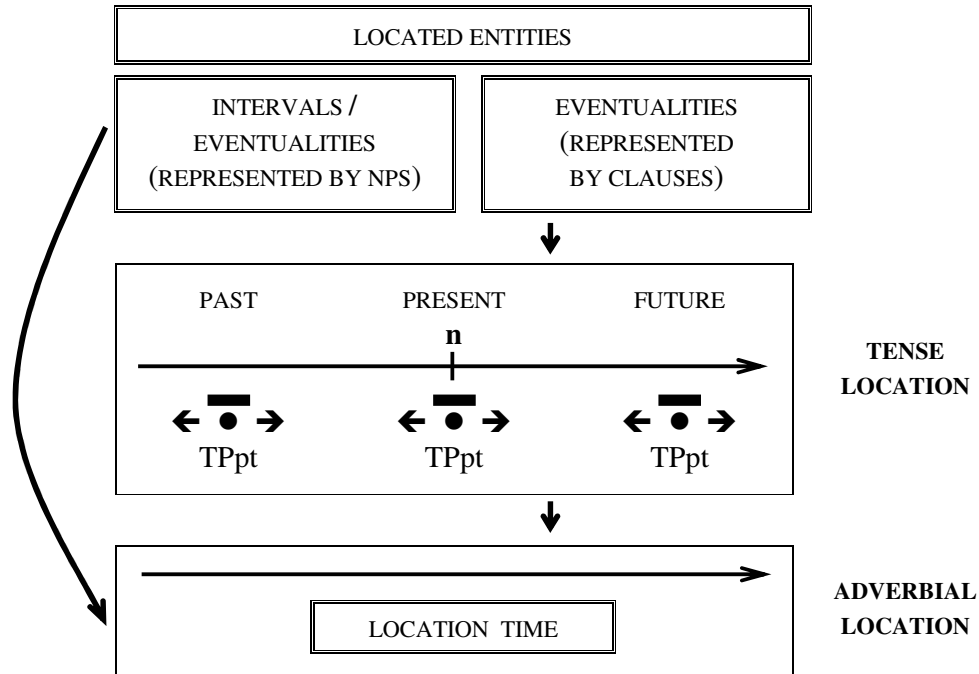


Figure 3. Temporal location by tense and by (time) adverbials

As we can see, location by tense is essentially materialised in an *orientation* relative to a TPpt ●, marked by ← and → in the schema above, or an *overlapping* with that point, marked by ■■ (cf. Reichenbach’s “nine fundamental forms” in section 2.2.1). Adverbial location is materialised in some form of overlapping (cf. chapter 8) with a stretch of the time axis (the location time), which may or not be totally included in one of the three time-spheres defined after *n* (the negative case emerging with adverbials like *today*). Another striking difference between the two types of location is that tense location – applicable only to clausal constituents – is as a rule obligatory (the non-finite verb forms often involving anaphorical dependencies in the discourse), whereas the adverbial location – applicable both to clauses and to (temporal or situational) NPs – is in principle optional.

#### 4.2.2.4. Temporal locating adverbials are predicates of eventualities and times

In this dissertation, I will consider that temporal locating expressions are predicates on the entities they locate, i.e. **predicates of eventualities and times**. Thus, in a sentence like (141a) below, for instance, the time adverbial predicates over the *eventuality* described in the main clause<sup>80</sup>, whereas, in a sentence like (141b), it predicates over the *interval* represented in the matrix structure:

- (141) a. O Paulo morreu em 1980.  
Paulo died in 1980.

<sup>80</sup> Alternatively, without much difference, it can also be considered that the time adverbial predicates over the **loc** of the described eventuality, that is **Adv (loc (ev))**, in which case it is always and only a predicate of times.

- b. um fim-de-semana em 1980  
a weekend in 1980

In assuming this, I follow the spirit (and the letter) of Kamp and Reyle's theory about predication (cf. p. 260 ff.), although I will have to revise the construction rule these authors propose for temporal adverbials (cf. pp. 516, 543, 610). In this rule, which concerns the location of eventualities (expressed by sentential means), the authors take the temporal locating adverbial **Adv** as a predicate of times; more specifically, they take it as a predicate over the location time of the sentence, **t** (cf. the association of **Adv** with the condition **Adv (t)**, mentioned at the beginning of the previous subsection). I consider here, differently, that in this type of structures the time adverbial predicates over the located eventualities, that is, it occurs in a condition of type **Adv (ev)**, and not **Adv (t)** (where **t** is understood as the location time of the sentence, in the sense of Kamp and Reyle 1993). In order to justify my position, I will briefly summarise Kamp and Reyle's theory about predication, which I basically adopt.

Kamp and Reyle (1993) assume that "each natural language predicate has one argument – its so-called *referential argument* – which is never expressed by an argument phrase that is disjoint from the predicate" and that "if the predicate takes additional arguments besides, then these – the *non-referential arguments* of the predicate – always are expressed by terms that are disjoint from it" (p. 261). A relational noun like *friend*, for instance, has two arguments: a non-referential one, expressed by its NP complement (e.g. *Carol Rayner*, in *a friend of Carol Rayner*) and the referential one, expressed by the whole NP that contains the noun *friend* as head (e.g. *a friend of Carol Rayner*, which is the natural language representation of the person who is Carol Rayner's friend). One place nouns like *table* or *dog* only have the referential argument. In terms of DRS-construction, **referential arguments** and **non-referential arguments** are distinguished as follows:

"The non-referential argument places of a natural language predicate are just (...) slots to be filled by arguments which must come from somewhere else if the predicate is to be turned into a well-defined sentence (...). In contrast, the referential argument of a natural language predicate *is introduced by the predicate itself*; more precisely, the predicate comes with a variable (or, in our terminology, a discourse referent) which itself fills the referential argument slot; at the same time the predicate passes the variable on to the larger expression of which it is a constituent" (pp. 261-262).

Adjectives, like nouns, are assumed to always have a referential argument. When they are combined with a noun in adnominal position, the authors consider that "the referential argument of the adjective gets identified with that of the noun" (p. 262) – e.g. in a phrase like *a man devoted to Carol Rayner*, the referential argument of the two-place adjective *devoted* and the referential argument of the one-place noun *man* are identified. This mechanism of **referential argument identification** is also adopted for prepositions. Prepositions are assumed to always have a referential argument and (at least) one non-referential argument (expressed in the complement of the preposition). When prepositional phrases occur adnominally, like in *a pub near the church* (authors' example) or *a restaurant in the park*, Kamp and Reyle consider that the referential argument of the



preposition (passed up to the prepositional phrase) gets identified with that of the noun. Therefore, an expression like *a restaurant in the park* would be associated with the following two DRS-conditions: [restaurant (x)] and [in the park (x)]. Although the authors do not explore in detail the adverbial uses of prepositional phrases with respect to the issue at stake, they consider that the same identification mechanism also applies there, that is, the referential argument of the preposition gets identified with that of the verb (an eventuality):

“when a prepositional phrase combines with a verb – as does *near the church* in *she stood near the church* – its referential argument gets identified with that of the verb in precisely the same way as the referential argument of a prepositional phrase which is combined with a noun is identified with the referential argument of that noun” (pp. 263-264, my italic, bold in the original).

Having these ideas and assumptions in mind, let us now consider temporal locating prepositional phrases. See, for instance, the following examples that illustrate the distribution of Portuguese *em 1980* and its English counterpart *in 1980*:

- (142) a. um fim-de-semana *em 1980*  
a weekend *in 1980*  
b. um terramoto *em 1980*  
an earthquake *in 1980*  
c. O Paulo morreu *em 1980*  
Paulo died *in 1980*

If we extend Kamp and Reyle’s assumptions described above to the domain of temporal locating prepositions and prepositional phrases, we have to assume that the temporal preposition *in* has a referential argument that is passed up to the prepositional phrase *in 1980*, and that this referential argument is identified with that of the (time) noun *weekend* in (142a), with that of the (eventuality) noun *earthquake* in (142b), and with that of the verb *die* (an achievement description) in (142c). The same, modulo the lexical differences, is obviously valid for the Portuguese examples. The (relevant) DRS-conditions associated are:

- (142) a’. [weekend (t’)], [in 1980 (t’)] – *in 1980* is a **predicate of times**  
b’. [earthquake (ev)], [in 1980 (ev)] – *in 1980* is a **predicate of eventualities**  
c’. [ev: Paulo die], [in 1980 (ev)] – *in 1980* is a **predicate of eventualities**

In simpler words, an expression like *in 1980* denotes the set of eventualities and times “in 1980”, i.e. the set of eventualities and times included in 1980, or possibly also – in the case of atelic eventualities – those merely overlapping 1980. Given these facts, Kamp and Reyle’s algorithm for processing temporal locating phrases (cf. pp. 543, 610) has to be revised. In fact, these authors consider that

“the first step in the construction of a DRS for (...) [any sentence, with or without temporal locating adverbial] must involve the following operations: (...) (iii’) Introduction of a discourse referent **t** for the location time (...); (iv’’) in case the sentence contains a temporal adverb  $\beta$ , introduction of a condition  $\beta(\mathbf{t})$  to record the constraint which the adverb imposes on the location time” (pp. 514-516)

In the light of what has been said so far, the condition introduced will be  $\beta(\mathbf{ev})$ , where  $\mathbf{ev}$  is the located eventuality, and not  $\beta(\mathbf{t})$ , given that the referential argument of the locating adverbial is this eventuality and not the location time. Note that I follow here Kamp and Reyle's convention of using discourse referents within **parentheses** in complex syntactic configurations for expressing a predicative relation (in the case under analysis, between the temporal PP-node and its referential argument  $\mathbf{ev}$ ):

“certain intermediate conditions take the form of predications in which the argument is a discourse referent and the predicate is a complex syntactic structure. In these cases, we have been writing the argument in parentheses behind the top node of the syntactic tree which identifies the predicate” (pp. 531-532).

Of course, the question remains that the constraints which the temporal locating PP imposes on the location time  $\mathbf{t}$  have to be registered, at the level where the PP-node is processed. Now, if the discourse referent  $\mathbf{t}$  is introduced when processing the top  $S'$ -level (a procedure adopted by Kamp and Reyle to which I will stick – cf. justification below), then the construction rules have to contain a mechanism to “pass it down” to the PP-node, where it will be affected by the expressions and operators therein contained. This is done in the rule proposed in the next subsection, where the discourse referent  $\mathbf{t}$  (introduced when processing  $S'$ ) is attached to the locating PP-node, enclosed within **brackets**: i.e. **PP ( $\mathbf{ev}$ ) [ $\mathbf{t}$ ]**. This will allow the rule that processes the temporal PP not only to affect  $\mathbf{ev}$  (e.g. by relating it with  $\mathbf{t}$ , i.e. locating it) but also to affect  $\mathbf{t}$  (e.g. by relating it with the time of the complement  $\mathbf{t}_c$ , and of course with  $\mathbf{ev}$ ). It is however crucial to notice that this “passing down” of the discourse referent  $\mathbf{t}$ , basically a formal trick to ensure its correct binding, is different from the predicative association of the PP-node with its referential argument: **PP ( $\mathbf{ev}$ )**.

At this point, it must be noted that, in Kamp and Reyle's system, the main reason to introduce the discourse referent for the location time  $\mathbf{t}$  when processing the  $S'$ -node (i.e. before processing the temporal locating PP) seems to be the interaction, which these authors assume to hold, between the tense features (TENSE and TEMPORAL PERSPECTIVE) and the location time  $\mathbf{t}$ . As I said in the previous subsection, I assume that these temporal features do not affect  $\mathbf{t}$  (but rather directly the eventuality  $\mathbf{ev}$  described in the tensed clause). Given this assumption, we could conceive of an alternative (simpler) construction mechanism, where  $\mathbf{t}$  is only introduced when processing the temporal locating PP. However, I will find it useful (e.g. for structures with common locators – cf. 4.2.3.4 – or constructions with full-scanning of the location time – cf. chapter 9) to maintain the insertion of  $\mathbf{t}$  at an earlier stage, and I will therefore use the “passing down” mechanism referred to above.

For uniformity reasons, I will adopt a parallel procedure, with respect to the introduction of the location time  $\mathbf{t}$ , for structures where the locating PPs occur adnominally (whether it involves location of eventualities or intervals). More specifically:

- (i) **t** will not be introduced when processing the locating PP, but rather when processing the node that contains the located entity, i.e. the matrix NP, in *um terramoto em 1980* / *an earthquake in 1980*, or *um fim-de-semana em 1980* / *a weekend in 1980*.
- (ii) **t** will be passed down to the locating PP, which will have the form **PP (ev) [t]**, for location of eventualities, or **PP (t') [t]**<sup>81</sup>, for location of intervals.

#### 4.2.2.5. Simplified DRS-construction rules for temporal locating adverbials

In accordance with what was assumed in the previous four subsections, the DRS-construction rules involving temporal locating expressions in adverbial position are as those below:

##### DRS-CR 1. Sentences containing a temporal locating adverbial

CR.S'	
Triggering configuration $\gamma \subseteq \gamma' \in \text{Con}_K$ :	<div style="text-align: center;"> <math>S'</math>  <math>\swarrow \quad \searrow</math>  <math>S \quad \text{PP}_{[+ \text{TEMPORAL LOCATING}]}</math>  </div> <div style="text-align: center;"> <math>\left\{ \begin{array}{l} \emptyset, em, durante, desde, até... / \\ \emptyset, in, on, at, during, since, until... \end{array} \right\}</math> </div>
Introduce in $U_K$ :	new discourse referents <b>ev</b> and <b>t</b>
Replace $\gamma$ by:	<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <math>S (ev) [t]</math>  </div> <div style="margin: 0 10px;">and</div> <div style="text-align: center;"> <math>\text{PP}_{[+ \text{TEMPORAL LOCATING}]} (ev) [t]</math>  </div> </div> <div style="text-align: center;"> <math>\left\{ \begin{array}{l} \emptyset, em, durante, desde, até... / \\ \emptyset, in, on, at, during, since, until... \end{array} \right\}</math> </div>

<sup>81</sup> For examples like *um fim-de-semana em 1980* / *a weekend in 1980*, **t'** represents the located weekend and **t** the location time, 1980. Note that these adnominal locating PPs may occur within sentences that have other location times. In these complex structures, the discourse referents for the location times obviously require distinguishing indices. I will resort to numerical subscripts:

- (i) Durante um fim-de-semana em 1980, o Paulo teve um acidente.  
During a weekend in 1980, Paulo had an accident.

$\text{PP}_{[+ \text{TEMPORAL LOCATING}]} (ev) [t]$

*during a weekend in 1980*

(**t** is the location time of Paulo's accident, i.e. the mentioned weekend)

$\text{PP}_{[+ \text{TEMPORAL LOCATING}]} (t') [t_1]$

*in 1980*

(**t**<sub>1</sub> is the location time of the mentioned weekend, i.e. 1980)

With respect to this construction rule, the following should be noticed:

- (i) The feature-value [+ TEMPORAL LOCATING] (percolating from the temporal preposition) distinguishes the PPs under consideration from others that may occur in the same syntactic configuration (e.g. spatial locators).
- (ii) The categorisation of all temporal locating phrases as PPs is a simplification; in fact, they can also belong to the category  $S'$ , if operators like e.g. *enquanto* / *while* are taken as genuine conjunctions.
- (iii) A covert (or null) locating operator “ $\emptyset$ ” may occur in combination with some time-denoting expressions – e.g. *ontem* / *yesterday*, expressions with English *last* (e.g. *last week*) or, as I will claim later, phrases with *antes* / *before* and *depois* / *after*.
- (iv) As said above, in the configuration **PP (ev) [t]**, **ev** is the referential argument of PP, and **t** is the discourse referent for the location time, which is introduced at the  $S'$ -level and is passed down to PP (since it is affected by the rule that processes this node – cf. DRS-CR 3 below).
- (v) Alternatively, the discourse referent for the location time (**t**) might be inserted only when processing the locating PP. This would simplify the rule, inasmuch as the “passing down” mechanism could be dispensed with. However, there are constructions – where **t** is affected within  $S$  – which require that this discourse referent be attached to the  $S$ -node, and therefore be inserted before the split  $S$  / PP (i.e. at the  $S'$ -level). These structures are, namely: those involving full-scanning of the location time (cf. chapter 9), and those with common locators, if it is assumed that they occur in adjunction to VP (cf. DRS-CR 2 below, and also section 4.2.3.4). Accordingly, I will generalise, and state the  $S'$ -rule as always inserting **t** and passing it down to the two nodes resulting from the split of the original triggering configuration, viz. **S (ev) [t]** – rather than simply **S (ev)** – and **PP (ev) [t]**.
- (vi) If it were assumed (as in Kamp and Reyle’s system) that the aktionsart features of  $S'$  trigger a general condition relating **ev** and **t**, the following instruction would have to be added to DRS-CR 1:  

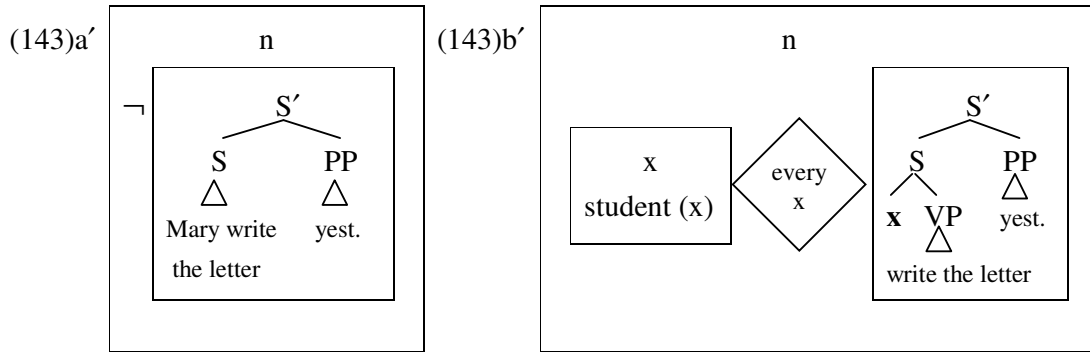
Introduce in  $\text{Con}_K$ : new condition  $[\text{ev} \subseteq \text{t}]$  (if **ev** is telic),  $[\text{ev} \circ \text{t}]$  (if **ev** is atelic).

Alternatively, as I said, these conditions may be inserted only when processing the temporal locating PP (a procedure that I adopt in this dissertation).
- (vii) I ignore here the contribution of the temporal features TENSE LOCATION and TEMPORAL PERSPECTIVE.
- (viii) A rule similar to DRS-CR 1 applies to nominal constituents containing adnominal temporal location phrases, possibly occurring in adjunction to  $N'$ , if they are restrictive (I will not try to assess here what the best syntactic configuration is). Depending on the features attached to the relevant nominal node, the located entity will either be an eventuality **ev** (like in the rule above), as in *um terremoto em 1980* / *an earthquake in 1980*, or an interval **t'**, as in *um fim-de-semana em 1980* / *a weekend in 1980*.

It must be stressed that this S'-rule (DRS-CR 1) does not apply to structures where S contains an operator that creates a sub-DRS (e.g. negation or a universal quantifier) and has scope over the locating adverbial:

- (143) a. A Mary não escreveu uma carta ontem.  
Mary did not write the letter yesterday. (cf. Kamp and Reyle 1993: 547)
- b. Todos os estudantes escreveram uma carta ontem.  
Every student wrote a letter yesterday.

In these cases, I assume that another S'-rule operates first. This S'-rule processes the information concerning the wide-scope operators, and inserts in the relevant sub-DRS a new S'-triggering configuration (to which the DRS-CR 1 above can apply), which is a transformation of the original one, resulting from processing the wide-scope operators (e.g. with elimination of the node NEG, or replacement of the wide-scope NP by the relevant discourse referent):



With respect to these representations, it must be noticed that:

- (i) Determining whether a given operator has (or not) wide scope is an independent issue. I will also not be concerned here with the way of marking wide scope in the formal representation (e.g. with a syntax different from Kamp and Reyle's where the scope is visible in the configuration, or with their syntax (cf. *ibid.*: 550) and a feature percolation mechanism which appends to S' the information that a wide-scope NOT, or EVERY-NP, constituent is inside).
- (ii) The processing of the *yesterday*-adverbial (in the sub-DRS) will insert the location condition  $[ev \subseteq t]$  in that sub-DRS, but will place the conditions defining the location time  $t$  ( $[t = t_c]$  and  $[yesterday(t_c)]$ ) in the main DRS, given the definite character of  $t$ . Note that definite time-denoting expressions behave like other definite NPs with respect to discourse referent accessibility, which means that they normally place their discourse referents in the main DRS (with exceptions, irrelevant now, parallel to that of non-temporal definite NPs). I will return to this issue – which can be quite consequential – at other points of this dissertation (cf. section 6.2.2, after DRS-CR 3', and 9.3.2).

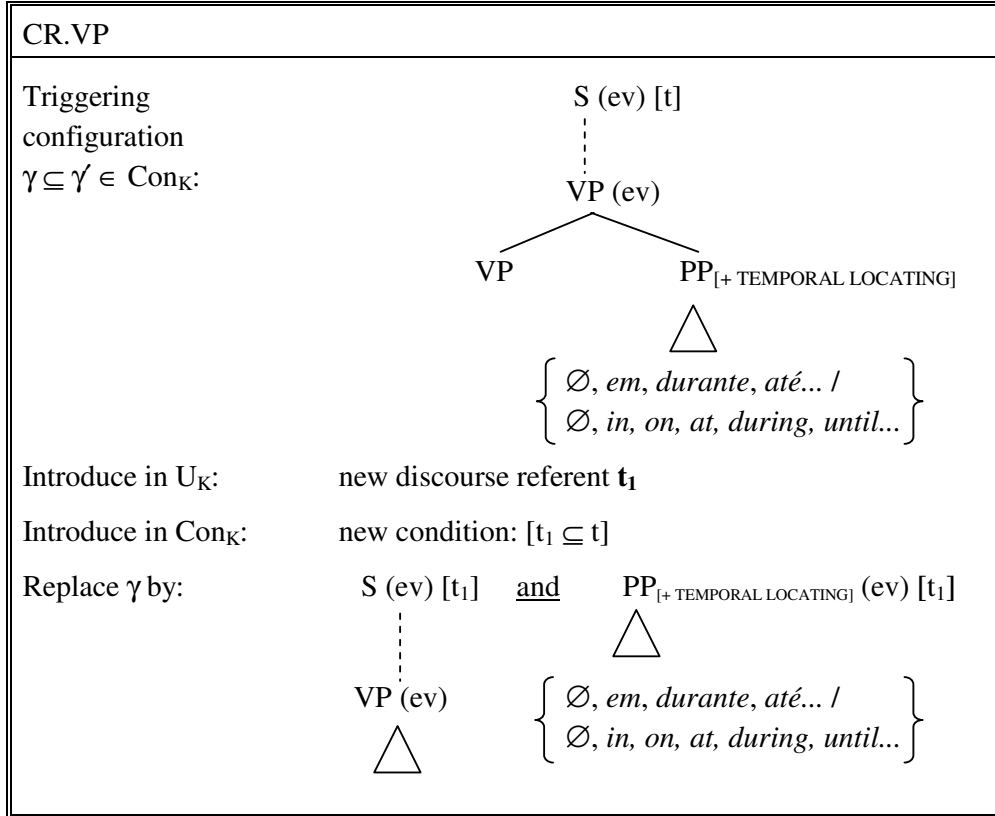
Note still that DRS-CR 1 does not apply, as stated, to *common* temporal locating phrases – i.e. adverbials with indefinite complements like those in italics in the sentences below – if we take them to be adjuncts at VP-level rather than at a sentential level, as has been proposed in the literature (cf. 4.2.3.4, for discussion of this issue):

- (144) a. O Paulo [foi à igreja *numa sexta-feira*] a semana passada.  
           Paulo [went to the church *on a Friday*] last week.  
       b. O Paulo [trabalhou *até às 10 horas*] ontem.  
           Paulo [worked *until 10 o'clock*] yesterday.

Nevertheless, I believe that a rule similar to DRS-CR 1 can be adopted for these cases, taking into account the differences in syntactic position. In particular, it has to be considered that the location times associated with common locators (a Friday, or a period stretching backwards from 10 o'clock to some unspecified moment, in the examples *a* and *b* above, respectively) are always subintervals of the location times associated with any proper locator that may occur in the same sentence (the week or day that precedes the utterance time, in the examples above).

The construction rule could be, tentatively, formulated as follows<sup>82</sup>:

**DRS-CR 2. VPs containing a temporal locating adverbial**

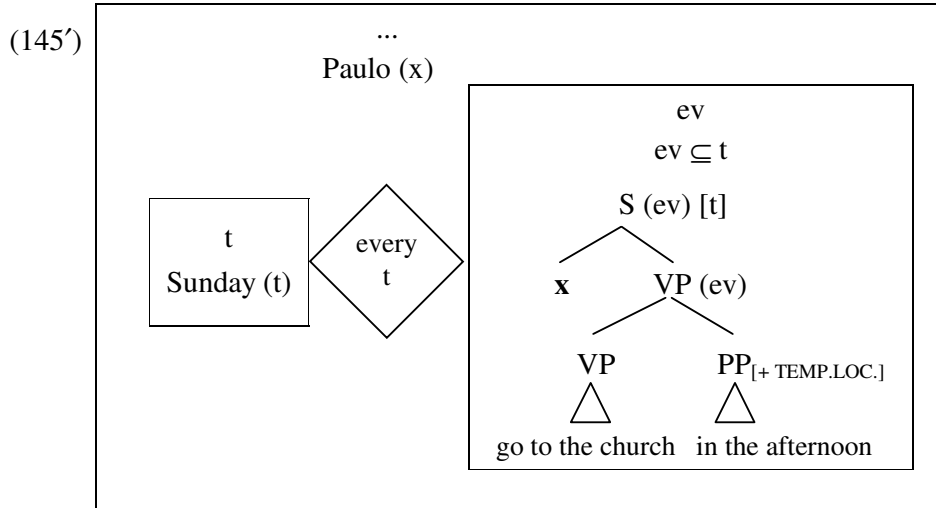


<sup>82</sup> I stress the tentativeness character of this rule. In fact, I have focused on proper location, and did not do enough research on common locators to assess the adequacy of DRS-CR 2 for all cases.

With respect to this construction rule, the following should be noticed:

- (i) **t** is the same time discourse referent that was inserted in the representation by the S'-rule (DRS-CR 1), and was passed down to the S-node. Note that that this discourse referent **t** is available for the VP-rule, because the successive transformations within S preserve the “skeleton” S–VP'–VP–V; in technical terms, VP is here the *root of the triggering configuration*, but not its higher node (which is S) – cf. Kamp and Reyle (1993: 532-533).
- (ii) There may be restrictions, which I ignore here, as to what temporal prepositions may head this type of locators (e.g. normally, *desde* and *since* cannot).
- (iii) It would certainly be interesting to assess whether/how this rule applies in more complex contexts, like those with “location relative to a set of intervals” (i.e. Kamp and Reyle’s structures with “adverbs of temporal quantification”). I will not do this assessment here, but note that the same rule apparently applies to triggering configurations inside the nuclear scope of duplex conditions, for instance, as sentence (145) below illustrates. In fact, at some point of the processing of this sentence, it seems plausible that the representation will look like (145')<sup>83</sup>:

- (145) O Paulo [foi à igreja à tarde] todos os domingos.  
 Paulo [went to the church in the afternoon] every Sunday.



<sup>83</sup> Obviously, I simplified here a lot, mainly by choosing an example without an explicit “higher frame” – like e.g. *em 1980 / in 1980* – which normally occurs in these type of sentences. Note that the inclusive condition  $[ev \subseteq t]$  in the nuclear scope of the duplex condition results directly, I assume, from the processing of the “adverbial of temporal quantification”  $\emptyset_{em} todos os domingos$  /  $\emptyset_{in} every Sunday$ . I will return to this type of sentences in section 4.2.3.4.

Finally, let us look at the rule that processes the temporal locating phrase itself.

### DRS-CR 3. Temporal locating adverbials

CR.PP <sub>[+ TEMPORAL LOCATING]</sub>	
<p>Triggering configuration  <math>\gamma \subseteq \gamma' \in \text{Con}_K</math>:</p>	<p>PP<sub>[+ TEMPORAL LOCATING]</sub> (ev) [t]</p>
Introduce in $U_K$ :	new discourse referent $t_c$
Introduce in $\text{Con}_K$ :	<p>new condition:</p> <p>[beg (t) <math>\subseteq</math> <math>t_c</math>], [end (t) <math>\subseteq</math> <math>t_c</math>], or [t = <math>t_c</math>]</p> <p>[NB: conditions introduced by <i>desde / since, até / until</i> and <i>em, durante / in, on, at, during</i>, respectively – cf. Table 4, on page 91]</p>
Introduce in $\text{Con}_K$ :	<p>new condition:</p> <p>[ev <math>\subseteq</math> t], [t <math>\subseteq</math> ev], [ev <math>\circ</math> t],  or other(s) relating <b>ev</b> and <b>t</b></p> <p>[NB: the choice depends on the aktionsart of <b>ev</b>, on the preposition P, and on other relevant information possibly available – cf. chapter 8]</p>
Replace $\gamma$ by:	<p>XP (<math>t_c</math>)</p>

With respect to this construction rule, the following should be noticed:

(i) The information about the aktionsart of **ev**, necessary to trigger the adequate location condition, is available in the very form of discourse referent (attached to the PP-node): **e** or **s**, for instance (**ev** being just a notational simplification here). More fine-grained distinctions between types of eventualities may of course be introduced, as is done in a DRT framework by e.g. Smith (1991) or Swart (1998).

(ii) If a general condition relating **ev** and **t** ([ev  $\subseteq$  t] or [ev  $\circ$  t]) were introduced in the DRS at the S'-level (as in Kamp and Reyle's system), only supplementary conditions, if



applicable, would be introduced at this PP-level. For instance, if there were a combination of a Portuguese *desde*-phrase or an English *until*-phrase with an atelic sentence, rule DRS-CR 1 would introduce  $[ev \circ t]$  and rule DRS-CR 3 would introduce  $[t \subseteq ev]$  (making the first condition redundant).

(iii) As was said, the complements of the locating operators (XP) may not be basic time-denoting expressions. For instance, they can be subordinate clauses that represent eventualities ( $ev'$ ). However, as will be discussed in the next section, these non-basically temporal expressions can, in principle, be associated, in these contexts, with an interval  $t_c$ , the default relation possibly being  $[t_c = loc(ev')]$ . However, there are cases where  $[t_c = beg(ev')]$ ,  $[t_c = end(ev')]$ , or even more complex relations hold (cf. observations about *quando / when* in 6.3). The choice of  $[R(t_c, ev')]$  is dependent on several factors, among which the locating operator preceding COMPL, and the (aktionsart) properties of COMPL.

(iv) Given this top-down algorithm,  $t_c$ , the argumental discourse referent of the complement of the locating preposition, is introduced in the DRS before this complement is processed. Hence, a time-denoting expression like *March*, in the sequence *Paulo got married in March*, for instance, comes associated with a discourse referent  $t_c$ , but, strictly speaking, does not introduce it into the DRS. This is in contrast with what happens in argumental contexts, like *March was a terrible month for me*, where the time-denoting expression itself introduces  $t_c$  in the representation (for these structures, I adopt Kamp and Reyle's algorithm for comparable structures). However, for simplicity, and given that this amounts to a mere technicality that does not seem to have much semantic import, I will sometimes say (throughout the dissertation) that time-denoting expressions *introduce* a discourse referent (together with one or more conditions that define it).

(v) DRS-CR 3 is a general rule that does not take into account the specificity of particular operators. A more refined rule should identify, for instance (just to give two simple examples): (i) for the null locating operator, the contexts where it is obligatory, optional and forbidden; (ii) for *desde* and *since*, that a condition defining the upper bound of the location time ( $[end(t) = TPpt]$ ) is also normally introduced (with some exceptions for Portuguese *desde*) – cf. chapters 8 and 9.

(vi) DRS-CR 3 seems to apply also to adnominal temporal location phrases. However, if location of intervals is involved, **PP** ( $t'$ ) [ $t$ ], rather than **PP** ( $ev$ ) [ $t$ ], will occur in the triggering configuration. Furthermore, as was already said, the location of intervals ( $t'$ ) seems to involve a less varied typology of location relations. Normally, only inclusive (not merely overlapping) conditions apply:  $[t' \subseteq t]$ . This is probably due to the fact that the intervals to be located – weekends, Sundays, etc. – are conceived of as bounded entities, and are thus subject to similar location restrictions as events (bounded eventualities).

(vii) Some adaptations of this rule may be required for the (relatively more complex) structures where temporal adverbials occur with perfective auxiliary verbs and (arguably)

locate the eventuality described by the underlying non-perfective clausal structure, rather than the result state described by the perfective clause. This is, for instance, the case of English sentences with *since*, in the analysis of Kamp and Reyle 1993:

“a *since*-phrase is not used to characterize the location time of the state *s* described by the sentence itself, but rather the location time of some other, related, eventuality”  
(p. 632, fn. 66).

This issue will be discussed in some detail in chapter 9.3.1.2, after DRS-CR 9.

### 4.2.3. Temporal location vs. time denotation

#### 4.2.3.1. General aspects

I claimed in 4.2.2.4 that **temporal locating adverbials** are predicates of eventualities and times<sup>84</sup>. They are, nevertheless, significantly distinct from what I call **time-denoting expressions**, which are essentially phrases that represent sets of intervals (i.e. predicates of times like *domingo* / *Sunday* or *fim-de-semana* / *weekend*), or directly designate intervals (i.e. names of times like *1980*), but that do not, just by themselves, locate the entities described in the structures to which they apply. Formally, time-denoting expressions merely introduce a time discourse referent *t'* (or are associated with a previously introduced time discourse referent *t'*), together with a condition of the form [TDE (*t'*)] (where **TDE** is the time-denoting expression), for instance (cf. Table 5 below).

Time-denoting expressions may occur as part of a temporal locating adverbial, as in (146a), though this needs not be the case – cf. (146b):

- (146) a. O Paulo casou em *1980*.  
Paulo got married in *1980*.
- b. *1980* foi um ano fantástico.  
*1980* was a splendid year.

Conversely, a temporal locating adverbial must always include a time-denoting expression (either basically time-denoting, or indirectly time-denoting, as is the case of temporal subordinate clauses – cf. next subsection).

As I said before, I will argue in this dissertation that some prepositional phrases – like, for instance, those headed by *antes* / *before*, *depois* / *after* and *entre* / *between* – are time-denoting expressions (which may be preceded by a null locating operator and thus look superficially like temporal locating adverbials) and not, strictly speaking, temporal locating adverbials (cf. specially chapter 6).

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<sup>84</sup> They are clearly predicates of times in contexts like *um fim-de-semana em 1980* / *a weekend in 1980* or *Junho é no primeiro semestre do ano* / *June is in the first half of the year*.

#### 4.2.3.2. Some notes on the semantic diversity of time-denoting expressions

The definition of intervals by means of time-denoting expressions is primarily constrained by the referential type of the expressions involved. A major basic distinction relevant to this question is the distinction between (i) strictly temporal expressions, (ii) situational expressions (including temporal clauses), and (iii) object or individual-denoting expressions. They are exemplified in sentences *a*, *b* and *c* below, respectively:

- (147) a. Portugal é uma República desde 1910.  
Portugal has been a Republic since 1910.
- b. O Paulo vive em Paris desde {*que se licenciou / a sua licenciatura*}.  
Paulo has lived in Paris since {*he graduated / his graduation*}.<sup>85</sup>
- c. Clinton foi o primeiro presidente democrata a ser reeleito desde *Roosevelt*.  
Clinton has been the first Democratic president to be reelected since *Roosevelt*.<sup>86</sup>

*Lato sensu*, **time-denoting expression** can be used as a cover term for all these expressions: strictly temporal expressions are *basic* time-denoting expressions; situational expressions and (basic) object or individual-denoting expressions are *derived* time-denoting expressions in contexts such as (147b-c). This is in keeping with the assumption (which I share with many authors in the literature – cf. references below) that, irrespective of their different (basic) referential properties, all these expressions behave homogeneously as representations of intervals in the adverbial contexts under analysis. The differences between the subtypes of time-denoting expressions at issue involve essentially the mechanisms through which they are associated with time intervals.

Observe the following table, where **TDE** represents a time-denoting expression, **t'** is discourse referent for the interval it represents which is relevant for temporal location, and **R** stands for a relation that is not specified here:

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<sup>85</sup> I will refer to the eventuality represented within the time adverbial as **locating eventuality** (as opposed to the **located eventuality**, represented in the matrix structure).

<sup>86</sup> João Peres (p.c.) called my attention to this type of time-denoting expressions.

*Table 5. Subtypes of time-denoting expressions (TDE)*

			associated conditions	examples
<b>basic TDE</b>	<b>strictly temporal expressions</b>	<b>structurally simple</b>	[TDE (t')] (irreducible)	<i>1910</i> <i>fim-de-semana / weekend</i>
		<b>structurally complex</b>	[TDE (t')] (reducible)	<i>há uma hora / one hour ago</i> <i>as últimas três horas / the last three hours</i> <i>antes de o Paulo chegar / before Paulo arrived</i> <i>entre as 2 e as 3 da tarde / between 2 and 3 p.m.</i>
<b>derived TDE</b>	<b>situational expressions</b>		[ev': TDE] (clausal) [TDE (ev')] (nominal) ^ [R (t', ev')]	<i>que se licenciou / he graduated</i> <i>a sua licenciatura / his graduation</i>
			■ [t' = loc (ev')] is possibly the default case; sometimes also [t' = beg (ev')], [t' = end (ev')], etc.	
	<b>object/individual-denoting expressions</b>		[TDE (x)] ^ [R (t', x)]	<i>Roosevelt</i>

In this dissertation, I will focus mainly on **strictly temporal expressions**. As said, these are basic time-denoting expressions, which predicate directly over (or else, name) parts of the time axis – cf. the associated DRS-condition [TDE (t')]. Even taking into account just this subclass, it is easy to notice that the processes by which intervals of the time axis are defined are quite varied and often complex. Compare, for instance, the diversity of semantic operations involved in the processing of expressions (which – I will advocate – are all basic time-denoting expressions) such as: *1910* (direct representation via a proper-like name), *há uma hora / one hour ago* (temporal measurement from the speech time, defining an interval non-adjacent to it), *as últimas três horas / the last three hours* (temporal measurement from the speech time, defining an interval adjacent to it), *quando o Paulo chegou / when Paulo arrived* (identification via an eventuality), *antes de o Paulo chegar / before Paulo arrived* (definition of an upper bound by reference to an eventuality), or *entre as 2 e as 3 da tarde / between 2 and 3 p.m.* (definition of a lower and an upper bound). As we can see, except for the first, all these time-denoting expressions have a relatively complex syntactic structure. This, in turn, corresponds to a complex semantic contribution (the *quando / when* cases being a case of outstanding complexity – cf. section 6.1.2). In fact, for these **structurally complex time-denoting expressions**, the general

condition [TDE ( $t'$ )] has to be regarded as a simplified notation for a set of DRS-conditions, i.e. as a reducible DRS-condition. In the following chapters, I will discuss and try to formalise some of these reducible conditions.

**Situational expressions** are nominal or clausal phrases that basically represent eventualities. However, as has been widely recognised for a long time (cf. e.g. Rohrer 1977, Hamann 1989), expressions like temporal clauses behave as time-denoting expressions, that is, they (also) represent intervals of time. In the system of Kamp and Reyle (1993), who also share this view on situational complements, this is dealt with by systematically associating – via the function LOC – the eventualities described in these complements with the smallest closed interval that contains them. Thus, the DRS-conditions associated to these derived time-denoting expressions are: (i) [ $ev'$ : TDE] or [TDE ( $ev'$ )] (for clausal and nominal complements, respectively), and (ii) [ $t' = loc (ev')$ ]. There is a slight complication in this case: as is well known, it is not always the case that the whole “loc” of the eventuality described in the subordinate structure ( $ev'$ ) is the relevant interval for temporal location (whence the observations in the table above); in some cases, only the beginning or the end of  $ev'$ , for instance, is relevant; for *quando / when*, nuclear components of  $ev'$  (e.g. its preparatory phase or consequent state) have also possibly to be taken into account. I will not elaborate on this issue in this dissertation (cf., however, observations in section 6.1.1.3, and the discussion about *quando / when* in 6.1.2).

Note still that, following the common use in the literature, I use the term *temporal* location also for structures involving eventualities as locating entities. This, however, is not supposed to mean (as was already said in 1.2.1.1) that the eventualities located in these structures are necessarily associated, by way of the adverbial, with a specific part of the time axis, definable by a calendar term, for instance<sup>87</sup>. Take as an example the sentence:

- (148) a. Estava a chover quando o Paulo chegou.  
It was raining when Paulo arrived.

If nothing is known about the time of Paulo’s arrival, then, strictly speaking, the eventuality described in the main clause is not located on the time axis, but it is merely located relative to another eventuality. This is in contrast with what happens in structures like:

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<sup>87</sup> Cf. e.g. Heinämäki (1974):

“Temporal clauses give a time reference for the main clause. Time adverbials do the same. (...) The temporal clauses do not give the time reference directly, but with respect to some other state of affairs. If one knows when this other state of affairs obtained, one can also infer the time of the main clause, within certain limits. However, [for a sentence like *John graduated when unemployment was very high*] even if the hearer does not know when the job market was bad, for instance in terms of years or months, the temporal clause is still not out of place. The hearer is entitled to infer that there was such a time (...) and that John's graduation occurred at that time” (p. 23).

Note that the term “time adverbial” is used by Heinämäki in a more restricted sense than the one used in this dissertation, not covering temporal clauses.

- (148) b. Estava a chover hoje às sete horas.  
It was raining at 7 o'clock today.
- c. Estava a chover quando o Paulo chegou, hoje às sete horas  
It was raining when Paulo arrived, at 7 o'clock today.

It seems to be a general property of the (so-called) temporal expressions that they allow both what can be termed a “(strictly) time-related location” and an “eventuality-related location”. Compare, for instance, the examples *a* and *b* in the following pairs of sentences (which exhibit different types of temporal adverbials):

- (149) a. Vários edifícios ruíram durante os últimos dois anos. [time-related]  
Several buildings collapsed during the last two years.
- b. Vários edifícios ruíram durante o terramoto. [eventuality-related]  
Several buildings collapsed during the earthquake.
- (150) a. O professor discutiu a obra de Goethe há três semanas. [time-related]  
The teacher discussed Goethe's work three weeks ago.
- b. O professor discutiu a obra de Goethe há três aulas. [eventuality-related]  
The teacher discussed Goethe's work three classes ago.
- (151) a. O Paulo foi para a cama depois das dez horas. [time-related]  
Paulo went to bed after 10 o'clock.
- b. O Paulo foi para a cama depois de ver o noticiário. [eventuality-related]  
Paulo went to bed after watching the news.

In the next subsection, I will return to this type of structures involving locating eventualities (and discuss some specific questions they pose).

Finally, **(basic) object/individual-denoting expressions**, i.e. nominal expressions that basically denote objects or individuals, can also be used, in adverbial contexts such as (147c) above, to represent times (i.e. as derived time-denoting expressions). Here are some more examples:

- (152) a. Clinton é o presidente americano mais popular desde Roosevelt.  
Clinton has been the most popular American president since Roosevelt.
- b. Nenhum presidente tinha sido tão popular (como Clinton) desde Roosevelt.  
No president had been so popular (as Clinton) since Roosevelt.

As can be easily seen, these expressions require an even more complex process (than that of situational expressions) to relate the individual they basically denote (**x**) to a stretch of the time axis (**t'**). Consequently, the DRS-condition  $[R(t', x)]$  in Table 5 is to be taken as a simplified notation that stands for (possibly) a set of conditions relating the two relevant discourse referents. I will also not elaborate on this issue here, leaving it for further research.

#### 4.2.3.3. Temporal locating adverbials and non-strictly temporal (rhetorical) relations

In this subsection, I will describe some facts, involving derived time-denoting expressions (situational complements), that may suggest that the rule for temporal locating adverbials proposed in 4.2.2.5 is insufficient or not adequate for all cases. These facts have to do with the frequent emergence of non (strictly) temporal relations – for instance, causal relations – in structures with temporal locating adverbials. I will try to show that an analysis of time adverbials along the lines proposed in 4.2.2.5 is compatible with these facts.

As was said, eventualities expressed through matrix structures may be located in time by way of other eventualities (“locating eventualities”), occurring within temporal locating adverbials. At this point, it is important to recall that locating eventualities (like, for that matter, located ones) may be expressed by nominal means, as in (153a), or by sentential means (temporal clauses), as in (153b):

- (153) a. O Paulo adormeceu durante *a viagem de avião de Lisboa para Estugarda*.  
Paulo fell asleep during *the flight from Lisbon to Stuttgart*.
- b. O Paulo adormeceu enquanto *a Ana preparava o jantar na cozinha*.  
Paulo fell asleep while *Ana prepared the dinner in the kitchen*.

Structures involving locating eventualities pose special problems, which, as a rule, I will ignore in this dissertation, since they require a study of their own. However, given that some of them seem to interact more or less directly with the assumptions that are being made in this chapter, it is relevant to consider them at this point. Let us start by observing the following two structures:

- (154) a. O Paulo nasceu durante *a Segunda Guerra Mundial*.  
Paulo was born during *the Second World War*.
- b. Está a chover desde *que o Paulo chegou*.  
It has been raining since *Paulo arrived*.

In the most natural interpretation of these sentences, the relationship between locating and located eventualities seems to be **strictly temporal** (as is arguably also the case for those in (153)), that is, these eventualities seem to be connected merely by the temporal relation expressed by the temporal adverbial. For instance, in (154a) the birth-event is included in the period the war lasted, and in (154b) the rain-eventuality covers the whole period between Paulo’s arrival and the utterance time (and, also in the most natural interpretation, started at the moment of his arrival, no causal connection between these two events, for example, being plausible). I believe that these strictly temporal cases can be accounted for by the type of construction rule proposed in 4.2.2.4, assuming that the locating eventuality ( $ev'$ ) is associated with an interval ( $t_c$ ), via the function **loc**: [ $t_c = \text{loc}(ev')$ ] – the “time of the complement”  $t_c$  is the time of the war in (154a) and the moment of Paulo’s arrival in (154b). The temporal information conveyed by the sentences in (154) follows directly:

- (i) the temporal operator relates this time of the complement ( $t_c$ ) to the location time of the sentence ( $t$ ) – *durante* and *during* equate the two intervals ( $[t = t_c]$ ), *desde* and *since* associate  $t_c$  with the lower bound of  $t$  ( $[beg(t) \subseteq t_c]$ );
- (ii) the temporal preposition relates the location time  $t$  to the located eventuality ( $ev$ ) (in interaction with the relevant aktionsart features in the structure) – *durante* and *during* locate the achievement described in (154a) inclusively ( $[ev \subseteq t]$ ), *desde* and *since* locate the activity described in (154b) duratively ( $[t \subseteq ev]$ ).

However, as has been acknowledged in the literature for a long time, the use of eventuality-descriptions in temporal locating expressions often conveys more than merely temporal information. I will focus on two non-temporal (or, at least, non-strictly temporal) relations between located and locating eventualities that are often associated with temporal locating expressions: **causal relations**, as in the more natural interpretation of (155), and what we could perhaps term **mereological relations**<sup>88</sup>, as in the more natural interpretation of (156):

- (155) a. Todos riram quando o John estava a tentar trepar uma palmeira.  
Everybody laughed when John was trying to climb a palm tree.  
(Heinämäki 1974: 23)
- b. O John ficou doente depois de comer vinte donuts.  
John got sick after he ate 20 donuts. (*ibid.*)
- c. O John está a sentir-se maldisposto desde que comeu este bolo.  
John has been feeling sick since he ate this cake.
- (156) a. Quando construíram a ponte da 49<sup>th</sup> Street, um arquitecto da cidade  
desenhou os planos.  
When they built the 49<sup>th</sup> Street bridge, a local architect drew up the plans.  
(Moens 1987: 77)
- b. Quando construíram a ponte da 49<sup>th</sup> Street, usaram os melhores materiais.  
When they built the 49<sup>th</sup> Street bridge, they used the best materials. (*ibid.*)

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<sup>88</sup> I will use the term mereological – or part-of – relation in a relatively informal sense here, without a commitment to any specific (formal) structure of the domain of events, and without trying to define criteria that determine whether an event is conceived of as part of another one. I will stick to very simple cases, where the notion of “part-of-an-event” seems intuitive. For instance, there is an intuitive sense in which bombardments of towns (or even human casualties) can be conceived as part of a war; that is why I say that a mereological relation may be involved in (156c). Sentences (156a-b) can be conceived in similar terms (as parts of the preparatory phase of the described accomplishment), with the peculiarity that a sort of anaphoric connection can be established between the subordinate and the main clause, thus facilitating the mereological reading (*um arquitecto da cidade desenhou os planos [da ponte] / ...a local architect drew up the plans [of the bridge]*, *...usaram os melhores materiais [na construção da ponte] / ...they used the best materials [in the construction of the bridge]*). This “mereological relation” is *grosso modo* the “elaboration relation” of the literature on rhetorical relations – cf. (160) below.



- c. Cem cidades foram bombardeadas durante a guerra.  
One hundred towns were bombarded during the war.

These types of relations are probably to be regarded as outstanding instances of a more general requirement affecting the use of eventuality-descriptions within temporal adverbials, viz. that some **relevance relation** can be established between the locating and the located eventualities. This seems to be the view of Heinämäki (1974: 23, my italics):

“If [in e.g. the sentence *John graduated when unemployment was very high*] the sole purpose of the temporal clause is not to give the time reference of the main clause [in DRT-terms: **loc (ev)**] as precisely as possible, then on what basis can one choose the content of the temporal clause out of the multitude of events that happened simultaneously with John’s graduation? Why mention the high [un]employment rate? If the discussion is concerned with John’s chances of getting a job, then the general job situation is certainly *relevant background information*. Among these “*relevance factors*” we can mention different kinds of *causal relations, which often figure on top of purely temporal relations*”.

Assuming this requirement, the oddity of sentences like the following may be attributed to the difficulty of establishing – given our world knowledge – any relevance relation between the described eventualities:

- (157) a. ?Choveu no deserto do Atacama quando o Paulo deixou de fumar.  
          ?It rained in the Atacama desert when Paulo stopped smoking.  
      b. ?O Paulo deixou de fumar desde que choveu no deserto do Atacama  
          pela última vez.  
          ?Paulo has quit smoking since it rained in the Atacama desert for the last  
          time.

At this point, it is important to notice that the issue at stake – the existence of non-strictly temporal relations between eventualities *within single sentences containing temporal locating adverbials* – must probably be considered within the more general issue of the **rhetorical** (or **discourse**) **relations** between sentences. This general issue has received quite a lot of attention in the literature since the mid-eighties, essentially after the works of Nicholas Asher and Alex Lascarides<sup>89</sup> and specially in association with multi-sentential discourse<sup>90</sup>. Asher’s “rhetorical relations” (e.g. explanation, elaboration, background, narration), which are assumed to govern discourse connectedness, can be associated with the “relevance factors” mentioned in Heinämäki’s quotation above. Observe Asher’s *Principle of Rhetorical Connectedness*:

<sup>89</sup> Cf., just to give some examples, Asher (1993), Lascarides and Asher (1993), Lascarides and Oberlander (1993), and before them Hobbs (1985) and Mann and Thompson (1987).

<sup>90</sup> For an analysis of these relations within a single (complex) sentence, cf. Bäuerle (1995), who discusses the existence of rhetorical relations in association with *als* (German approximate counterpart of *when*) clauses.

(158) PRINCIPLE OF RHETORICAL CONNECTEDNESS

“Each new sentence or clause in a discourse or text must be interpreted as standing to one or more other clauses or sentences in text in a certain rhetorical relation.

(If the interpretation does not succeed in establishing such a relation, then the interpreter has the feeling that the current sentence or clause has not been properly understood and the discourse appears to lack coherence.)” (*apud* Kamp 1998: Appendix, p. 2).

An approximation can be made between the two types of relations observed within single (possibly complex) sentences in (155) and (156) above, and two rhetorical relations, described for sequence of sentences, namely: between the “causal relation” of (155) and the (rhetorical) “explanation relation”, on one hand, and between what I called the “mereological relation” of (156) and the (rhetorical) “elaboration relation”, on the other hand<sup>91</sup>. See the following definitions in Lascarides and Asher (1993: 440):

(159) *Explanation*( $\alpha$ ,  $\beta$ ): the event described in  $\beta$  explains why  $\alpha$ ’s event happened (perhaps by causing it) – e.g. *Max fell. John pushed him.*

(160) *Elaboration*( $\alpha$ ,  $\beta$ ):  $\beta$ ’s event is part of  $\alpha$ ’s (perhaps by being in the preparatory phase) – e.g. *The council built the bridge. The architect drew up the plans.*

For the purposes of the present discussion, it is not important to assess whether or not the non-temporal relations between temporal adverbials and matrix clauses have (as the facts may seem to suggest) exactly the same status as the rhetorical relations between sentences in multi-sentential discourse. I will leave this issue aside, and stick to the terminology of “causal” and “mereological” relations. It is interesting to notice, however, that, should the non-temporal relations exemplified in (155) and (156) be considered as rhetorical relations, the latter would have to be conceived of as relations between eventuality-describing expressions in general (nominal constituents included) and not as relations between sentences and/or clauses alone. Observe:

(161) a. O Paulo ficou doente depois de *um jantar de quatro pratos em casa da Ana*.  
Paulo got sick after *a four-course dinner at Ana’s place*.  
[likely causal / explanation relation]

Compare with:

- b. O Paulo adoeceu depois de ter um jantar de quatro pratos em casa da Ana.  
Paulo got sick after eating a four-course dinner at Ana’s place.
- c. O Paulo adoeceu. Teve um jantar de quatro pratos em casa da Ana.  
Paulo got sick. He ate a four-course dinner at Ana’s place.

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<sup>91</sup> Note that, whereas, in (155), the “explanation” is made (i.e. the cause is expressed) by the (complement of the) temporal adverbial, in (156), the “elaboration” is made (i.e. the subevent is expressed) by the main clause.

- (162) a. Cem cidades foram bombardeadas durante *a guerra*.  
 One hundred towns were bombed during *the war*.  
 [likely mereological / elaboration relation]

Compare with:

- b. Cem cidades foram bombardeadas enquanto a guerra durou.  
 One hundred towns were bombed while the war lasted.
- c. A guerra durou vários meses. Cem cidades foram bombardeadas.  
 The war lasted several months. One hundred towns were bombed.

In this dissertation, I do not wish to delve into the specific analysis of intra-sentential interactions (or interactions between sentential and non-sentential eventuality-descriptions, for that matter). The main reason to bring this topic into the discussion here is that the facts described up to now might be thought to indicate that the rule I have proposed for temporal adverbials needs to be revised (I will argue that this not the case!), in order to account for these kinds of extra-temporal information (should they be considered part of the semantic contribution of the time adverbial). The relevant questions to be considered here are: (i) the linguistic status of the non-temporal information conveyed in sentences with time adverbials (in particular whether it is an assertion or an implicature, or else whether it has the status of a rhetorical relation, as suggested above), and – in connection with this question – (ii) what is the source of the non-temporal information (the time adverbial itself, or not). I will subsequently make three observations pertaining to these issues.

1. We must note that the existence of non (strictly) temporal relations – e.g. causal or mereological relations – between eventualities, in structures with temporal adverbials, does not seem to result from the use of specific temporal operators. On the contrary, these relations seems to be generally compatible with most (if not all) of these operators – cf. e.g. *quando* / *when*, *depois* / *after*, *desde* / *since* and *durante* / *during*, in the examples above; examples with other operators, such as *antes* / *before*, *até* / *until*, or *enquanto* / *while*, *as long as*, can also easily be constructed on parallel terms (cf. examples of “causal implicatures” associated with some of these operators in Heinämäki 1974: 115 ff.). Consequently, the existence of a given non-temporal relation in the relevant type of structures does not seem to be predictable from – though, of course, it can be constrained by<sup>92</sup> – the temporal operator alone. Neither is it predictable from the whole temporal adverbial, as the following pairs of sentences, exhibiting the same adverbial, illustrate:

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<sup>92</sup> The compatibility with causal and mereological relations can be partially determined by the intrinsic temporal properties of the temporal operators. For instance, a part-of relation entails a temporal overlap of eventualities – therefore, it is easily compatible with operators like *durante* / *during*, *enquanto* / *while* or *quando* / *when*, for instance, but seems hardly compatible with e.g. Portuguese *desde* / *since*, *depois* / *after* and *antes* / *before* (cf. example of possible exception: *o Paulo mora num apartamento desde que está em Paris* [“Paulo LIVES in a flat since he IS in Paris”]; here, the states of the matrix and of the subordinate clause run concurrently, given that, when the complement of *desde* is a stative clause with simple present, the lower bound of the location time is the *beginning* of the state described in this complement). A causal relation, on the

- (163) a. Todos riram *quando o Paulo estava a tentar trepar uma palmeira*.  
Everybody laughed *when Paulo was trying to climb a palm tree*.  
[likely causal relation]
- b. Começou a chover *quando o Paulo estava a tentar trepar uma palmeira*.  
It started to rain *when Paulo was trying to climb a palm tree*.  
[no causal relation]
- (164) a. O Paulo ficou doente *depois de comer vinte donuts*.  
Paulo got sick *after he ate twenty donuts*.  
[likely causal relation]
- b. O Paulo comeu dez “hamburgers” *depois de comer vinte donuts*.  
Paulo ate ten hamburgers *after he ate twenty donuts*.  
[unlikely causal relation]

In fact, as these examples clearly evince, the non-temporal relations at stake seem to be essentially dependent on the lexical content of both the locating and the located eventualities, and on the world knowledge of the possible relations between eventualities (as, for that matter, is also the case with rhetorical relations in discourse). Heinämäki (1974), for instance, takes the type of causal relations under discussion to be implicatures, dependent on the context:

“it is possible for (12) [*everybody laughed when John was trying to climb a palm tree*] to appear in a context where it has been made clear that people were laughing for some other reason, or (13) [*John got sick after he ate 20 donuts*] is still true if John became sick from something other than donuts. The point is that these *causal implicatures* are affected by the context, while the temporal relation remains unaffected” (p. 24, my italics).

Mereological relations seem to be dependent on the same type of contextual information. Compare, for instance, the following three sentences, and the likelihood of the events described in the main sentence being conceived as part of the wedding ceremony:

- (165) a. Durante a cerimónia de casamento, o padre leu uma passagem da Bíblia.  
During the wedding ceremony, the priest read a passage of the Bible.
- b. Durante a cerimónia de casamento, a torre da igreja foi atingida por um raio.  
During the wedding ceremony, the church steeple was struck by lightning.
- c. Durante a cerimónia de casamento, o Paulo sentiu sede.  
During the wedding ceremony, Paulo felt thirsty.

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other hand, entails normally temporal sequence, whence it combines more easily with operators like Portuguese *desde / since* and *depois / after*; however, the occurrence of causal relations is also possible with so-called “co-temporal operators” (cf. footnote 94).

Compare still the following two sentences:

- (166) a. O Paulo morreu durante a guerra.  
Paulo died during the war.
- b. O Paulo nasceu durante a guerra.  
Paulo was born during the war.

While the latter obviously carries no implication that Paulo's birth be considered part of the war event, the former may – though need not (a matter of ambiguity, or vagueness, thus arising) – carry the implication that Paulo's death is “part of the war” (or is caused directly by some event that is part of the war, such as a bomb being dropped, for instance<sup>93</sup>). The “merely temporal interpretation” is made prominent with a strictly temporal locating expression, as in (167a). The “mereological interpretation” is made prominent by supplying contextually relevant information, as in (167c).

- (167) a. O Paulo morreu entre 1939 e 1945.  
Paulo died between 1939 and 1945.
- b. O Paulo morreu no campo de batalha durante a guerra.  
Paulo died on the battlefield during the war.
- c. O Paulo morreu durante a guerra. Era um soldado valente e caiu em combate.  
Paulo died during the war. He was a brave soldier, and was lost in action.

2. The second observation in order is quite crucial for the issue (under discussion) of the adequacy of the proposed DRS-rule for temporal locating adverbials. It has to do with the **(possible) redundancy of the temporal information conveyed by the temporal locating adverbial** in contexts where the mentioned extra-temporal relations are present. Let us consider a case involving (likely) causal relations between the described eventualities:

- (168) a. O Paulo ficou doente depois de comer vinte donuts.  
Paulo got sick after he ate twenty donuts.
- b. O Paulo está doente desde que comeu este bolo.  
Paulo has been sick since he ate this cake.

Causality obviously has temporal implications, the normal assumption being that a caused event follows the causing event (cf. e.g. “layman's view of causality” in Heinämäki 1974:

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<sup>93</sup> Note the following interesting fact: the dying-event is temporally included in the war time; if the war (as a whole) is considered as the cause of the death, this is a case in which what is being taken, in general terms, as the causing event does not (entirely) precede the caused event (as is the normal case), but merely overlaps it. Of course, this is only possible because the war can be conceived as containing some particular subevent that precedes Paulo's death and directly causes it (e.g. somebody shooting a gun, or some bomb hitting the ground). For the sake of simplicity, I will consider that a “mereological” rather than a “causal” relation is involved here (but this does not affect the point at stake).

120, fn. 5) – (169a) – or at least does not precede it<sup>94</sup> (cf. e.g. the law “Causes Precede Effects”, in Lascarides and Asher 1993<sup>95</sup>) – (169b):

- (169) a. [cause (ev', ev)] → [ev > ev'] (stronger version)  
 b. [cause (ev', ev)] → [ev > beg (ev')] (weaker version)

If we assume that a causal relation (stronger version) obtains in the sentence (168a), as seems natural, then the temporal information conveyed by *depois* and *after* is obviously redundant. In sentence (168b), matters are slightly different. Even with a similar assumption, the temporal information conveyed by *desde* and *since* is not redundant, given that these prepositions express more than mere posteriority (namely, that the state still holds at the utterance time). However, the point is that causal relations may – though not always do – make the strictly temporal information conveyed by the temporal adverbials redundant.

The cases involving mereological relations are particularly interesting in this respect, since these relations seem to make the strictly temporal information always redundant. Take, for instance the following sentence (and assume a framework where the bombardment is taken to be a part of the war-event):

- (170) Londres foi bombardeada durante a Segunda Guerra Mundial.  
 London was bombed during the Second World War.

The strictly temporal information that the bombardment is included in the period of the war ([ev ⊆ t]), conveyed by *durante* and *during*, is obviously redundant in the light of the more specific mereological relation. In fact, if we assume that

- (171) [part-of (ev, ev')] → [loc (ev) ⊆ loc (ev')]

the relevant temporal information is always inferred. Let us look at this in more detail. According to the construction rule I proposed in 4.2.2.5, the representation of (170) would include the following DRS-conditions (identical for Portuguese and English, modulo the lexical differences):

- (170)' [ev: London be bombed]  
 [ev ⊆ t], [t = t<sub>c</sub>], [t<sub>c</sub> = loc (ev')]  
 [the Second World War (ev')]  
 [part-of (ev, ev')] (not provided by my rule)

<sup>94</sup> Heinämäki (1974: 118) mentions cases of “an overlap of duration of the cause and effect” (when the clauses are co-temporal), as in *we felt homesick when we were eating blueberry pie*. Eating the pie can be understood as a cause for the feeling of homesickness; however, the eating-the-pie-eventuality obviously does not have to entirely precede (i.e. to be finished before) this feeling appeared. The case discussed in the previous footnote is perhaps comparable.

<sup>95</sup> “• Causes Precede Effects

If  $e_1$  causes  $e_2$ , then (indefeasibly)  $e_2$  does not precede  $e_1$ . (...)

□ (cause ( $e_1, e_2$ ) → ¬  $e_2 < e_1$ )” (Lascarides and Asher 1993: 445, 463)

Given (171) above, the three (temporal) conditions on the second line of (170') are redundant, that is, (170') is tantamount to the following:

- (170)'' [ev: London be bombarded]  
           [the Second World War (ev')]  
           [part-of (ev, ev')]

Now, the question raised by these types of structures – with redundant temporal information provided by the temporal locating adverbial – is the need to have, in the first place, this information inserted in the representation (by a DRS-rule like the one I proposed above). Two alternatives are available. One, which I am inclined to favour, is that all the mentioned strictly temporal information is always inserted in the structure: this means applying the proposed DRS-rule for temporal locating adverbials in all these cases, thus treating the adverbials therein uniformly as true temporal locating adverbials; the relevant thing to remark then is that the temporal location information they convey may be made redundant given the temporal properties associated with other relations (e.g. causal or mereological) present in the structure<sup>96</sup>. In my opinion, this analysis elegantly accounts for the fact that the same formal resources (in terms of prepositional operators) are used in the cases where a strictly temporal reading is obtained and in those where the interpretation invokes a non-temporal relation as well. Another alternative is to consider that these adverbials are not basically temporal, that is – formally – that they do not define a location time *t* for the located eventualities *ev* (and do not express a relation between *t* and *ev*). Rather, their function is to directly express a causal or mereological relation (or possibly others). For the sake of simplicity, let us consider the mereological case only. The analysis at stake would imply considering that the adverbials in the following pairs of sentences are of a different type (though superficially identical):

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<sup>96</sup> It must be noted that I have considered here essentially relations that have an “extra-temporal component”, viz. the causal one (cf. explanation relation) or the mereological one (cf. elaboration relation). The cases where I considered that a *strictly temporal interpretation* is at stake could, however, be analysed also by invoking rhetorical relations, namely “background” and “narration” (which are essentially temporal relations):

- (i) O Paulo adormeceu {enquanto chovia, lá fora / durante a viagem de avião de Lisboa para Estugarda}.  
       Paulo fell asleep {while it was raining outside / during the flight from Lisbon to Stuttgart}.  
       [background]
- (ii) O Paulo adormeceu antes de {começar a chover / o noticiário}.  
       Paulo fell asleep before {it started to rain / the news}.  
       [narration]
- (iii) Depois do noticiário, o Paulo adormeceu.  
       After the news, Paulo fell asleep.  
       [narration]

Note, however, that if we consider that rhetorical relations are present in this type of structures as well, and, furthermore, that this information does not come from the temporal adverbial alone (as seems to be the case with the other two types of rhetorical relations), then the contribution of the adverbial alone (in the terms I propose here) is once more redundant.

- (172) a. O Paulo nasceu durante a Segunda Guerra Mundial.  
Paulo was born during the Second World War.  
[temporal]
- b. Londres foi bombardeada durante a Segunda Guerra Mundial.  
London was bombed during the Second World War.  
[non-strictly temporal: mereological]
- (173) a. O Paulo teve uma dor de cabeça terrível há três aulas (atrás).  
Paulo had a terrible headache three classes ago.  
[temporal]
- b. O professor discutiu a obra de Goethe há três aulas (atrás).  
The teacher discussed Goethe's work three classes ago.  
[non-strictly temporal: mereological]

This analysis has perhaps the advantage of a simpler discourse representation – (170), for instance, would be represented as (170''), and not as (170'). I will not try to assess its possible adequacy here. However, as I said, I am inclined to reject it, based on the following facts: (i) it does not account for the fact that the same formal resources are used for both the strictly temporal and the non-strictly temporal readings, and (ii) the relevant non-temporal relations do not seem to stem from the adverbial alone.

3. A third and final observation about this matter has to do with some particularly outstanding **interactions between the non-temporal relations under analysis and the temporal information conveyed by the locating adverbials**. I will refer to two different cases here. The first is a case where the (in)existence of causal relations directly affects the temporal conditions imposed by a time adverbial. It is illustrated in the following group of sentences:

- (174) a. O Paulo está doente desde segunda-feira.  
Paulo has been ill since Monday.
- b. O Paulo está doente desde que começou as férias.  
Paulo has been ill since his holidays began.  
[unlikely causal relation]
- c. O Paulo está doente desde que tomou estes comprimidos.  
Paulo has been ill since he took these pills.  
[likely causal relation]

The use of *desde* and *since* adverbials in combination with descriptions of simple states involves – or may involve (in the case of *since*)<sup>97</sup> – a durative temporal location, that is, the

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<sup>97</sup> In combination with descriptions of simple states, like in (174a), *desde* only allows the durative reading; *since* also allows a non-durative reading ( $[s \circ t] \wedge [\neg [t \subseteq s]]$ ), which is not relevant here.



described states  $s$  are said to cover the whole of a (location) period  $t$ , stretching from the time nailed down by the complement of *desde* ( $t_c$ ) to – normally – the TPpt. As said before, this mode of location can be expressed formally with the condition:

$$(175) \quad [t \subseteq s] \text{ (where, in this case, } [beg(t) \subseteq t_c] \text{ and } [end(t) = TPpt])$$

This is clearly what happens in (174a-b), which do not involve causal relations, in the Portuguese sentences, and in one (possibly the most salient) reading of the corresponding English sentences. However, if a causal link is established between locating and located eventuality, as in the most natural interpretation of (174c), the temporal interpretation cannot be accounted for with the condition  $[t \subseteq s]$ . In this case, the location time, as defined by *desde que tomou os comprimidos / since he took the pills* is the whole interval that mediates between Paulo's taking the pills ( $t_c$ ) and the utterance time. But Paulo's sickness cannot, strictly speaking, cover this whole interval, if the sickness is caused by taking the pills. In fact, the located eventuality (i.e. the caused event of being sick) follows the locating eventuality (the causing event of taking the pills), and it is quite plausible that a hiatus (short though it may be) occurred between them. In this case, we have a **quasi-durative location**, which can be paraphrased as “the located eventuality covers *almost* the whole of the location time”, and can be formally represented as:

$$(176) \quad [beg(t) <_{close} s] \wedge [end(t) \circ s]$$

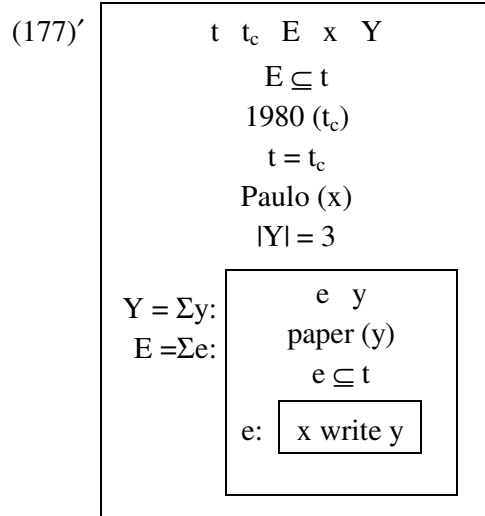
(where “ $<_{close}$ ” stands for a relation of “close anteriority”)

Thus, the choice between (175) and (176) in atelic sentences with *desde* or (durative) *since* adverbials depends merely on the (in)existence of causal relations in the structure. I will return to this issue in chapter 8.

The second case of a particularly interesting interaction between temporal and non-temporal relations involves structures where (what I will call) a “full-scanning” of the location time occurs. The concept of full-scanning will be thoroughly explored in chapter 9. For the purposes of the present discussion, suffice it to say that: (i) the notion at stake applies, for instance, to structures where the number of entities involved in a given eventuality is counted, taking into account *the whole of* a given period, as in:

$$(177) \quad \begin{array}{l} \text{O Paulo escreveu (exactamente) três artigos em 1980.} \\ \text{Paulo wrote (exactly) three papers in 1980.} \end{array}$$

and (ii) in these structures, a representation like (177') below, where the discourse referent for the location time occurs within a sub-DRS, in the condition  $[e \subseteq t]$ , seems adequate. Note that (177') and the two other representations that will be presented in this subsection are identical for English and Portuguese, modulo the lexical differences (but, for facility, I represent the lexical elements in English):

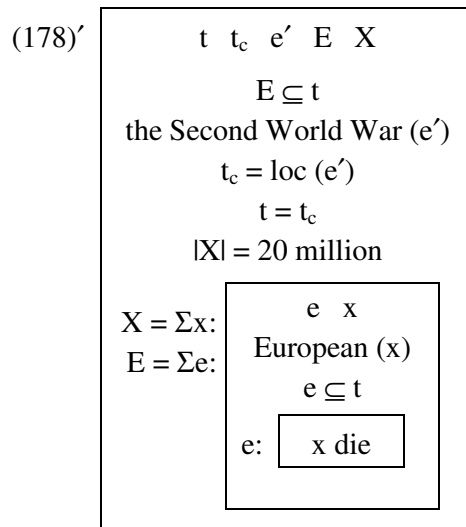


The relevant part of this representation is to be read as “the set of papers (**Y**) that Paulo wrote *within time t* has cardinality 3”. If Paulo had written a different number of papers (say, two or six) within that time the sentence would be false.

Now let us consider the next example, and assume a mereological (or causal<sup>98</sup>) connection between the described eventualities (which is in fact in keeping with the historical facts):

- (178)     Vinte milhões de europeus morreram durante a Segunda Guerra Mundial.  
Twenty million Europeans died during the Second World War.

Observe the following (simplified) representation, where this connection is not expressed:



The relevant part of this representation is to be read as “the set of Europeans (**X**) that died *within time t* (the period the war lasted) has cardinality 20 million”. Now, this is obviously

<sup>98</sup> Cf. footnote 93.

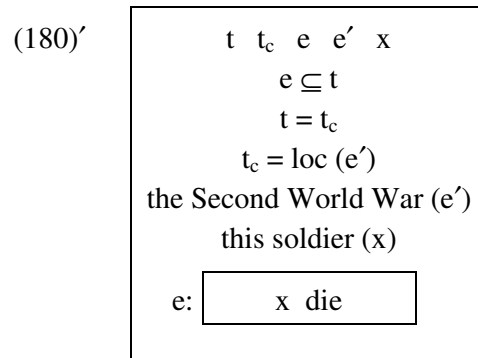
not what the sentence says, nor is it in keeping with the historical facts. In reality, many more Europeans died during the period of the war, i.e. between 1939 and 1945: the deaths of Europeans within this period include those occurred in geographical areas that were not involved in the war, and those occurring in the belligerent countries that resulted from natural causes, or other causes not directly associated with the war. Clearly, what the sentence (178) says is that “20 million is the total number of Europeans that died *during the period of the Second World War* and, furthermore, *as a (more or less) direct result of this war*”. The latter *restriction* has to be encoded in the representation, within the sub-DRS – e.g. under the form [part-of (e, e’)] or [cause (e’, e)], for instance – or else the sentence will be – wrongly – computed as false, in a model defined according to the real historical events. Another similar example, involving causal relations is the following:

- (179) Depois de a doença das vacas loucas ter sido descoberta, foram abatidas  $n$  mil vacas na Inglaterra.  
After the mad-cow disease was discovered,  $n$  thousand cows were slaughtered in England.

Clearly, this sentence can be uttered having into account only the  $n$  thousand cows that were slaughtered in order to try and contain the epidemic (many more were probably slaughtered for other purposes, namely to sell their meat, within the same period and in the same geographical area). In this reading, the causal restriction has to be encoded in the sub-DRS associated to the NP [ $n$  thousand cows] in order to correctly register the truth conditions of the sentence.

The general problem that these sentences illustrate is that they would be considered false in worlds where they are supposed to be true, if the (restrictive) non-temporal relations were not inserted in the representation. It must be noted that this problem, which arises in the full-scanning structures just mentioned, does not arise, with the same import, in sentences involving simple inclusive location, such as:

- (180) Este soldado morreu durante a Segunda Guerra Mundial.  
This soldier died during the Second World War.



Obviously, here, even if the mereological (or causal) relation is not introduced in the representation, the sentence would not be considered false, if this relation holds. In this

case, the representation says “less” (so to speak) than the sentence says, in the mereological or causal reading, but not something different from it.

Given the temporal relevance of the mentioned non-temporal relations, I will occasionally introduce in the representations conditions such as [cause (ev', ev)] (for causal relations) or [part-of (ev, ev')] (for mereological relations), although they are not provided by the algorithm I propose.

#### 4.2.3.4. Proper vs. common time-denoting expressions

To end this chapter, I will consider the type of variation (in time-denoting expressions) illustrated in the following sentences:

- (181) a. O Paulo nasceu {no domingo passado / no primeiro domingo de 1965}.  
Paulo was born {last Sunday / on the first Sunday of 1965}.
- b. O Paulo nasceu num domingo.  
Paulo was born on a Sunday.

Sentences (181a), containing a definite expression, involve a uniquely defined interval, referring to a specific part of the time axis, which is used as a frame for location. Conversely, sentences (181b), containing an indefinite expression, involve a *type of* interval that occurs recursively on the time axis, and with which the described eventuality is associated; these sentences can be taken to also express temporal location, though less precise (so to say) than (181a), to the extent that they relate an eventuality to a time interval. The two forms of location illustrated here – one involving a specific part of the time axis, the other merely a type of intervals – are substantially different. Let us concentrate in the latter case, since the former has been the focus up to now. The relevance of the temporal information conveyed in (181b) results basically from the contrast between the type of interval that is mentioned and other (comparable) types in which the described eventuality might also have fallen (but did not): with (181b), the speaker expresses that Paulo was born on a Sunday, as opposed to any other day of the week. In these structures, the locating adverbial functions as a true **verbal modifier**. What was said about (181b) applies, with the relevant adaptations, to sentences like:

- (182) a. O Paulo nasceu {num mês de Inverno / num ano bissexto}.  
Paulo was born {in a winter month / in a leap year}.
- b. O Paulo nasceu {num período de crise económica / num dia de chuva}.  
Paulo was born {in a period of economical crisis / on a rainy day}.

The differences between (181a), on one hand, and (181b)-(182), on the other hand, have basically to do with the type of **time-denoting expression** that serves as the complement of the temporal locating operator – expressions in (181a) are **proper** in the sense that they uniquely specify an interval; those in (181b)-(182) are **common** in the sense that they specify a class of intervals. (182b) has, furthermore, the peculiarity of defining these

intervals on the basis of their including a given type of eventuality; in these cases, the information conveyed by the temporal adverbial is “eventuality-related” and not “time-related”, in the sense expressed in 4.2.3.2, that is, the eventuality described in the main clause is not located relative to a portion of the time axis, designated with a calendar term, but rather relative to an eventuality (a state of economical crisis or unstable weather, here).

Note, furthermore, that a parallel distinction to the one observed between (181a) and (181b)-(182) can be observed in structures involving strictly situational complements<sup>99</sup>:

- (183) a. O Paulo nasceu num avião durante a primeira viagem que os pais fizeram ao Brasil.  
Paulo was born on a plane during the first trip their parents made to Brazil.
- vs. b. O Paulo nasceu num avião durante uma das muitas viagens que os pais fizeram ao Brasil.  
Paulo was born on a plane during one of the frequent trips their parents made to Brazil.
- (184) a. Esta ponte ruiu durante o terramoto do ano passado.  
This bridge collapsed during last year’s earthquake.
- vs. b. Esta ponte ruiu durante um terramoto.  
This bridge collapsed during an earthquake.

If we extend the common / proper dichotomy, which pertains primarily the domain of time denotation, to temporal location, we can distinguish between **proper temporal location**, in (181a), (183a) and (184a), and **common temporal location**, in (181b), (182), (183b) and (184b), as already mentioned in sections 1.2.1.1 and 4.2.2.5 above. The differences (both semantic and syntactic) between these two subtypes of temporal location are certainly an interesting topic of study (the application of the term “temporal location” to the second type of sentences being even a matter of debate, given how little temporal information they may convey). I will consider this issue now, taking into account mainly the work of Hitzeman (1993, 1997), but only in a relatively superficial way, since the focus of this dissertation is, as said, proper temporal location.

There are some notable differences between proper and common locators, which can be perceived in different linguistics contexts. For instance, apparently only proper locators can occur in sentence-initial position. Compare sentences (184) above with the following:

- (185)a. Durante o terramoto do ano passado, esta ponte ruiu.  
During last year’s earthquake, this bridge collapsed.
- b. Durante um terramoto, esta ponte ruiu.  
During an earthquake, this bridge collapsed.

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<sup>99</sup> The temporal adverbials in (182b) do not have “strictly situational” complements, since the head of these complements is a temporal noun (*period*, *day*).

The crucial contrast is between (184b) and (185b). In (184b), the expression *um terramoto / an earthquake* can be nonspecific (or nonreferential), in the sense that the speaker does not have a particular entity in mind<sup>100</sup>; the sentence has a “common location reading” then, according to which the speaker asserts that it was during an earthquake-eventuality – whichever it may have been – that the collapse occurred, as opposed to its having occurred during a bombardment, or a tornado, for instance; as noted before, the adverbial acts a verbal modifier here. This reading does not seem to be available in (185b), where a specific interpretation of *um terramoto / an earthquake* prevails; in fact, this sentence only seems to have a “proper-location-like” interpretation, where the speaker has a particular earthquake in mind. Note that this interpretation is also available in (184b), which is therefore a genuinely ambiguous sentence (the same applying to other parallel cases presented above, like (181b), for instance).

This type of contrasts, or comparable ones, was studied by Hitzeman (1993, 1997). This author claims that sentences with locating adverbials in final position can normally have two readings, which she calls “p(osition)-definite” and a “non-p(osition)-definite”<sup>101</sup> (and which correspond to the “proper location” and the “common location” readings, respectively, in the terminology I adopt)<sup>102</sup>:

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<sup>100</sup> “Nonspecific” does not mean here that the existence of the relevant entity is not implied.

<sup>101</sup> Hitzeman focuses on adverbials that contain predicates of amounts of times like *for three hours*, or *in three hours*. For these adverbials, the “p-definite reading” corresponds to “proper location” as well; in fact, a simple predicate of amounts of times can be interpreted in certain contexts as representing not an amount of time *x*, but a particular stretch of the time axis with size *x* (deictically or anaphorically dependent on some anchor point – e.g. the utterance time):

- (i) For an hour Martha will be in her office. (Hitzeman 1997: 89)  
 Durante uma hora, a Martha estará / ficará no escritório.

Note that, according to Hitzeman (1997: 89), in the p-definite reading, *for an hour* is interpreted as “for the hour immediately following the utterance time”; this is, according to her, the only reading that the English sentence in (i) can have; I am not sure that this is necessarily so: at least in the Portuguese sentence in (i), I think that the speaker may have some particular (future) one-hour period in mind (specific reading), which needs not be the one immediately following the utterance time. I will not pursue this question here, though.

The “non-p-definite reading” of the adverbials under consideration does not correspond to “common location”, but rather to “time measurement”:

- (ii) Martha will be in her office for an hour. (*ibid.*)  
 A Martha estará / ficará no escritório durante uma hora.

The adverbials in (ii) are ambiguous between a p-definite and a non-p-definite reading in Hitzeman’s terms. In my terms, they are ambiguous in that they can either be “(proper) temporal locating adverbials” or “temporal measure adverbials”.

<sup>102</sup> A parallel between “p-definiteness” and “specificity” is also established by Hitzeman.

- (186) Mary bought a fur coat in the summer. (cf. Hitzeman 1993: 74)<sup>103</sup>  
 A Mary comprou um casaco de peles no Verão.

The p-definite reading of this sentence involves a location in the summer immediately preceding the utterance time<sup>104</sup>, i.e. proper location; *in the summer* is equivalent here to [*in the*] *last summer* (about this type of context-dependency in the interpretation, cf. also Kamp and Reyle 1993: 613 ff., and Kamp and Schiehlen 1998: 36 ff.). The non-p-definite reading involves a non-specified summer in the past of the utterance time, i.e. common location; *in the summer* is therefore equivalent to *in a (past) summer*.

As Hitzeman notes, the non-p-definite (or common location) reading seems to be lost when the adverbial is placed in sentence-initial position (the same applying to the Portuguese counterparts of the relevant examples):

- (187) In the summer Mary bought a fur coat. (cf. Hitzeman 1993: 75)  
 No Verão, a Mary comprou um casaco de peles.

Hitzeman, invoking Dowty (1979), interprets contrasts like those between (186) and (187) as revealing a difference in the syntactic position of the adverbs, which – using the terminology common / proper locator – can be expressed as follows: proper locators are syntactically attached to the sentential level, common locators to the VP-level (cf. Hitzeman 1993: 96). Notice that I borrowed this analysis in the construction rules for these subtypes of locating expressions presented in 4.2.2.5 (DRS-CR 1 vs. DRS-CR 2).

As Hitzeman also notes, the p-definite reading is lost when a quantifier over events like *once* is added – cf. (188a). More generically, I would say, this reading is lost whenever expressions that involve quantification over the location times associated with these adverbials are added, *once* being one such expression (cf. its analysis in chapter 9); others are plural quantifiers over events (*twice, three times,...*) – (188a) – and adverbials that involve “cardinal” or “proportional” quantification<sup>105</sup> over location times – (188b) and (188c), respectively (cf. section 1.2.1.2):

- (188) a. Mary bought a fur coat in the summer {once / three times}.  
 A Mary comprou um casaco de peles no Verão {uma vez / três vezes}.
- b. Mary bought a fur coat in the summer in three (different) years.  
 A Mary comprou um casaco de peles no Verão em três anos (diferentes).

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<sup>103</sup> In order to make the non-p-definite reading of “in the summer” (i.e. the one in which it is interpreted as a verbal modifier) more salient, I substituted *fur coat* for *car* (which is the noun occurring in Hitzeman’s original example). In this reading: the (possibly unnatural) event of buying a fur coat *in the summer* is being contrasted with the (possibly more natural) one of buying a fur coat in other seasons of the year.

<sup>104</sup> Depending on the discourse context, another specific summer may be picked up.

<sup>105</sup> Cf. the distinction between “cardinality quantifiers” and “proportional quantifiers” in Kamp and Reyle (1993: 454 ff.).

- c. Between 1980 and 1885, Mary bought a fur coat in the summer every year.  
Entre 1980 e 1985, a Mary comprou um casaco de peles no Verão todos os anos.

These facts clearly show that the period associated with a common locator may act as a bound variable (ranging over possible location times). Conversely, the period associated with a proper locator does not have this property.

Finally, note that, if we disregard the quantificational aspects, complements of common locators (predicates of times) seem to behave essentially in the same way in all the structures considered. See, for instance:

**indefinite quantification**

- (189) A Ana foi à igreja num domingo [em 1980].  
Ana went to church on a Sunday [in 1980].

**cardinality quantification**

- (190) A Ana foi à igreja (em) três domingos [em 1980].  
Ana went to church (on) three Sundays [in 1980].

**proportional quantification**

- (191) A Ana foi à igreja  $\emptyset_{em}$  todos os domingos [em 1980].  
Ana went to church  $\emptyset_{on}$  every Sunday [in 1980].

In the simplified (schematic) representations below (where **ev** represents an event of Ana going to church, which is iterated in the cases of (190)-(191)), we can observe that:

- (i) structures with (singular) indefinite quantification involve single location times; normally, the common locator introduces a discourse referent for the location time  $t_n$  in the main DRS<sup>106</sup> (unless some subDRs-creating wide-scope operator is present – cf. 4.2.2.5);  $t_n$  is to be interpreted as a subinterval of any bigger location time  $t_{n-1}$  already introduced for the same sentence (cf. DRS-CR 2, on page 106) – 1980, in the example (189) above:

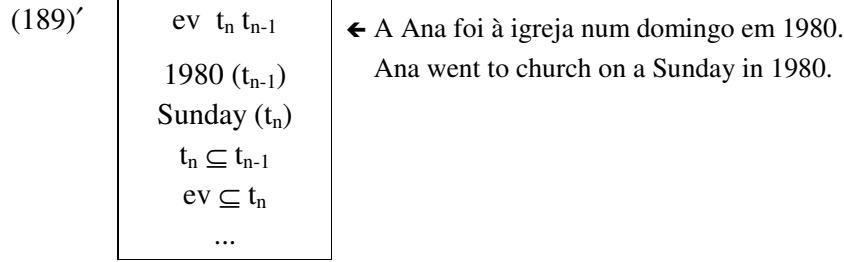
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<sup>106</sup> Singular common and proper locators behave similarly in this respect. Note still that in certain contexts definite descriptions may introduce their discourse referents at subordinate levels – cf. Kamp and Reyle (1993: 297 ff.): *every student fears the professor who supervises [his dissertation]*; the same happens with definite locators (and with indefinite ones, *a fortiori*):

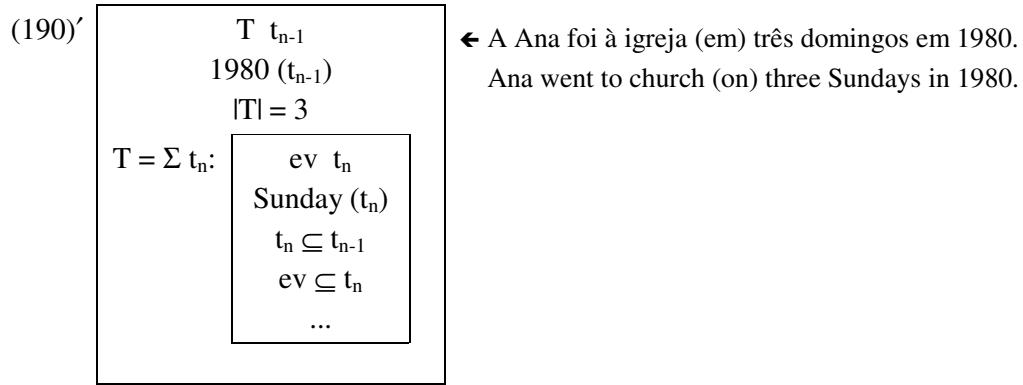
- (i) Todos os pais foram à igreja n [o domingo em que o seu primeiro filho se baptizou].  
Every parent went to church on [the Sunday their eldest child was christened].

This issue will not be discussed here.

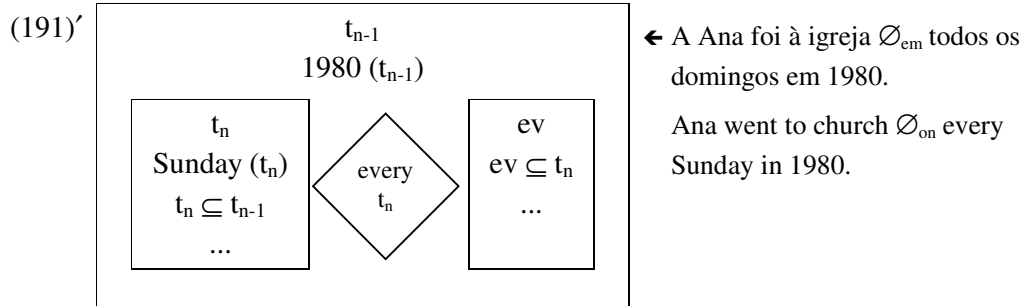




- (ii) structures with cardinality quantification involve multiple location times (unless they express cardinality “one”); the common locator introduces a bound discourse referent for a location time  $t_n$  in a sub-DRS created by abstraction (assuming Kamp and Reyle’s treatment of cardinal quantifiers)<sup>107</sup>; the relation between  $t_n$  and any possible bigger location time  $t_{n-1}$  already introduced for the same sentence is inclusion, as above:



- (iii) structures with proportional quantification involve multiple location times; the common locators introduce a bound discourse referent for a location time  $t_n$  in the restrictor of a duplex condition (assuming Kamp and Reyle’s treatment of proportional quantifiers); once more, the relation between  $t_n$  and any possible bigger location time  $t_{n-1}$  already introduced for the same sentence is inclusion:



<sup>107</sup> On some issues raised by the introduction of non-atomic time discourse referents (**T**), and the cardinality assertions involving these referents, see chapter 7.1.2.

Note that, for examples parallel to (191) with adverbials containing eventuality-descriptions (cf. (192) below), it can still be considered that the “principal discourse referent of the duplex condition” (i.e. the one within the diamond) represents an interval ( $t_n$ ) rather than directly an eventuality ( $ev'$ ):

- (192) a. durante todas as cerimónias de casamento  
           during every wedding ceremony  
       b. sempre que havia um casamento  
           whenever a wedding was celebrated  
       c. quando havia um casamento  
           when a wedding was celebrated

In these cases,  $t_n$  is related with the described eventuality  $ev'$  (which is defined in the restrictor) by e.g. **loc** ( $[t_n = \text{loc}(ev')]$ ) or some other pertinent, perhaps more complex, relation. In other words, the quantification over the eventualities described in the adverbial can be interpreted, at least in some cases, as quantification over intervals to which they are associated (typically their “loc”, but not necessarily so). Note that, if we opt for this “indirect proceeding”, a uniform treatment of eventuality-descriptions in locating and so-called frequency (or temporal quantification) adverbials is achieved. In fact, as noted several times before (cf. e.g. previous subsection, or 4.2.2.5), it is common to associate temporal locating subordinate clauses (or NPs) to intervals, which are then taken as location times for other eventualities.

Structures containing temporal locators with singular definite or indefinite complements instantiate what I termed **location relative to a single interval** (cf. Table 1, on page 14). Structures with cardinal or proportional quantification instantiate **location relative to a set of intervals**. The common formal aspect, which justifies the use of the term “location” in both cases, is the presence of a condition relating a given entity (described in the structure to which the adverbial applies) to an interval (described in the adverbial) –  $[ev \subseteq t_n]$ , in the examples above.

## Chapter 5

### The dividing line between temporal locating adverbials and temporal measure adverbials<sup>108</sup>

In many cases, the distinction between temporal locating adverbials and temporal measure adverbials is self-evident:

- (193) a. A Ana trabalhou como enfermeira neste hospital *em 1980*.  
Ana worked as a nurse in this hospital *in 1980*.  
b. A Ana trabalhou como enfermeira neste hospital *durante três anos*.  
Ana worked as a nurse in this hospital *for three years*.

In (193a), the eventuality of Ana working as a nurse in the hospital is located in a given stretch of the time axis (the year 1980), whereas in (193b) the same eventuality is temporally quantified, that is, a given amount of time is stated as corresponding to its duration. Consequently, the expressions in italics qualify indisputably as a temporal locating adverbial and a temporal measure adverbial, respectively. These are trivial cases that seem to pose no problems of classification<sup>109</sup>.

However, the dividing line between the two classes at stake is not always so easy to draw. As was said in section 4.1, the most salient cases of disputable classification involve the expressions considered by some authors as examples of **overlapping of functions** in one single phrase: location and temporal measurement of a given eventuality.

“in some cases, an adverbial phrase serves both as a durative adverbial phrase and as a frame adverbial phrase” (Bennett and Partee 1978: 29)

“there are (...) adverbs which simultaneously serve as location and as measure of the described eventuality. So it is not easy to draw a sharp dividing line between locating adverbs and measure adverbs” (Kamp and Reyle 1993: 612-13)

Among the examples mentioned in the literature, I will focus on those that include predicates of amounts of time, such as *durante os últimos três anos* / *for the last two years*,

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<sup>108</sup> The core content of this chapter was presented at the XVI<sup>th</sup> International Congress of Linguistics, in Paris, July 1997, under the title “On the Expression of Duration and Temporal Location through Adverbials Containing Predicates of Amounts of Time” (bibliographical reference: Mória 1997).

<sup>109</sup> In fact, the Portuguese sentence (193b) may be ambiguous (cf. section 5.2). If the preposition *durante* is interpreted as the counterpart of English *during*, and *ano* (*year*) is taken as calendar noun (rather than as a measure noun), the adverbial as a whole involves cardinality quantification over location times (three calendar years), and is therefore of a type akin to the traditionally designated “frequency adverbials” (cf. section 4.2.3.4).

because they seem to be the most controversial<sup>110</sup>. Other adverbials (not containing predicates of amounts of time) that may raise similar questions of ambivalence, such as *das duas às três da tarde* / *from 2 to 3 p.m.*, will be briefly dealt with at the end of section 5.1.3 (cf. examples (214)).

Hence, the main issue I will be concerned with is whether a clear-cut **classification** of the adverbials containing predicates of amounts of time, like *durante dois anos* / *for two years* and *durante os últimos dois anos* / *for the last two years*, can be defined, taking into consideration the question of overlapping of functions. I will try to show that the most economic and revealing classification of these adverbials is one that distinguishes just two basic categories – “temporal measure adverbials” and “temporal locating adverbials” (this being a much wider class including also adverbials that do not contain predicates of amounts of time) – and places the so-called “ambivalent adverbials” in the second category. These two categories are essentially told apart by the fact that – in the latter, but not in the former – the predicates of amounts of time contained in the adverbials are combined with an expression that defines an interval of the time axis, which serves as a location frame. In other words, I will advocate that, except for indefinite expressions like *durante dois anos* / *for two years*, which may express solely the duration of an eventuality, without locating it, all other adverbials containing predicates of amounts of time (as, for that matter, many others that do not contain such predicates) are locating expressions.

Furthermore, I will hypothesise that *inferentially extracted information* about the duration of the located eventuality is what makes some of these locating adverbials look like ambivalent operators, even though, as far as assertion is concerned, they are merely locating expressions. Thus **asserted vs. inferred duration** of eventualities will prove to be a key distinction with respect to the definition of a clear taxonomy of temporal adverbials.

In this chapter, I will present data in Portuguese, English and German, for the sake of language variety, and because of the interesting properties of the German operator *lang* with regard to the issue under discussion. It will be noted that, despite some idiosyncrasies of the operators, the main principles seem to apply quite generally across different languages. I will concentrate on Portuguese *durante* and *em* adverbials, and their counterparts in English – *for*, *during* and *in* adverbials – and German – *lang*, *während* and

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<sup>110</sup> Kamp and Reyle (1993) seem inclined to adopt an analysis of these expressions as basically temporal measure adverbials:

“the contributions of **for three years** and **for the last three years** are clearly distinct for one involves reference to an amount of time and the other reference to some particular interval. But on reflection this might well be a distinction without a difference. Intuitively, the roles which the two **for**-phrases play (...) seem very similar indeed. Both, it might be thought, have the function of determining the duration of the states they serve to characterize. That the phrase **the last three years** also specifies – supererogatorily, so to speak – the temporal location of those states does not alter this. Once we think of **the last three years** as a measure phrase (...)” (p. 650).

The data presented in this subchapter shows that this view is untenable as soon as adverbials containing expressions like *the last three years* headed by prepositions other than *for* are taken into account.

in adverbials<sup>111</sup>. For simplicity, I will refer to them collectively as “*for*, *during* and *in*-type adverbials”, or “FDI-adverbials”, for short.

A second question that will be briefly addressed in this chapter, in section 5.2, is the **ambiguity** of some adverbial phrases, which can be both locating and temporal measure adverbials, in certain contexts. This ambiguity relates directly, as will be observed, to the lexical ambiguity of nouns like *month*, *year*, etc., which can be both “measure nouns”, (that is, express amounts of time, or “units of time measurement”) and “calendar nouns” (that is, represent specific parts of the time axis, or “units of calendar time”)<sup>112</sup>. For all the examples given in 5.1, only the measure noun interpretation is relevant.

### 5.1. The categorisation of adverbials containing predicates of amounts of time

In this subchapter, I will concentrate on the categorisation of the adverbials headed by a preposition (or a comparable expression<sup>113</sup>) that have predicates of amounts of times as complements, or as part of their complements. These are illustrated in the following sentences:

- (194) a. A Ana viveu em Amsterdão {durante dois anos / durante os últimos dois anos}.  
 Ana has lived in Amsterdam {for two years / for the last two years}.  
 Ana hat {zwei Jahre lang / während der letzten zwei Jahre} in Amsterdam gelebt.
- b. Ana wrote this book {in two years / in the last two years}.  
 A Ana escreveu este livro {em dois anos / nos últimos dois anos}.  
 Ana hat dieses Buch {in zwei Jahren / in den letzten zwei Jahren} geschrieben.

More specifically, I will take into account all the adverbials – headed by the prepositions *for*, *during* and *in*, and their counterparts in Portuguese and German – that contain predicates of amounts of time, either alone or in combination with: deictic / anaphoric adjectives, relative clauses, (eventuality or time-describing) prepositional phrases, demonstratives, or nuclear nominal expressions – cf. Table 6 below, where these possibilities are illustrated in the order presented here.

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<sup>111</sup> In the structures analysed here, *durante* covers the use of both *for* and *during*, in English, and *lang* and *während*, in German. The distribution of *for* and *lang*, on one hand, and of *during* and *während*, on the other hand, is not the same, as will be seen from the examples given; for instance, *for*, but not *lang*, takes complements containing a predicate of amounts of time combined with a deictical adjective: *for the last two years* vs. \**die letzten zwei Jahre lang*. I will not try to make a thorough description of the distributional differences of the adverbials considered, although some of them will be mentioned along the text.

<sup>112</sup> The terms “measure noun” and “calendar noun” are from Kamp and Schiehlen (1998); the terms “unit of time measurement” and “unit of calendar time” are from Leech (1969).

<sup>113</sup> German adverbials containing the expression *lang*, which does not qualify as a preposition, will also be taken into account. For simplification of the exposition, however, I may ignore in some parts of this text the different (non-prepositional) status of *lang*, and make a collective reference to the structures under analysis as involving a preposition and a complement.

The adverbials at issue include some that have been (or can be) considered ambivalent, but also others that cannot be considered as such<sup>114</sup>. The reason to take them all into account is that a general view of these expressions may – I believe – give a clearer insight into the problem of the overlapping of functions.

### 5.1.1. A two-class typology: (strict) temporal measure adverbials vs. temporal locating adverbials

As said above, I am inclined to think that a suitable categorisation of FDI-adverbials containing predicates of amounts of time is two-fold, distinguishing just between “temporal measure adverbials” and “temporal locating adverbials” (the latter including the so-called “ambivalent adverbials”). In other words, the two basic categories in the following table seem to constitute an appropriate partition of this class of adverbials<sup>115</sup>:

**Table 6. Partition of the set of adverbials that contain predicates of amounts of time**

		typical examples
<b>A.</b>	TEMPORAL MEASURE ADVERBIALS	PREPOSITION + <i>dois anos / two years</i> [non-specific]
<b>B.</b>	TEMPORAL LOCATING ADVERBIALS	PREPOSITION + ----- <i>os últimos dois anos / the last two years</i> <i>os dois anos em que a Ana viveu em Amsterdão /</i> <i>the two years Ana lived in Amsterdam</i> <i>os dois anos do estágio da Ana /</i> <i>the two years of Ana's training course</i> <i>os dois anos entre Março de 1980 e Março de 1982 /</i> <i>the two years between March 1980 and March 1982</i> <i>esses dois anos / those two years</i> ----- <i>o exame de duas horas / the two-hour exam</i> ----- <i>dois anos / two years</i> [specific]

<sup>114</sup> Despite the underlying criteria, it is not absolutely clear, in Kamp and Reyle (1993) and in Bennett and Partee (1978), which adverbials containing predicate of amounts of times (the only ones I am concerned here with) are to be considered ambivalent. For instance, *for*-adverbials, but not *in*-adverbials, are mentioned in these texts as ambivalent adverbials. However, given that the latter also convey – or rather, may convey – information about the duration of the eventuality described in the main clause (cf. (204a) below), I think they would (or should) be considered as such.

<sup>115</sup> Note that, taking into account the data presented in this chapter, adverbials headed by *during* seem to belong only in the second category (i.e. they are not used as strict temporal measure adverbials) and adverbials with *lang* seem to belong only in the first.

The dividing line between these two categories is set by the fact that only the latter contains a combination of a predicate of amounts of time and another expression which defines a location frame on the time axis – e.g. *os últimos dez dias* / *the last ten days*. Given that this combination results normally in a definite expression (at least when the predicate of amounts of time is in a nuclear position), the definiteness of the complement of the preposition ends up playing a crucial role in determining what the (basic) function of the adverbial is. Let us now look at the two classes of Table 6 with more detail.

**Class A** contains adverbials with *indefinite* (non-specific) complements of the form [X-TIME], where X-TIME is a predicate of amounts of time – e.g. *sete horas* / *seven hours*, *dois meses* / *two months*. These adverbials may express solely the duration of an eventuality, without locating it. In DRT terms, they contribute to the DRSs of the sentences in which they occur the discourse referent in (195a) and the conditions in (195b-c):

- |          |   |   |                                       |
|----------|---|---|---------------------------------------|
| (195) a. | mt  | → | amount of time specified by X-TIME    |
| b.       | [X-TIME (mt)]                                     |   |                                       |
| c.       | [dur (ev) R mt]                                   | → | condition stating directly the        |
|          | (where $\mathbf{R} \in \{=, >, \geq, <, \leq\}$ ) |   | duration of the described eventuality |
|          |   |   | <b>ev</b>                             |

The following sentences, in the interpretation given in the subsequent paraphrase, contain this type of adverbials:

- (196) a. A Ana leu este livro *em duas horas*.  
 Ana read this book *in two hours*.  
 Paraphrase: “it took Ana an amount of time of two hours to read this book”.
- b. A Ana esteve no escritório *durante sete horas*.  
 Ana was in the office *for seven hours*.  
 Paraphrase: “Ana was in the office for an amount of time of seven hours”.

**Class B** includes all other FDI-adverbials that contain predicates of amounts of time. A first subset within this class is composed by adverbials with *definite* complements of the form [(*the*) MOD X-TIME] or [(*the*) X-TIME MOD], where the predicate of amounts of time (X-TIME) is in a nuclear position and MOD represents – directly or indirectly (through reference to an eventuality) – properties of an interval of time. MOD may be instantiated by a deictic or anaphoric adjective, a relative clause, a situational or temporal PP, or a demonstrative, for instance (cf. the group under the first dotted line in Table 6). Notice that these complements, as a whole, qualify as time-denoting expressions, i.e. representations of particular portions of the time axis, and not as predicates of amounts of time.

There are some interesting differences between the subtypes of expressions included in this first subset:

- (i) The expressions containing a combination of a predicate of amounts of time and a deictic or anaphoric adjective, such as *último* / *last*, *próximo* / *next*, *anterior* / *previous* or *seguinte* / *following*, define an interval by referring to a specific point on the time axis – an “anchor point” – and stating a quantity of time stretching forwards or backwards from it via the predicate of amounts of time (see more about this in chapter 7). Consequently, in

these structures, the predicate of amounts of time is essential to the definition of the interval, no other of its properties being referred to.

(ii) The expressions containing a combination of a predicate of amounts of time and a relative clause, or a situational or temporal PP, define an interval of the time axis by referring to a given eventuality that occurs in it, or by referring to purely temporal properties, such as its boundaries. Given that this eventuality, or these temporal properties, define the interval uniquely, the predicate of amounts of time, contrary to what happens in the previous case, states a property that is not essential to its definition.

(iii) Demonstratives may anaphorically refer to intervals specified in both these ways.

It must be stressed that all the expressions in this group are being taken as **temporal locating adverbials**, although they contain an expression – the [X-TIME] part of the complement – that represents an amount of time. The crucial thing to notice is that *this amount of time specifies the size of the location time, not the duration of the eventuality represented in the main clause* – cf. (197d) and (197f) below. In DRT terms, the expressions at issue contribute to the DRSs of the sentences in which they occur the discourse referents in (197a-b) and the conditions in (197c-g) (cf. chapter 7 for the relevant constructions rules):

- |       |  |   |
|-------|--|---|
| (197) | a. $mt$  | → amount of time specified by X-TIME  |
|       | b. $t_c$   | → interval represented by the complement of the temporal preposition as a whole, which will be identified with the location time – cf. (197f)   |
|       | c. [X-TIME ( $mt$ )]   |   |
|       | d. [dur ( $t_c$ ) R $mt$ ]   | → condition defining the size of the interval $t_c$<br>( $R \in \{=, >, \geq, <, \leq\}$ )  |
|       | e. [MOD ( $t_c$ )]   | → abbreviation that stands for one or more conditions imposing restrictions on $t_c$ , triggered by the predicative expressions (adjectives, relative clauses, etc.) contained in these adverbials  |
|       | f. [ $t = t_c$ ]   | → condition stating the coincidence between the interval represented in the complement ( $t_c$ ) and the location time of the sentence ( $t$ ); this condition is triggered by the prepositional temporal operator ( <i>durante</i> / { <i>for</i> / <i>during</i> }, <i>em</i> / <i>in</i> ), which belongs to the class of direct temporal locating operators (cf. section 4.2.2.2)                         |
|       | g. [ $ev \subseteq t$ ], [ $t \subseteq ev$ ],<br>or a comparable<br>condition | → temporal location condition, varying mainly according to the preposition and the aktionsart of <b>ev</b> , e.g. [ $ev \subseteq t$ ] (inclusive location), or [ $t \subseteq ev$ ] (durative location) – cf. 4.2.1.2, 4.2.2.1; note that the English preposition <i>for</i> is only compatible with the durative location, while <i>in</i> and <i>during</i> may be associated with other types of location |



The following sentences, in the interpretation given in the subsequent paraphrase, contain this type of adverbials:

- (198) a. A Ana leu este livro *nas últimas duas horas*.  
 Ana read this book *in the last two hours*.  
 Paraphrase: “Ana read this book within the period stretching backwards from the utterance time two hours”.
- b. A Ana esteve no escritório *durante as últimas sete horas*.  
 Ana has been in her office *for the last seven hours*.  
 Paraphrase: “Ana was in her office during the whole of a period stretching backwards from the utterance time seven hours”.

A second subset of temporal locating FDI-adverbials containing predicates of amounts of time (class B) includes expressions with complements of the form [(Det) NUCL X-TIME] or [(Det) X-TIME NUCL], where X-TIME occurs in a subordinate (i.e. non-nuclear) position within the NP, and NUCL is a nominal expression containing the head of the complement:

- (199) durante {um / o} exame de duas horas  
 during {a / the} two-hour exam

These adverbials are on a par with those in the first subset of class B in the aspects which are relevant to the present discussion (cf. (203c) below), but need be distinguished, since they may also occur with indefinite complements.

Note still that (i) these adverbials, like some of the mentioned first subset, define an interval by referring to a given eventuality (that occurs in it), and (ii) the predicate of amounts of time they contain (unless it is a noun modifier) states a property of that interval that is not essential to its definition. The specificity of these structures (in the second subset) is that the complement of the preposition refers directly to an eventuality *ev'* rather than to an interval, that is, they involve a *derived* time-denoting expression ([*t<sub>c</sub>* = loc (*ev'*)] and [*t* = *t<sub>c</sub>*]) – cf. 4.2.3.2. Given that the predicate of amounts of time does not state a property essential to the definition of the location time, and does not occupy a nuclear position, it may be omitted without changing the truth value of the sentence. Compare (200a) with (200b) below:

- (200) a. A Ana sentiu-se mal durante o exame de duas horas.  
 Ana felt sick during the two-hour exam.
- b. A Ana sentiu-se mal durante o exame.  
 Ana felt sick during the exam.

Of course, the last assertion is only valid if the predicate of amounts of time is not used as a modifier of the head noun. Otherwise, it contributes to identifying the eventuality described in the adverbial and, through it, the location time (cf. *a Ana sentiu-se mal durante o exame de duas horas, mas não durante o de quatro horas* / *Ana felt sick during the two-hour exam, but not during the four-hour one*).

Finally, with respect to the composition of class B, it is still relevant to recall Hitzeman's (1993, 1997) analysis of temporal adverbials like *for an hour*, or *in an hour* (cf. section 4.2.3.4, specially footnote 101, on page 130). According to this author, these adverbials give systematically rise to an ambiguity between a "position-definite" and a "non-position definite" reading (when they occur in sentence-final position). In the first reading, which is the relevant one now, the sentence does not involve *just any* one-hour period (i.e. an amount of time), but rather a *specific* one-hour period attached to a temporal perspective point (typically the utterance time):

- (201) a. For an hour Martha will be in her office. (Hitzeman 1997: 89)  
           *Durante uma hora, a Martha vai estar no escritório.*
- b. Martha will be in her office for an hour. (*ibid.*)  
           *A Martha vai estar no escritório durante uma hora.*

In the reading at stake, these sentences mean that Martha will be in the office for the one-hour period that immediately follows (given the use of a future tense) the utterance time (the same being valid for the past tense, with the relevant period preceding the utterance time). In others words, *for an hour / durante uma hora* can be semantically equivalent to *for the next hour / durante a próxima hora*. If we accept this analysis, the natural consequence is to consider that time adverbials formed by a preposition and a simple predicate of amounts of time, like *for an hour / durante uma hora*, are semantically ambiguous; they may be (i) true temporal measure adverbials (class A), as in some examples observed before (e.g. (196) in the paraphrased interpretations), and (ii) (proper-like) locating adverbials (class B), namely in the p-definite readings of sentences like (201). I will ignore the latter case from now on.

### 5.1.2. Temporal locating adverbials and inferred duration of eventualities

In the previous section, I classified as mere temporal locating adverbials the expressions referred to in the literature as ambivalent locating / measure phrases. As already said, an important piece of evidence in support of this categorisation would be obtained by the proof that the information these adverbials convey about the duration of the described eventuality is not directly asserted, but rather inferred. An argument in favour of this view is, hopefully among others, the effect of negation with sentences exhibiting the so-called ambivalent operators at stake, which shows that, given a true negative sentence, the falsity of a corresponding positive necessarily affects the temporal location predication, but not the temporal measurement, which can still apply<sup>116</sup>. Observe that, if the beginning of 1998 is taken as the utterance time, the first, but not the second, of the following two sequences is a contradiction:

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<sup>116</sup> This argument was given to me by João Peres (p.c.).

- (202) a. A Ana não viveu em Amsterdão durante os últimos três anos, mas viveu em Amsterdão *do início de 1995 até ao final de 1997*.  
Ana hasn't lived in Amsterdam for the last three years, but she has lived in Amsterdam *from the beginning of 1995 until the end of 1997*.  
[contradiction, if we take the beginning of 1998 as the utterance time]
- b. A Ana não viveu em Amsterdão durante os últimos três anos, mas viveu em Amsterdão *durante (pelo menos) três anos*.  
Ana hasn't lived in Amsterdam for the last three years, but she has lived in Amsterdam *for (at least) three years*.  
[no contradiction]

If this trend can be pursued, the information about duration at stake can be treated in terms of well-known inferential mechanisms that impregnate numerous domains of natural language semantics. The required inferential reasoning is based on the (location) relation between **ev** and **t** and on the explicit definition (by way of the predicates of amounts of time contained in the adverbials) of the size the location time **t**. In these terms, the measure function of these adverbials is “subsidiary” (cf. opposite view in Kamp and Reyle 1993, mentioned here in footnote 110) since it is directly related to – and dependent on – the location conditions they are associated with.

With respect to inferences about the duration of the described eventualities (**ev**), the following modes of location seem of particular relevance (cf. also section 4.2.1.2):

**Table 7. Temporal location of eventualities and inferences about their duration**

<b>I</b>	<b>durative location of atelic eventualities</b> <sup>117</sup>	$[t \subseteq \text{ev}] \rightarrow [\text{dur}(\text{ev}) \geq \text{dur}(t)]$
<b>II</b>	<b>inclusive location of events</b>	$[\text{ev} \subseteq t] \rightarrow [\text{dur}(\text{ev}) \leq \text{dur}(t)]$
	<b>exact location</b>	$[\text{loc}(\text{ev}) = t] \rightarrow [\text{dur}(\text{ev}) = \text{dur}(t)]$

Case I is illustrated in the following English examples<sup>118</sup>:

- (203) a. Ana has been ill for the last two months.  
→ Ana has been ill for (at least) two months.
- b. Ana was in Paris for the two years John lived in Amsterdam.  
→ Ana was in Paris for (at least) two years.
- c. Ana was in a bad state during the whole two-hour exam.  
→ Ana was in a bad state for (at least) two hours.

<sup>117</sup> As I said above, *for*-adverbials (contrary to *during*, *durante* or *während* adverbials) seem to express only this kind of location.

<sup>118</sup> I do not give Portuguese examples here, given that the intrinsic durative / inclusive ambiguity of *durante* complicates the assessment of the issue at stake (cf. discussion below).

Note still that, if the location of the atelic eventuality is exact (i.e.  $[\text{loc}(\text{ev}) = t]$ ), which, for Gricean reasons, is in many cases the preferred reading, then an inference about the *exact* duration of the eventuality described in the main sentence is obtained. This is the case with sentence (203a), *Ana has been ill for the last two months*, in the interpretation where Ana's illness started two months before the utterance time.

Case II (of Table 7) is illustrated in the following example:

- (204) A Ana escreveu este livro nos últimos dois meses.  
 Ana wrote this book in the last two months.  
 →  
 A Ana escreveu este livro em (no máximo) dois meses.  
 Ana wrote this book in (at most) two months.

An exact reading, according to which the writing of the book started at the very beginning of the mentioned two-month period and ended at its upper bound (i.e. around the utterance time), is also possible, in which case a more precise information about the duration of the event is obtained. Note, however, that the question of (in)exactness in temporal location seems more an issue of implicature than of strict assertion (cf. section 8.3).

The conclusion that the examples above seem to suggest is that *inferentially extracted information about the duration of the located eventuality* is what makes the adverbials under analysis look like ambivalent operators but, as far as assertion is concerned, they are mere temporal locating adverbials.

### 5.1.3. Advantages of the two-class typology

I take it that some positive consequences can be drawn for an interpreted grammar from the two-class typology proposed here, as opposed to a three-class typology, distinguishing the so-called “ambivalent operators”. The first is the possibility of grouping all the expressions of B (in Table 6) in the same category, regardless of the types of sentences in which they occur, rather than in different categories according to some characteristics of those sentences. This has to do with the existence of structures where (some of) these expressions clearly do not contribute information about the temporal size of the eventuality they locate (although, in other contexts, they may behave as ambivalent operators). The existence of such structures – two of which will be described below – clearly precludes a unified classification of the adverbials in B as ambivalent temporal measure-temporal location adverbials.

One structure where adverbials of class B, although containing predicates of amounts of time that explicitly define the size of the location time, do not behave as ambivalent operators involves the non-durative location of states and activities (cf. definition in 4.2.1.2). Mainly *during*, *durante* and *während* adverbials occur in these structures. Consider the following sentences in their **non-durative reading**<sup>119</sup>:

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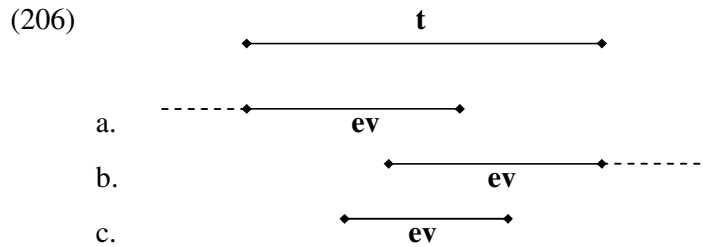
<sup>119</sup> On the ambiguity of *during*-phrases, as adverbials that may locate eventualities duratively or non-duratively, see, for instance, Quirk *et al.* (1985):

- (205) a. A Ana esteve doente durante os últimos dois meses.  
 Ana was ill during the last two months.  
 Ana war während der letzten zwei Monate krank.
- b. A Ana esteve doente durante os dois meses em que viajou pela Europa.  
 Ana was ill during the two months she was travelling through Europe.  
 Ana war während der zwei Monate, in denen sie durch Europa gereist ist, krank.

In the mentioned reading, these sentences do not seem to exclude an interpretation where the state of Ana being ill exceeds one of the borders of the location time. For sentence (205b), for instance, this would be the case if Ana had fallen ill somewhere within the two months she was travelling through Europe and continued to be ill until some time after that period, as is made explicit in the following discourse:

- (205) b'. A Ana esteve doente durante os dois meses em que viajou pela Europa.  
 Na realidade, adoeceu na última semana de férias e levou vários meses a recuperar.  
 Ana was ill during the two months she was travelling through Europe.  
 In fact, she fell ill in the last week of her vacation and it took her several months to recover.

As was said in 4.2.1.2, the non-durative location of atelic eventualities is compatible with any of the following possibilities<sup>120</sup> (although some may be excluded by contextual information):



Consequently, when expressions such as *durante os últimos dois meses* / *during the last two months* are used non-duratively, no inference about the duration of the eventuality represented in the main clause can in principle be drawn, unless the interpretation of scheme (206c) is imposed in the context, in which case an inference like the one in row I of

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«phrases with *during* are ambiguous (...):  
 He'll be staying here *during the next month*.  
 The adjunct here could either mean 'for some period falling within the month'  
 or 'for the whole of the month'» (p. 536, fn. [b]).

<sup>120</sup> Cf. observations of Kamp and Reyle (1993: 513-514) on "the question how a described state can relate to the time denoted by the temporal adverb", and in particular on the non-durative reading of the sentence *Mary was ill on Sunday*.

Table 7 is valid (this being in contrast to what happens when they are used to locate eventualities duratively, in which case an inference like that in row II of that table is valid). Thus:

- (207) A Ana esteve doente durante os dois meses em que viajou pela Europa.  
 Ana was ill during the two months she was travelling through Europe.  
 [non-durative]  
 –/→  
 Ana esteve doente durante (no máximo / pelo menos) dois meses.  
 Ana was ill for (at most / at least) two months.

Given that in these cases we do not (necessarily) have temporal measurement – not even inferred – of the eventuality represented in the main clause, the adverbials at stake do not seem to qualify, under any criteria, as temporal measure ones. This fact seems clearly due to the specificity of the temporal location of atelic eventualities, rather than to the adverbials themselves. So, classifying all definite FDI-adverbials as locating and considering its temporal measure function as a parallel function that may or may not be “in force” (depending on the type of location) allows a unified treatment of expressions like *durante os últimos dois meses / during the last two months*. Otherwise, these expressions would have to be grouped into two different classes – strictly temporal locating or ambivalent – merely depending on the type of location expressed in the sentence in which they occur.

A second type of structure where adverbials of class B do not behave as ambivalent operators involves their use in the (inclusive) location of achievements; *in/during*, *em/durante* and *in/während* adverbials occur in these structures. Observe the following sentences:

- (208) a. A Ana adoeceu {em / durante} as últimas duas semanas.  
 Não sei exactamente quando.  
 Ana fell ill {in / during} the last two weeks. I don't know exactly when.  
 Ana ist {in den / während der} letzten zwei Wochen krank geworden.  
 Ich weiß nicht genau wann.
- b. A Ana encontrou acidentalmente uma moeda {em / durante} as duas horas em que esteve a passear na praia.  
 Ana accidentally found a coin {in / during} the two hours she was walking on the beach.  
 Ana hat {in den / während der} zwei Stunden, in denen sie am Strand gelaufen ist, zufällig eine Münze gefunden.

When the located eventuality is punctual, the (possible) inferences about the (maximal) duration of *ev* are irrelevant, since punctual events are conceived of as having no duration. Therefore, it would be odd to classify such adverbials as ambivalent locating-measure phrases in these cases, given that their measure function is, so to speak, void. Note, incidentally, that the combination of achievements with strict temporal measure adverbials is ungrammatical, unless some aktionsart shift mechanism (cf. Moens 1987) converts these

punctual events into extended ones. Compare, for instance, (208b) with the following ungrammatical sentences:

- (209) \*A Ana encontrou acidentalmente uma moeda em duas horas.  
 \*Ana accidentally found a coin in two hours.  
 \*Ana hat in zwei Stunden zufällig eine Münze gefunden.

The categorisation proposed here has the advantage of not requiring the classification of adverbials like *nos últimos dois meses* / *in the last two months* sometimes as ambivalent – cf. (204) – sometimes as only locating, as in (208), merely according to the aktionsart nature of the structures to which they apply.

Another favourable result of classifying the so-called ambivalent adverbials (or more generally, all the definite FDI-adverbials containing predicates of amounts of time) in a category that is clearly distinct from that of temporal measure adverbials is the possibility of better accounting for important linguistic differences between these two groups of adverbials. Observe the following sentences (and take *dia* / *day* / *Tag* as a measure noun):

- (210) a. A Ana esteve doente {durante / \*em} cinco dias.  
 Ana was ill {for / \*during / \*in} five days.  
 Ana war {fünf Tage lang / während fünf Tagen / \*in fünf Tagen} krank.
- b. A Ana esteve doente {durante / em} os últimos cinco dias.  
 Ana was ill {for / during / ?in} the last five days.  
 Ana war {\*die letzten fünf Tage lang / während der letzten fünf Tage / in den letzten fünf Tagen} krank.
- (211) a. A Ana escreveu dois artigos {\*durante / em} cinco dias.  
 Ana wrote two essays {\*for / \*during / in} five days.  
 Ana hat {\*fünf Tage lang / \*während fünf Tagen / in fünf Tagen} zwei Aufsätze geschrieben.
- b. A Ana escreveu dois artigos {durante / em} os últimos cinco dias.  
 Ana wrote two essays {\*for / during / in} the last five days.  
 Ana hat {\*die letzten fünf Tage lang / während der letzten fünf Tage / in den letzten fünf Tagen} zwei Aufsätze geschrieben.

The relevant differences in these examples concern (i) the aktionsart restrictions connected to the use of each temporal operator, and (ii) the set of temporal operators that may head these adverbials.

With respect to the first type of differences, we must recall that, in Portuguese, English, German, and many other languages, the operator that heads a (strict) temporal measure phrase is conditioned by the aktionsart of the measured eventuality: for atelic eventualities, Portuguese uses *durante*, English *for* and German *lang/während*; for telic eventualities Portuguese uses *em*, and English and German *in* (cf. sentences *a*). Now, these selectional restrictions do not seem to apply to:

- (i) definite *em* and *in* adverbials, which are compatible with descriptions of atelic eventualities<sup>121</sup> – cf. (210b);
- (ii) definite *durante* and *während* adverbials, which are compatible with descriptions of telic eventualities – cf. (211b).

Note still that the contrast between (208) and (209) above illustrates another (general) difference concerning aktionsart restrictions: definite *in*-adverbials combine with descriptions of *achievements*, whereas the strict temporal measure *in*-adverbials do not.

With respect to the second type of differences, observe that:

- (i) The preposition *during* cannot be applied directly to expressions denoting amounts of times (that is, is apparently unable to head strict temporal measure adverbials) – cf. English sentences *a*. However, it may head definite FDI-adverbials containing predicates of amounts of time, and, furthermore, exhibits no aktionsart restrictions parallel to those of *in* and *for* in (strict) temporal measure adverbials – cf. English sentences *b*.
- (ii) The expression *lang* can only occur in (strict) temporal measure adverbials (in the type of structures considered here). Its combination with definite adverbials containing predicates of amounts of time leads to ungrammaticality – cf. German sentences *b*.
- (iii) The preposition *for* (contrary to *during* and *lang*) may, under the analysis I advocate, head both strict temporal measure adverbials and temporal locating adverbials<sup>122</sup>. The same applies to German *während* and Portuguese *durante*, which occur in an even wider range of contexts than *for*.

I think that the differences in behaviour between strict temporal measure adverbials and those that I am here classifying as locating adverbials (containing predicates of amounts of time) are possibly accounted for in a simpler way by assuming that they belong to completely distinct independent categories.

Yet another possible advantage of the categorisation proposed here is the possibility of a unified analysis, as members of the same class (of locating expressions), of adverbials that differ only with respect to the presence of a predicate of amounts of time explicitly defining the size of the location time, as those in the sentences below.

- (212) a. Estive em Paris durante os dois anos em que Ana viveu em Amsterdão.  
I was in Paris for / during the two years Ana lived in Amsterdam.
- b. Estive em Paris durante o período em que Ana viveu em Amsterdão.  
I was in Paris ?for / during the period Ana lived in Amsterdam.

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<sup>121</sup> English sentences with *in* and atelic descriptions seem (slightly) odd, according to my informants, although they are considered good in the interrogative version: ?*Mary was ill in the last five days* vs. <sup>OK</sup>*Was Mary ill in the last five days?*

<sup>122</sup> Cf. also their use in phrases like *for three weekends* or *for the last three weekends*, which express “location relative to a set of intervals” (subchapter 7.3).



- (213) a. Senti-me mal durante (todo) o exame de duas horas.  
I was in a bad state during the (whole) two-hour exam.
- b. Senti-me mal durante (todo) o exame.  
I was in a bad state during the (whole) exam.

Note that the adverbials in *b*, contrary to those in *a* in the durative reading, cannot be taken as ambivalent operators, since no information about the duration of *ev* is conveyed.

A final advantage is the possibility of a unified categorisation of the “ambivalent” adverbials that contain predicates of amounts of time and the locating adverbials that, although not containing this type of predicates, also have a – clearly “subsidiary” – measure function. Among these, I include all the adverbials that locate atelic eventualities duratively (i.e. those, or some of those, headed by *de...a* / *from-to*, *até* / *until*, *desde* / *since*, *durante* / *during*, etc.), which are considered by Bennett and Partee (1978) as simultaneously frame and durative adverbials, and by Smith (1991) and Vlach (1993) as durative adverbials (hence belonging in the same class as strict temporal measure *for*-adverbials) – cf. section 4.1.

- (214) a. A Ana tocou piano das duas às quatro (da tarde).  
Ana played the piano from 2 to 4 p.m.  
→  
A Ana tocou piano durante (pelo menos) duas horas.  
Ana played the piano for (at least) two hours.
- b. A Ana vive em Paris desde 1980.  
Ana has been living in Paris since 1980.  
→  
A Ana já viveu em Paris durante (pelo menos) *x* anos.  
Ana has been living in Paris for (at least) *x* years.  
(*x* being the difference between 1980 and the year in which the utterance takes place)
- c. A Ana esteve doente durante (todo) o Verão de 1980.  
Ana was ill during the (whole) summer of 1980.  
→  
A Ana esteve doente durante (pelo menos) três meses.  
Ana was ill for (at least) three months.
- (215) a. A Ana escreveu este artigo nos primeiros dois meses do ano.  
Ana wrote this paper in the first two months of the year.<sup>123</sup>  
→  
A Ana escreveu este artigo em (no máximo) dois meses.  
Ana wrote this paper in (at most) two months.

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<sup>123</sup> These sentences do not contain a predicate of amounts of time. The noun *mês* / *month* is here a calendar noun and not a measure noun (cf. next subsection).

- b. A Ana escreveu este artigo em Julho e Agosto.  
Ana wrote this paper in July and August.  
→  
A Ana escreveu este artigo em (no máximo) dois meses.  
Ana wrote this paper in (at most) two months.
- c. A Ana construiu a casa no Verão de 1980.  
Ana built a house in the summer of 1980.  
→  
A Ana construiu a casa em (no máximo) três meses.  
Ana built a house in (at most) three months.
- d. A Ana escreveu uma carta ao namorado durante o jogo de futebol.  
Ana wrote a letter to her boyfriend during the football game.  
→  
A Ana escreveu uma carta ao namorado em (no máximo) noventa minutos.  
Ana wrote a letter to her boyfriend in (at most) ninety minutes.  
(if the match had no extra-time)

All the adverbials in these sentences allow, in some way or other, inferences about the duration of the eventuality described in the main clause (though not all of them are classified as “ambivalent operators” in the literature). They show that the inferential mechanisms alluded to before are not restricted to adverbials containing predicates of amounts of time, rather involve a much wider range of temporal adverbials (including some that are normally referred to as merely locating or frame adverbials). The specificity of those that contain predicates of amounts of time is simply that they explicitly state the size of the location time, whereas with others – cf. (214)-(215) – that information is obtained by different means (e.g. via the lexical content of the temporal nouns, or via world-knowledge of the typical duration of certain eventualities).

## 5.2. Ambiguous temporal measure / temporal locating adverbials

It has often been noted that nouns like *day*, *month* or *year* are ambiguous, representing either specific sectors of the time axis or amounts of time, which are independent of position on the time axis<sup>124</sup>. In Leech (1969), these two temporal entities are termed “unit of calendar time” and “unit of time measurement”, respectively:

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<sup>124</sup> It has also been noted that the ambiguity at stake seems more salient with nouns like *day*, *month* or *year*, which can be designated by single proper or common nouns (*Monday*, *January*, *1980*,...), than with nouns like *second*, *minute* or *hour* (these generally representing units of time measurement, rather than units of calendar time). Therefore, a sequence like *in two years*, for instance, is more likely to be taken as ambiguous than *in two hours*.

“nouns like *hour* and *day* can designate either (a) units of time measurement, or (b) units which not only have a given length, but also begin and end at a given point. A ‘year’ in the first sense (e.g. in ‘twelve years ago’) is any period of twelve months; a ‘year’ in the second sense (as in ‘this time last year’) not only consists of twelve months, but begins on 1st January” (pp. 113-114).

In Kamp and Schiehlen (1998), these two types of nouns are designated as “calendar nouns” and “measure nouns”, a terminology I will mostly use henceforth. In Kamp and Reyle (1993), the former belong in the class of “predicates of times”, the latter are (constitutive elements of) “predicates of amounts of time”.

Given the lexical ambiguity of a noun like *month*, the sequence *two months*, for instance, can represent either (i) sets of two months of the calendar, i.e. intervals that have specific beginnings and ends (January, February,...), or else (ii) a mere time extent (property of intervals), i.e. periods of (more or less) sixty days, irrespective of where they begin and end, or even irrespective of their (dis)continuity.

For the purposes of the discussion in this chapter, it is relevant to observe the effect of this lexical ambiguity *at the level of the time adverbial* (containing this type of ambiguous noun). Note that a sequence like *nos últimos dois meses / in the last two months*, for instance, may have two different readings: (i) “in the two calendar-months that precede the utterance time”, if *month* is taken as an calendar noun; (ii) “in the sixty days that precede the utterance time” (a period which may overlap three different months of the calendar), if *month* is taken as an measure noun. Note still that, in the typology proposed here, this adverbial would be categorised as a temporal locating adverbial in both cases<sup>125</sup>. However, there are (more interesting) cases where the category of the adverbial varies according to the homonym that is used. These cases involve a superficial combination [preposition-quantifier-noun], as in the sequence *em dois anos / in two years*. I will consider them in more detail, since their distinction is relevant for the clarification of the typology proposed in this chapter.

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<sup>125</sup> In Kamp and Reyle’s system, adverbials containing calendar nouns (as heads of the complement) are locating (not temporal measure) phrases, since they represent sectors of the time axis – they occur in conditions of the type [month (t)] or [year (t)] (rather than [Q months (mt)] or [Q years (mt)]). However, given the relationship between calendar and measure nouns, inferences about the duration of the described eventualities may also be generally derived from the use of adverbials with the first type of nouns (and so they also often behave as “ambivalent operators” – cf. (215a)). This relationship is as follows: a unit of calendar time represented by *x* has always the extent expressed by the homonymous unit of time measurement, while a unit of time measurement represented by *x* can be associated with sectors of the time axis other than the one represented by the homonymous unit of calendar time. In other words, a “calendar month”, for instance, has always the size one month, but a “measure month” can apply to intervals that are not months of the calendar (e.g. to the period between March 15, 1980 and April 15, 1980). So, the following inference rule (where *N* is a calendar noun like *month*, *year*, etc. and *N’* its homonymous measure noun) applies:

(i) [N (t)] → [[dur (t) = mt] ∧ [one N’ (mt)]]

The ambiguity at stake is more salient in telic sentences with *em* and *in* – cf. (216a) – but it also occurs in atelic sentences with Portuguese *durante* and German *während* (although not with *lang*) – (216b). It does not occur in atelic sentences in English, because different prepositions are normally used for calendar and measure nouns (*during* and *for*, respectively). Observe the following sentences, where *meses* / *months* / *Monate(n)* may be ambiguously interpreted<sup>126</sup>:

- (216) a. A Ana fez uma viagem pela França *em* dois meses. [CALENDAR or MEASURE]  
 Ana made a trip around France *in* two months. [CALENDAR or MEASURE]  
 Ana hat *in* zwei Monaten eine Reise durch Frankreich gemacht.  
 [CALENDAR or MEASURE]
- b. A Ana esteve empregada nesta firma *durante* dois meses.  
 [CALENDAR or MEASURE]  
 Ana was employed in this company { *during* two months [CALENDAR] /  
*for* two months [MEASURE] }.  
 Ana war { *während* zweier Monate [CALENDAR or MEASURE] /  
 zwei Monate *lang* [MEASURE] } in dieser Firma angestellt.

Note incidentally that, when the head noun represents units of calendar time, the numeral may entail quantification over the eventualities represented in the main sentence (cf. reading B1 below) or not (cf. reading B2 below) – see also chapter 9 on this issue. Therefore, a sentence like (216a) can in principle have (at least) the following three readings<sup>127</sup>:

- A. It took Ana an amount of time of two months to make/complete a trip around France.
- B1. Ana made a trip around France in each of two different months of the calendar – March and August, for instance (i.e. there are at least **two trips** involved).
- B2. Ana made a trip around France in a period formed by two months of the calendar – March and April, for instance (i.e. it is possible that only **one trip** was made in the period referred to by the temporal adverbial).

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<sup>126</sup> Several factors, which I will not consider here, may determine whether or not a sequence is ambiguous. For instance, when combined with a quantifier like *menos de um* / *less than one*, a noun like *mês* / *month* expresses (in principle) units of time measurement, and the adverbial containing this combination is, therefore, only a temporal measure one:

- (i) A Ana fez uma viagem pela França em menos de um mês.  
 Ana made a trip around France in less than one month.

Conversely, the “calendar reading” may be made more salient, or even the only one available, by the use of certain expressions, such as the adjective *diferente* / *different*, or the quantifier *ambos* / *both*:

- (ii) A Ana fez uma viagem pela França {em dois meses diferentes / em ambos os meses}.  
 Ana made a trip around France {in two different months / in both months}.

<sup>127</sup> The reading paraphraseable as “two months after some given temporal perspective point, Ana started her trip around France” is not being taken into account here (“ingressive reading”, in Smith’s 1991 terminology).

The two readings B seem less prominent than the reading A. B2, in particular, appears to be very marginal. However, these readings seem not to be completely ruled out, provided an appropriate context is given, and specially if a specific reading of *dois meses / two months* (calendar months) is involved. Observe the following sentences with *em dois meses / in two months / in zwei Monaten*, that explicitly suggest a reading like B1 – sentences *a* – or B2 – sentences *b*<sup>128</sup> (under the presupposition that the Oktoberfest normally takes place in October):

- (217) a. Vai haver uma “Kleines Oktoberfest” em Munique em Julho. Por isso, este ano a Oktoberfest realiza-se *em dois meses* (Julho e Outubro).  
 There is a “Kleines Oktoberfest” in München in July. So, this year the Oktoberfest will take place *in two months* (July and October).  
 Es gibt ein “Kleines Oktoberfest” in München im Juli. Also, wird dieses Jahr das Oktoberfest *in zwei Monaten* (Juli und Oktober) stattfinden.
- b. (?)Se a Oktoberfest começasse este ano em Setembro, realizar-se-ia pela primeira vez *em dois meses* (Setembro e Outubro).  
 (?)If the Oktoberfest started this year in September, it would for the first time take place *in two months* (September and October).  
 (?)Wenn dieses Jahr das Oktoberfest im September anfangen würde, würde es zum ersten Mal *in zwei Monaten* (September und Oktober) stattfinden.

Note also that readings parallel to B1 and B2 above are unproblematically obtained in sentences where the *em / in* adverbial contains calendar terms integrated in clearly definite complements (not homonymous of temporal measure phrases), or names of months. The following sentences seem more clearly to have the two readings at stake: one, maybe preferred, involving (possibly only) one trip, in the mentioned two-month interval; another one involving necessarily (at least) two trips, one in each of the relevant two months:

- (218) a. A Ana fez um viagem pela França em Julho e Agosto<sup>129</sup>.  
 Ana made a trip around France in July and August.
- b. A Ana fez um viagem pela França nos dois primeiros meses do ano.  
 Ana made a trip around France in the first two months of the year.
- c. A Ana fez um viagem pela França nesses dois meses.  
 Ana made a trip around France in those two months.
- d. A Ana fez um viagem pela França nos últimos dois meses.  
 Ana made a trip around France in the last two months.

<sup>128</sup> For some speakers, the addition of an adjective like *diferente / different*, or the inclusion of an apposition specifying the relevant months involved, considerably improves the grammaticality of the sequences.

<sup>129</sup> The reading that involves (at least) two trips is more salient with PP-coordination: *em Julho e EM Agosto / in July and IN August*.

### 5.3. Conclusion

Briefly, I have claimed in this chapter that the best typology of time adverbials involving duration and/or location of eventualities is one that considers just two basic categories: (strict) temporal measure adverbials, including those that merely contain a predicate of amounts of time as complement, and locating adverbials, including all others. The former includes expressions formed by a combination [temporal operator + predicate of amounts of time]; the latter, expressions formed by a combination [temporal operator + time-denoting expression] (these time-denoting expressions possibly containing predicates of amounts of time). A distinction of subtypes of the latter is certainly required to account for several linguistic differences among members of the class, some of which were pointed out along the text; for instance: (i) differences with respect to inferences about the duration of the “main clause eventualities” – e.g. the subtype of locating FDI-adverbials containing predicates of amounts of time generally (with some exceptions analysed) allows such inferences in a quite direct way, whereas the others may not; (ii) differences in the distribution of the various prepositions (apparently requiring quite fine-grained distinctions, whose definition is beyond the scope of this dissertation). I have tried to show that a postulated third subclass of ambivalent adverbials (simultaneously temporal measure and temporal locating) is not only unnecessary, once some general inferential patterns are acknowledged, but also disadvantageous, inasmuch as reduces the generalisation power of the system, by precluding a homogeneous characterisation of closely related groups of adverbials.

## Chapter 6

### The dividing line between temporal locating adverbials and time-denoting expressions

#### 6.1. Apparently ambivalent time-denoting / temporal locating expressions

##### 6.1.1. Introduction

In many cases, the distinction between temporal locating adverbials and time-denoting expressions is unproblematic:

- (219) a. Portugal tornou-se uma República [em *1910*].  
Portugal became a Republic [in *1910*].  
b. Várias epidemias assolaram Portugal [durante *o século XIV*].  
Several epidemics swept through Portugal [during *the 14th century*].

In these sentences, the expressions in italics – *1910*, *o século XIV* / *the 14th century* – are clearly time-denoting expressions, while the prepositional phrases that contain them as complements (represented within brackets) – *em 1910* / *in 1910*, *durante o século XIV* / *during the 14th century* – are temporal locating expressions (cf. the definition of these concepts in section 4.2.3, partially repeated below).

There are, however, some cases where the dividing line is not so easy to draw. This occurs namely with expressions that can surface with exactly the same form in the typical contexts of both time-denoting expressions and temporal locators, thus appearing to be **ambivalent**. This is the case of relatively simple expressions like *agora* / *now*, *então* / *then*, *ontem* / *yesterday* or *a semana passada* / *last week*, for instance. See the following pairs of sentences, where the expressions in italics occur in a typical context of a time-denoting expression, namely the complement of the temporal prepositions *desde* / *since* or *até* / *until* (in *a*), and in a typical context of a temporal locating adverbial (in *b*):

- (220) a. O Paulo está no hospital desde *ontem*.  
Paulo has been in the hospital since *yesterday*.  
b. O Paulo saiu do hospital *ontem*.  
Paulo left the hospital *yesterday*.  
(221) a. Até *então*, o Paulo tinha sido feliz.  
Until *then*, Paulo had been happy.  
b. *Então*, o Paulo sentiu-se muito infeliz.  
*Then*, Paulo felt very miserable.  
(222) a. O Paulo está em Lisboa desde *a semana passada*.  
Paulo has been in Lisbon since *last week*.  
b. O Paulo partiu para Estugarda *a semana passada*.

Paulo left for Stuttgart *last week*.

More interestingly, this is also the case, as we will see in some detail, of relatively more complex expressions, which include a prepositional (or prepositional-like) temporal operator, such as the following:

	operator	example of apparently ambivalent expressions
	↓	↓
(223)	a. antes before	antes de 1980 before 1980
	b. depois after	depois das eleições after the elections
	c. entre between	entre 1100 e 1300 between 1100 and 1300
	d. quando when	quando o Paulo chegou when Paulo arrived
	e. haver (há) ago	há cinco dias five days ago
	f. de (aqui) a from (now)	daqui a duas semanas five weeks from now

Compare, for instance, the behaviour of *ontem* / *yesterday*, *então* / *then* and *a semana passada* / *last week* in (220)-(222) with that of *antes de 1980* / *before 1980* and *há três anos* / *three years ago* in the following sentences:

(224) a. O Paulo é professor desde *antes de 1980*.  
Paulo has been a teacher since *before 1980*.

b. O Paulo licenciou-se *antes de 1980*.  
Paulo graduated *before 1980*.

(225) a. O Paulo foi professor até *há três anos*.  
Paulo was a teacher until *three years ago*.

b. O Paulo licenciou-se *há três anos*.  
Paulo graduated *three years ago*.

The main question I will be concerned with in this chapter is whether this kind of apparently ambivalent phrases should be regarded as temporal locating expressions, as time denoting expressions or as both. I will advocate an analysis for all of them as **mere time-denoting expressions** (i.e. expressions that denote intervals or sets of intervals). Thus, the operators in (223), contrary to those described in 4.2.2.2 (cf. Table 4, on page 91 – e.g. *em* / {*in* / *on* / *at*}, *durante* / *during*, *enquanto* / *while*, *ao longo de* / *throughout*, *desde* / *since*, *até* / *until*), will be taken as **heads of (structurally complex) time-denoting expressions**, and not as temporal locating operators.

The discussion must obviously be started with the basic semantic concepts at stake: “time-denoting expression” and “temporal locating adverbial”. Briefly, I will summarise here the most relevant aspects of the semantic difference between these two categories of expressions, which were described in section 4.2.1:



## I. TIME-DENOTING EXPRESSIONS

- Time-denoting expressions represent intervals or sets of intervals.
- They do not, just by themselves, locate the entities (eventualities or intervals) described in the structures to which they apply.
- Formally, a time-denoting expression **TDE** simply introduces a time discourse referent  $t'$ , together with a condition of the form  $[TDE(t')]$ .
- Time-denoting expressions may (but need not) occur as part of a temporal locating adverbial – cf. *O Paulo morreu em 1980 / Paulo died in 1980* vs. *1980 foi um ano fantástico / 1980 was a splendid year*.

## II. TEMPORAL LOCATING ADVERBIALS

- Temporal locating adverbials have a more complex semantic contribution. More specifically, they play two concurrent roles:

- (i) They (help) define the location time (of the located entity) –  $t$  – out of the interval represented by the time-denoting expression that is the complement of the temporal preposition –  $t_c$  –, that is, they state  $R(t, t_c)$ . For instance,  $t_c$  may coincide with  $t$ , or set one of its boundaries (cf. 4.2.2.2).

Note that  $t_c$  is the non-referential argument of the temporal preposition.

- (ii) They state that a given relationship  $R'$  (such as inclusion or overlapping) exists between the location time  $t$  and the located entity  $\pi$  (an eventuality  $ev$  or a time  $t'$ ), which is described in the matrix structure –  $R'(\pi, t)$ . In other words, they locate  $\pi$  (whence their designation “temporal locating”) – cf. 4.2.2.1. I will focus here mainly on the cases involving location of eventualities.

Note that  $\pi$  is the referential argument of the temporal preposition (and of the temporal locating PP) – cf. 4.2.2.4.

The differences in **denotation** between these two categories go, quite naturally, on a par with differences in their **distribution**. The most obvious distributional difference involves the *(im)possibility of direct combination with descriptions of eventualities*. Being mere designators of intervals (or sets of intervals), time-denoting expressions – as such – are expected not to combine directly with descriptions of eventualities, this combination requiring the presence of a locating operator, such as the preposition *em / in*. This clearly tells *1910* apart from *em 1910 / in 1910*, for instance:

- (226) Portugal tornou-se uma República { \*1910 / em 1910 }.  
Portugal became a Republic { \*1910 / in 1910 }.

Conversely, some other contexts are apparently exclusive to time-denoting expressions. In these contexts – four of which will be mentioned right below – expressions like e.g. “*em / in TDE*” or “*durante / during TDE*” (TDE being a time-denoting expression) cannot occur.

- I. arguments of temporal nominal predicates like *período / period, ano / year, mês / month*, etc. (which are normally modified by other predicative expressions representing a property of the relevant periods<sup>130</sup>):

- (227) a. *1910 foi um ano muito tenso em Portugal.*  
*1910 was a very tense year in Portugal.*  
b. *A década de 60 foi uma década de orçamentos equilibrados.*  
*The sixties was a decade of balanced budgets.*

- II. arguments of the equative verb *ser / to be*, in constructions where the other member of the equation is a temporal NP with head predicates like *período / period, ano / year, mês / month*, etc.:

- (228) *1910 foi o ano em que a República foi instaurada em Portugal.*  
*1910 was the year in which Portugal became a Republic.*

- III. (normally prepositioned) complements of temporal predicates, like {*marcar / agendar*} (*para*) / *schedule (for)*, {*transferir / mudar / adiar*} (*para*) / *reschedule (for)*, *datar (de) / date (from)*, {*remontar / reportar-se*} (*a*) / *date back (to)*, etc.:

- (229) a. *O referendo está marcado para 28 de Junho.*  
*The referendum is scheduled for June 28.*  
b. *O presidente transferiu a reunião para o meio-dia.*  
*The president rescheduled the meeting for noon.*  
c. *Este monumento data do século XIV.*  
*This monument dates from the 14th century.*

Note that time-denoting expressions, contrary to temporal locators, may also be the argument of non-temporal predicates, like, for instance, adjectives and nouns representing properties that can be predicated of a given time stretch. Observe the examples below, where the relevant non-temporal predicates are *terrível / terrible, desastre / disaster* and *fácil / easy*:

- (230) a. *O ano de 1914<sup>131</sup> foi {terrível / um desastre}.*  
*The year 1914 was {terrible / a disaster}.*  
b. *A semana que corre não está a ser fácil para ninguém.*  
*The current week is not being easy for anyone.*

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<sup>130</sup> Cases without these modifying predicates would be *Março é um mês / March is a month*, for instance. These don't normally occur for obvious pragmatic reasons.

<sup>131</sup> Temporal expressions like *o ano de 1914 / the year 1914* seem to be predicative constructions, involving a proper name (1914) and a common noun (*ano / year*), similar to individual-denoting expressions like *o imperador Júlio César / the emperor Julius Caesar*. In Portuguese, in this type of temporal expressions, which occur especially with designations of years and months, a preposition (*de*) links the two nouns: *o ano de 1914* ('the year of 1914'), *o mês de Março* ('the month of March').

IV. complement of prepositional temporal operators, like *desde / since* or *até / until*:

- (231) Portugal é uma República desde 1910.  
Portugal has been a Republic since 1910.

Many temporal expressions only occur in the typical contexts of time-denoting expressions, and can therefore, rather uncontroversially, be classified as such. In Portuguese these include, for instance, designations of centuries (*o século XX* [*the 20th century*]), decades (*os anos 70 / a década de 70* [*the seventies*]), years (*1910 / o ano de 1910* [*1910 / the year 1910*]), months (*Janeiro* [*January*]), days of the year – but not days of the week, as we will see – (*11 de Outubro / o dia 11 de Outubro* [*October 11*]), hours (*as três da tarde / 15.00 h* [*three o’ clock, 3 p.m.*]), or parts of the day (like *o meio-dia* [*noon*] or *a meia-noite* [*midnight*]). However, as was said above, many other temporal expressions may occur, with superficially the same form, in the typical contexts of both time-denoting expressions and temporal locating expressions. These **apparently ambivalent expressions**, as I call them, raise the categorisation issue, and show that it is not always self-evident where the dividing line between temporal locating adverbials and time-denoting expressions should be drawn. They will be the main topic of analysis in the remainder of this chapter.

### 6.1.2. Subtypes of apparently ambivalent time-denoting / temporal locating expressions

There are several types of phrases that occur in the typical contexts of both time-denoting expressions and temporal locating adverbials. A **first group** of these apparently ambivalent phrases is composed of sequences that can freely occur *with or without* a temporal locating preposition (without difference in the interpretation), when combined with descriptions of eventualities. I will give some examples in Portuguese, where this group includes, for instance, names of days of the week (*sábado* [*Saturday*], *quinta-feira* [*Thursday*], etc.) and expressions with the deictical adjective *passado* [*last*], like *a semana passada* [*last week*]. Observe the following sentences (whose parenthesised elements may or may not be expressed):

- (232) a. O museu foi reaberto (em) *a semana passada*.  
“the museum was reopened (in) the last week”<sup>132</sup>  
b. O museu está aberto desde *a semana passada*.  
“the museum is open since the last week”  
c. *A semana passada* foi uma semana muito agitada.  
“the last week was a very turbulent week”

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<sup>132</sup> The grammatical English counterpart of (232a) is obligatorily non-prepositioned: *the museum was reopened last week*. On the contrary, the grammatical English counterpart of (233a) is obligatorily prepositioned: *the museum will be open on Saturday*.

- (233) a. O museu estará aberto (no) *sábado*.<sup>133</sup>  
           “the museum will be open (on the) Saturday”  
       b. O museu estará aberto até *sábado*.  
           “the museum will be open until *Saturday*”  
       c. *Sábado* é um dia ótimo para ir às compras.  
           “Saturday is a wonderful day to go shopping”

In the examples *a*, if the parenthesised elements are omitted, the expressions in italic (*a semana passada*, *sábado*) are used as “full” temporal locating adverbials; if they are not omitted, i.e. if they include an explicit preposition *em*, they are used as mere time-denoting expressions. It must be noted that, in general, the (non)mandatory character of the preposition in this type of constructions seems to be merely syntactically determined, varying from language to language (for parallel expressions). Note, for instance, that the English structures with *last* are necessarily non-prepositioned, while their Portuguese counterparts with *passado* may – though need not – take a preposition.

Sentences *b* and *c* above show that the expressions under analysis can also occur in contexts which are exclusive to time-denoting expressions.

A **second group** of apparently ambivalent adverbials is composed of expressions that systematically occur *without* any (explicit) temporal locating operator in adverbial position. These include, for instance, English expressions like *last week*, or referentially dependent English and Portuguese adverbs like *hoje* / *today*, *ontem* / *yesterday*, *amanhã* / *tomorrow*, *agora* / *now*, and *então* / *then*. The main difference with respect to the first group mentioned above is therefore the ungrammaticality of the use of a temporal preposition (like *em* / *in*) in sentences where these expressions occur in adverbial position (sentences *a* below):

- (234) a. O Paulo arranhou um novo emprego (\*em) *ontem*.  
           Paulo got a new job (\*in) *yesterday*.  
       b. O Paulo trabalha nesta empresa desde *ontem*.  
           Paulo has been working in this company since *yesterday*.

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<sup>133</sup> If the name of the day of the week is not modified by any other expression, it can appear in adverbial position either bare or with the preposition *em* plus the definite article *o* (in the contracted form *no*):

- (i) O museu esteve aberto {sábado / \*o sábado / \*em sábado / no sábado}.  
       “the museum was open {Saturday / the Saturday / on Saturday / on the Saturday}”

If a deictic adjective like *passado* (*last*) is present, the sequence name-adjective can also appear with just the definite article (though some speakers consider this possibility slightly marginal):

- (ii) O museu esteve aberto {sábado passado / ?o sábado passado / \*em sábado passado / no sábado passado}.  
       “the museum was open {last Saturday / the last Saturday / on last Saturday / on the last Saturday}”

In both cases, (i) and (ii), the use of the preposition *em* requires the use of the article.

- c. *Ontem* foi um dia terrível.  
*Yesterday* was an awful day.
- (235) a. O Paulo está no escritório (\*em) *agora*.  
Paulo is in his office (\*in/at) *now*.
- b. O Paulo esteve no escritório até *agora*.  
Paulo was in his office until *now*.
- c. *Agora* é o momento ideal para intervir.  
*Now* is the perfect time to intervene.

The non-prepositioned adverbial cases illustrated in sentences *a* of (232)-(235) above are treated by many authors – for English and other languages – as involving a null preposition with a value close to that of *in* (or *on*, or *at* depending on the complement)<sup>134</sup>. The existence of such null operators is assumed in the literature, just to give two examples, by Asher *et al.* (1995: 109) for the French adverbial *hier* (*yesterday*), and by Kamp and Reyle (1993), for the English adverbials with *last*:

“from a semantic viewpoint **last Sunday** functions rather like a prepositional phrase, with an empty preposition whose semantic contribution is the same as that of **on** in **on Sunday**. This is what we assume the syntax of the adverb **last Sunday** to be” (p. 623).

Notice that, under this “null operator analysis”, the expressions at stake *are not ambivalent*: they are **mere time-denoting expressions** in all the contexts in which they occur. The property that distinguishes them from other time-denoting expressions (like *1910*) is the fact that they can – or must – occur with a null locating operator, when they are used in adverbial position.

I will adopt this analysis for all the non-prepositioned adverbial cases referred to above (further justification will be presented in the next subsection). Furthermore, I will advocate, departing in this case from the analyses currently adopted in the semantic literature, that several other expressions that are normally treated as truly temporal locating adverbials should be put on a par with the two groups of expressions already mentioned, that is, they should also be treated as **mere time-denoting expressions that in adverbial contexts occur with a null locating preposition**. These are namely the structurally complex expressions headed by the operators mentioned in (223) above (and possibly others, similar to them) – *antes* / *before*, *depois* / *after*, *entre* / *between*, *quando* / *when*,

<sup>134</sup> Note that an expression like *ontem* / *yesterday* or *agora* / *now* cannot be preceded by the prepositions *em* / {*in* / *on* / *at*} but may be preceded by other temporal prepositions (e.g. *desde* / *since* or *até* / *until*):

- (i) \*em ontem/agora; desde ontem/agora; até ontem/agora  
\*in yesterday/now; since yesterday/\*now; until yesterday/now

The same applies to English expressions like *last week*:

- (ii) \*in last week; during last week; throughout last week; since last week; until last week

What these facts seem to indicate is that suppression is an idiosyncratic property of prepositions like Portuguese *em*, and English *in*, *on* or *at*.

*haver (há) / ago*, or *de...a / from*. Notice that these complex expressions already contain an explicit temporal operator (prepositional or similar); thus, when occurring in adverbial position with no other explicit preposition, I will postulate the existence of a **second invisible temporal operator** – e.g. *antes de 1980 / before 1980* will be analysed in the relevant contexts as [*em*] *antes de 1980 / [in] before 1980*.

At least four groups of these structurally complex expressions – listed below – can be distinguished. I will analyse them in more detail in the next sections of this chapter, focusing on the question of their **categorial-denotational status**. The question of how, precisely, intervals are defined via these complex expressions, i.e. of what specific properties these intervals have, will be addressed only for some of these expressions, and not in a thorough way, since this question is far too complex and could be the theme of another dissertation.

In the sets of sentences given below, examples *a* illustrate the occurrence of the italicised expressions in a characteristic context of a temporal locating adverbial, and examples *b*, their occurrence in a characteristic context of a time-denoting expression.

**I.** Phrases expressing anteriority and posteriority, in particular those headed by *antes / before* and *depois / after*:

- (236) a. O Paulo casou *depois de 1980*.  
Paulo got married *after 1980*.  
b. O Paulo trabalhou nesta empresa até *depois de 1980*.  
Paulo worked in this company until *after 1980*.

**II.** Expressions with *entre / between*:

- (237) a. A Europa esteve em guerra *entre 1914 e 1918*.  
Europe was at war *between 1914 and 1918*.  
b. Este quadro data de *entre 1914 e 1918*.  
This painting dates from *between 1914 and 1918*.

**III.** Expressions with *quando / when*:

- (238) a. O presidente contratou uma secretária nova *quando regressou do Brasil*.  
The president hired a new secretary *when he returned from Brazil*.  
b. O presidente marcou uma reunião para *quando regressar do Brasil*.  
The president scheduled a meeting for *when he returns from Brazil*.

**IV.** Expressions containing a predicate of amounts of time X-TIME (or a comparable expression) through which a given interval of the time axis is defined – e.g. adverbials of the form “*há X-TIME*” / “*X-TIME ago*”, or “*de COMPL a X-TIME*” / “*X-TIME from COMPL*”; the prepositions *antes / before* and *depois / after* can also occur in this type of

environment (where, arguably, they do not have the same analysis as in I above) – “X-TIME *antes* / *before*”, “X-TIME *depois* / *after*”<sup>135</sup>:

- (239) a. O Paulo casou *há dois anos*.  
           Paulo got married *two years ago*.  
       b. O Paulo trabalhou nesta empresa até *há dois anos*.  
           Paulo worked in this company until *two years ago*.

It must be noted that by analysing all these four groups of expressions as mere time-denoting expressions, I divide the set of temporal operators that are traditionally classified as temporal locating into two main groups, illustrated in the following table (for group I, the subset of *truly* temporal locating operators, cf. Table 4, on page 91):

**Table 8. Partition of the set of operators traditionally classified as temporal locating**

<b>I temporal locating operators</b>		<b>II heads of (structurally complex) time-denoting expressions</b>	
Portuguese	English	Portuguese	English
<i>em, a</i>	<i>in, on, at</i>	<i>antes</i>	<i>before</i>
<i>durante</i>	<i>during, for</i> <sup>136</sup>	<i>depois</i>	<i>after</i>
<i>enquanto</i>	<i>while, as long as</i>	<i>entre</i>	<i>between</i>
<i>ao longo de</i>	<i>throughout</i>	<i>quando</i>	<i>when</i>
<i>desde, a partir de</i>	<i>since, from</i>	<i>haver</i> (X-TIME)	(X-TIME) <i>ago</i>
<i>até</i>	<i>until, by</i>	<i>de...a</i> (X-TIME) <sup>137</sup>	(X-TIME) <i>from</i>
<i>de...até / a</i>	<i>from...until / to</i>	X-TIME <i>antes</i>	X-TIME <i>before</i>
		X-TIME <i>depois</i>	X-TIME <i>after</i>

<sup>135</sup> In chapter 7, I will show that not only predicates of amounts of time occur in this type of expressions. Predicates of times or situational predicates, for instance, may also occur:

- (i) [O Paulo foi à igreja] *há três domingos*.  
       [Paulo went to church] three *Sundays ago*  
 (ii) [Este assunto foi discutido] *há três aulas*.  
       [This subject was discussed] three *classes ago*.

Therefore, the definition of intervals by this type of expressions may be associated not only with *time measurement* but also with *counting of temporally ordered entities*.

<sup>136</sup> I take *for* to be a temporal locating operator in structures like *for the last two months* or *for those two months* (cf. chapter 5).

<sup>137</sup> The discontinuous operator *de...a* can be a temporal locating operator – e.g. *de 1980 a 1985* (*from 1980 to 1985*) – or as the head of a time-denoting expression – e.g. *de {aqui / domingo} a cinco dias* (*five days from {now / next Sunday}*); cf. section 6.3.

In the next two subchapters, I will try to motivate the analysis of the complex expressions headed by the operators in the group II of Table 8 as (mere) time-denoting expressions. In order to simplify the exposition, I will proceed as follows: rather than taking all these expressions into account at the same time, I will concentrate on a subset of them, namely those headed by *antes* / *before* and *depuis* / *after* (section 6.2); the remaining expressions will be briefly considered in section 6.3, where I will try to show that they share the relevant properties with those headed by these prepositions. The arguments in favour of the analysis in question will be presented for *antes* / *before* and *depuis* / *after* and will not be repeated for the remaining expressions, although they are supposed to apply also to them, with the relevant adaptations.

## 6.2. The categorisation of *antes* / *before* and *depuis* / *after* phrases<sup>138</sup>

I will try to assess, in this section, whether the expressions headed by the temporal prepositions *antes* / *before* and *depuis* / *after* are better categorised as temporal locating expressions, as time-denoting expressions or as both. The conclusions to be drawn seem to apply to the counterparts of these expressions in other languages as well<sup>139</sup>, which seems to indicate that the behaviour of this type of operators is cross-linguistically very stable with respect to the issues at stake.

For simplicity, in the following text and in the schemata to be presented, I will only make reference to the English prepositions *before* and *after*, although the observations apply in like manner to *antes* and *depuis* (as can be gathered from the examples, which I will continue to provide in both languages).

In the first four subsections of 6.2, I will concentrate only on the occurrences of *before* and *after* in structures where they are *not combined* with predicates of amounts of time – e.g. in sequences like *Paulo got married before Christmas*, but not *Paulo got married two weeks before Christmas*. Unless otherwise stated, references to *before* and *after* and the claims to be made will concern only this type of occurrence. The reason for this separation is that the structures where *before* and *after* combine with predicates of amounts of time (and other related structures that I will describe later on, in chapter 7) have specific properties that require independent consideration. Some of them, namely those where *before* and *after* are “modified” by predicates of amounts of time (or comparable expressions), cannot be accounted for with the treatment to be proposed in this subsection, thus raising the issue of the ambiguity of these two temporal operators. The combination in question will be analysed in some detail in section 6.2.5 and in chapter 7.

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<sup>138</sup> The core content of this subchapter was presented at the conference “The Syntax and Semantics of Tense and Mood Selection”, in Bergamo, Italy, in July 1998, under the title “On the Semantics of Temporal Operators Expressing Anteriority and Posteriority” (bibliographical reference: Móia 1998).

<sup>139</sup> Observe, for instance, the grammaticality of Spanish *hasta despues*, French *jusqu’après*, or Italian *fino a dopo*.



### 6.2.1. Alternative analyses of *before* and *after* phrases

I will start by considering different alternative analyses of *before* and *after* phrases. For simplicity, I will give examples only with *before*, but the observations made apply also to *after*, with the relevant changes. Observe the following sentences:

- (240) a. O Paulo casou antes do Natal.  
           Paulo got married before Christmas.  
       b. O Paulo casou antes de se licenciar.  
           Paulo got married before he graduated.

Sentences with the operator *before* such as those in (240) may have two seemingly equivalent analyses. One has three main ingredients: the event represented in the main clause (**e**), the interval represented by the complement of *antes* (**t'**) and the temporal relation of anteriority that connects them.

- (241) [e: Paulo get married]  
           [Christmas (**t'**) or [[e': Paulo graduate]  $\wedge$  [**t'** = loc (**e'**)]]<sup>140</sup>  
           [e < **t'**]

This first analysis takes the expressions with *before* and *after* as – basically – **temporal locating expressions**. It corresponds to the traditional view, according to which these two prepositions, or their counterparts in other languages, serve essentially to mark a value of anteriority or posteriority, between eventualities or between an interval and an eventuality – cf., for instance, the approaches of Heinämäki (1974) or Sinn (1992?), who says about the German counterpart of *before*: “There is general agreement in the literature that *bevor* is a purely locational (...) conjunction which expresses that the main clause situation is located prior to the complement clause situation” (pp. 228-229).

An alternative analysis has four ingredients: **e** and **t'** as above, plus the interval represented by the *before*-phrase as a whole (**t''**) and the temporal locating relation. This relation differs from that of the previous analysis: given that it connects **e** and **t''**, and not **e** and **t'** as before, it is an inclusion (therefore, overlapping) relation, not an anteriority relation.

- (242) [e: Paulo get married]  
           [Christmas (**t'**) or [[e': Paulo graduate]  $\wedge$  [**t'** = loc (**e'**)]]  
           [**t''**  $\supset$  **t'**]  
           [e  $\subseteq$  **t''**]

This type of analysis has been advocated in the literature, for instance in Rohrer (1977), Hamann (1989) or Kamp and Reyle (1993). In these proposals, the English expressions with *before* and *after* are taken simultaneously as **time-denoting expressions** and

<sup>140</sup> For the subordinate *before*-clause, the analysis can be similar, involving the interval where the graduation takes place **t'** (as in this schema), or else it could be made in principle even simpler, involving just the two event discourse referents **e** and **e'** ([e < e']).

**temporal locating expressions**, i.e. expressions that denote intervals<sup>141</sup> and locate eventualities relative to those intervals:

“we could say that in ‘John came before supper’ the temporal adverb ‘before supper’ specifies an interval in which the sentence ‘John came’ must be true. The same holds for the temporal clause ‘before Mary left’. Its sole function is to specify an interval in which the main clause occurs. (...) ‘yesterday’, ‘before supper’, ‘before Mary left’ (...) all belong to the same semantic category: they all denote intervals” (Rohrer 1977: 6).<sup>142</sup>

«What the phrase **after**  $\alpha$  does is to divide the axis of time into two halves and to say of the described eventuality that it lies in the “upper half”. **Before**-phrases do much the same, except that they locate the eventuality in the “lower half”» (Kamp and Reyle 1993: 626-627).

For the type of sentences presented above, though not for others that will be presented later on, the differences between the two analyses seem negligible. In fact, at first sight, not much seems to be gained or lost by analysing (240a) as “the event of Paulo getting married preceded Christmas” or, alternatively, as “it took place in a period that preceded Christmas”, or by analysing (240b) as “the event of Paulo getting married preceded the moment he graduated” or, alternatively, as “it took place in a period that preceded the moment he graduated”. If any of these analyses appears to be preferable, judging only by this data, it is the first one, because of its relative simplicity: it accounts for the truth value of the sentences with one discourse referent less.

However, I will argue that the second analysis – or rather, one along its lines – is the most adequate. I will present linguistic evidence showing that phrases headed by *before* and *after* behave as time-denoting expressions, and consequently that an independent time discourse referent ( $t''$ , in the scheme (242)) is required in the DRSs in order to correctly represent the semantic structure of the sentences in which they occur. Incidentally, it must be noted that this analysis provides by inferential means the information that the first explicitly states; hence, no information is lost by adopting it:

$$(243) \quad [[e \subseteq t''] \wedge [t'' \supset \subset t']] \rightarrow [e < t']$$

<sup>141</sup> An important issue – that I will not be able to fully address here, and to which Hans Kamp drew my attention – is to know whether (in this type of locating contexts) *before* and *after* phrases denote an interval (whose beginning is unspecified, although it may be contextually restricted or even fully determined), and are therefore a kind of “referring expressions”, or instead denote sets of intervals abutting the relevant point set by the complement, and are therefore genuine “predicates of times”. I will side-step this issue here, since I have no conclusive arguments to decide for one or the other hypothesis. The first hypothesis, however, seems more attractive to me, and appears to go well together with what will be said about *before* and *after* in this chapter. Note, by the way, that this seems to be the position of Rohrer (1977: 7): “Before B denotes an arbitrary interval up to the first point where B is true”. Cf. also observations (made later on) about the apparent dependency between the (in)definiteness of *before* and *after* phrases and the (in)definiteness of their complements.

<sup>142</sup> In this quotation, Rohrer highlights only the time-denoting function of these expressions, but in his formalisation the locating function is also considered (cf. definition (39), on page 6 of his paper).

Moreover, I will argue that the most economic and revealing analysis of the phrases headed by *before* and *after* is the one that takes them as **mere time-denoting expressions**. This analysis implies postulating the existence of an obligatorily **null** temporal locating preposition, with a value close to that of *in* (in Portuguese, *em*), to which the locating function is directly associated. Sentences (240) are thus interpreted as:

- (244) a. O Paulo casou [em] antes do Natal.  
           Paulo got married [in] before Christmas.  
       b. O Paulo casou [em] antes de se licenciar.  
           Paulo got married [in] before he graduated.

Under this analysis, *before* and *after* phrases *are not* temporal locating expressions, in the sense that the temporal relation involving the eventuality represented in the main clause –  $[e \subseteq t']$  in the sentences above – is not directly associated with them, but with null *in*. An important consequence of this analysis is that it sets *before* and *after* – mere heads of time-denoting expressions – apart from other truly temporal locating operators, such as *in*, *during*, *throughout*, *while*, *since* or *until* or their Portuguese counterparts (in accordance with what was said above – cf. Table 8). This analysis has been suggested in the literature, namely by Declerck (1991)<sup>143</sup>, but (to my knowledge) has not been elaborated upon:

Under this analysis, the temporal conditions associated with *before* in (242) are associated with two different operators:

- (i)  $[e \subseteq t']$ , the temporal location condition (of inclusion), is associated with [*in*];  
 (ii)  $[t'' \supset \subset t']$ , the condition that defines the (location) interval  $t''$ , is associated with the *before*-phrase, which is therefore taken as a mere time-denoting expression at the level of assertion.

This is the analysis I will advocate here, with the following (minor) changes, resulting from the assumptions made in chapter 4: (i) instead of  $t''$ , there are two discourse referents –  $t$  (for the location time) and  $t_c$  (for the interval represented by the *before*-phrase); (ii) the null operator [*in*], a “direct temporal locating operator”, states the equivalence between these two intervals, by introducing the condition  $[t = t_c]$ . The discourse referent for the interval represented by the complement of *before* –  $t'$  – is now represented as  $t_{cc}$ .

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<sup>143</sup> Declerck (1991) hypothesises:

«The adverbials *before the war* and *after breakfast* have the same meaning as *at some time before the war* and *at some time after breakfast*. (...) (Perhaps we can even consider *before/after the war* as a reduction from something like *at (a time) before/after the war*. This would be in keeping with the fact that some prepositions can appear overtly before *before/after*: *I stayed until after the game was over*, *I haven't seen him since before he left for America*.)

Adverbial clauses introduced by conjunctions like *before* and *after* can be analysed in the same way. (...) the adverbial *after he had left* means ‘at some time after he had left’» (pp. 287-288).

- (245) [e: Paulo get married]  
 Christmas ( $t_{cc}$ ) or  $[[e': \text{Paulo graduate}] \wedge [t_{cc} = \text{loc}(e')]]$   
 $[t_c \supset \subset t_{cc}] \rightarrow$  contribution of *before*  
 $[t = t_c] \rightarrow$  contribution of [*in*]  
 $[e \subseteq t] \rightarrow$  contribution of [*in*]

It must clearly be stated that this analysis does not entail that *before* and *after* are not used in discourse mainly to convey an ordering of events and/or times. In fact, in many cases, as has been noted, the most salient and relevant information they convey seems to be precisely this ordering. What it simply states is that the ordering is not directly asserted via a condition “x precedes y” or “x follows y”, but rather that it is derived – or, more precisely, inferred – from a more complex formal process (sketched in (243)), possibly together with some restrictions on the undefined bound of the interval represented by a *before* and *after* phrase. This last observation deserves some more attention.

As has been pointed out by many authors (e.g. Heinämäki 1974, Rohrer 1977, or Kamp and Reyle 1993), the undefined bound of the interval represented by a *before* or *after* phrase – i.e. **beg** ( $t_{cc}$ ) and **end** ( $t_{cc}$ ), respectively – can be restricted in several ways (that is, these phrases do not normally represent completely unbounded intervals). Among the restrictions noted in the literature are: (i) restrictions that result from the interaction with other temporal locating adverbials, with the tense of the matrix clause or with the tense of the subordinate clause, and (ii) (pragmatic) restrictions having to do with the (normally short) distance between the eventualities represented in the main clause and the eventualities/times represented in the subordinate structure<sup>144</sup>. The latter is particularly important – cf. the sequence “Bill arrived on Wednesday at five. He left *after ten*”, in Kamp and Reyle (1993: 627), a sentence like “after a game of tennis Mary always smoked a cigarette” (*ibid.*: 627-628) or contexts of “narrative sequencing” where immediacy is even suggested<sup>145</sup>, like:

- (246) a. Depois de uma ausência de três anos, o Paulo regressou a Lisboa.  
 After an absence of three years, Paulo returned to Lisbon.  
 b. Em vez de entrar logo na casa, ele esperou trinta segundos antes de meter a chave na fechadura.  
 Instead of entering the house at once, he waited thirty seconds before he pushed the key into the lock.<sup>146</sup>

<sup>144</sup> Cf. Kamp and Reyle (1993):

“in actual use **before-** and **after-**phrases often carry a certain implication about the distance between the described eventuality and the time or event mentioned by the adverbial. (...) Arguably this is a problem for pragmatics (...). There is (...) a problem of ineliminable vagueness” (pp. 626-628).

<sup>145</sup> These include in particular structures where the duration of the eventuality described either in the main (cf. (246a)) or in the subordinate (cf. (246b)) clause is specified.

<sup>146</sup> This English sentence is given in Declerck (1991: 102) as an example of a “narrative *before-clause*”; I substituted *thirty seconds* for *some time*.

It seems possible to associate this “closeness or immediacy effect” to the fact that the context may impose – and normally does – restrictions on the undefined bound of the interval represented by a *before* or *after* phrase, namely: that this bound is “not too distant” from the time represented by the complement of *before* and *after*. Formally, the restriction at stake, possibly an implicature associated to the use of these operators (in at least certain contexts), can be formulated as:  $[\text{beg}(t_c) <_{\text{close}} t_{cc}]$  (for *before*), and  $[t_{cc} <_{\text{close}} \text{end}(t_c)]$  (for *after*). Now take, for instance, the sentence *he left after ten*, in Kamp and Reyle’s example *Bill arrived on Wednesday at five. He left after ten*. The above-mentioned restriction together with the normal conditions associated with the structure (cf. schema (245)) entails that the described event takes place closely after ten:

(247)	assertion	$[e: \text{he leave}], [e \subseteq t], [t = t_c], [t_{cc} \supset \subset t_c], [\text{ten}(t_{cc})]$
	implicature	$[t_{cc} <_{\text{close}} \text{end}(t_c)]$
	inference	$[t_{cc} <_{\text{close}} e]$

I will not pursue the analysis of this issue here, since it goes well beyond the scope of this dissertation.

Before proceeding, there is an important question to be addressed, pertaining to the definition of the explicitly specified boundary of the intervals denote by *before* and *after* phrases. The question is namely to determine whether the relation between  $t_c$  and  $t_{cc}$  is better described as abutment or as simple anteriority / posteriority. Taking a simple example: does the expression *before Christmas* denote an interval that abuts Christmas or an arbitrary interval in the past of Christmas<sup>147</sup>? I will assume that the relevant relation is **abutment** (as was expressed in the schemata above). This is in line with Rohrer (1977: 7, my italics), who claims that “Before B denotes an arbitrary interval *up to the first point* where B is true”, and with Kamp and Reyle (1993: 626) when they say: “what the phrase **after**  $\alpha$  [or **before**  $\alpha$ ] does is to divide the axis of time into two halves”, although in the DRSs for sentences with *before* and *after* these authors introduce the simple anteriority symbol “<” rather than the abutment symbol “ $\supset \subset$ ” (cf. pp. 627 and 654-656). The hypothesis that the (more restrictive) abutment relation is involved in the characterisation of *before* and *after* phrases seems to be favoured by the interpretation of sentences and expressions like the following:

- (248) O Paulo saiu zangado. Passaram-se três meses antes de a Ana  
o conseguir ver de novo.  
Paulo left the house angry. Three months elapsed before Ana  
managed to see him again.
- (249) a. os dez minutos antes do início do julgamento  
the ten minutes before the beginning of the trial

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<sup>147</sup> This question would have to be rephrased in terms of “sets of intervals”, if *before* and *after* phrases were considered genuine predicates of times – cf. footnote 141.

- b. os três fins-de-semana antes do Natal  
the three weekends before Christmas<sup>148</sup>

In (248), the mentioned three months have to be those that *immediately precede* the time  $t'$  where Ana sees Paulo again (after the time  $t''$  of Paulo's leaving, set by the first sentence); if any interval before the time when Ana sees Paulo again could qualify as the denotation of the *before*-phrase, the sentence would be trivially true: there is an infinite number of intervals (of three months) in the past of  $t'$  where (exactly) three months elapse; even if a restriction that these three months had to be after Paulo's leaving would be taken into account, the sentence would be true in scenarios where it should be false: e.g. if Paulo left three years before Ana managed to see him again (or any other amount of time superior to three months), there is an infinite number of intervals (of three months) in the past of  $t'$  and in the future of  $t''$  where (exactly) three months elapse.

The sequences in (249) show a similar situation (under the assumption that they do not contain any covert ordinal, like *first / primeiros* – cf. 7.1.2). There is an infinite number of ten-minute periods before any trial, and an infinite number of weekends before any Christmas. However, the expressions in questions only pick out the relevant periods immediately preceding the time set by the complement of *before*. I will return to these structures in section 6.2.5.1 and in chapter 7.

The analysis of *before* and *after* phrases sketched in this section has two main components (that I will try to argue for in the next subsections):

- I. *Before* and *after* phrases are time-denoting expressions. They introduce a discourse referent for a subordinating interval  $t_c$ , together with the condition (expressing minimal anteriority or posteriority) that defines it:  $[t_c \supset \subset t_{cc}]$  (for *before*),  $[t_{cc} \supset \subset t_c]$  (for *after*).
- II. *Before* and *after* phrases are not (at the level of assertion) temporal locating expressions. The condition that defines the location time  $t$  (stating its equivalence with the subordinating interval  $t_c$ ) –  $[t = t_c]$  – and the condition that locates the eventuality described in the matrix structure – e.g.  $[ev \subseteq t]$  – are associated with an empty locating operator.

As was already said, this second hypothesis is independent from the first one. An alternative analysis to I, compatible with II, is not to resort to the empty operator and still have the two conditions  $[t = t_c]$  and  $[ev \subseteq t]$  directly associated with the *before* and *after* phrases; these would then be taken not as mere time-denoting expressions, but as time-denoting expressions and temporal locating expressions, simultaneously.

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<sup>148</sup> Note the use of the definite article in the expressions of (249). These structures should not to be confused with those where the operators *before* and *after* are “modified” by predicates of amounts of time, as (i) or (ii) below (cf. section 6.2.5 and chapter 7):

- (i) dez minutos antes do início do julgamento [o réu teve um ataque de coração]  
ten minutes before the trial [the defendant had a heart attack]
- (ii) três fins-de-semana antes do Natal [muitas lojas ficaram sem produtos]  
three weekends before Christmas [many shops run out of goods]

In order to show the advantages of the above-proposed analysis, I will present some arguments in the following two subsections. In 6.2.2, I will show “indirect” evidence from the occurrence of *before* and *after* phrases in non-adverbial contexts and in adverbials headed by another time preposition (namely *since* and *until*); the aim will be to show that only the proposed analysis allows a uniform treatment of the expressions at stake in all the contexts considered. In 6.2.3, I will consider *before* and *after* phrases that surface as complete time adverbials (as those exemplified in (240)) and show the benefits of the analysis in question also for this type of structures.

## 6.2.2. A uniform analysis (as mere time-denoting expressions) of *before* and *after* phrases in different syntactic configurations

*Before* and *after* phrases can occur in contexts where they clearly behave as time-denoting expressions and where they seem not to have (if we ignore inferentially supplied information) a temporal locating function. I will refer to three of these contexts. Two of them involve structures where *before* and *after* phrases are verb arguments (therefore, not part of a temporal locating adverbial). These will be superficially dealt with. The third context, which has to do with the combination of *before* and *after* with *since* and *until*, will be explored in more detail, because it is especially revealing for the hypotheses under discussion in this text.

Temporal prepositions *before* and *after* occur as the head of verb arguments, for instance, in equative constructions with the verb *to be* (*ser*) that have a time-denoting expression as one term of the equation and a *before* or *after* phrase as the second term:

- (250) a. O período da minha vida em que fui mais feliz *foi* antes de ter deixado de estudar.  
The period of my life in which I felt happiest *was* before I quit studying.
- b. O pior período da história da Europa *foi* depois de 1939.  
The worst period in the history of Europe *was* after 1939.

The grammaticality of these constructions (with the intended meaning<sup>149</sup>) seems to indicate that the phrases headed by *before* and *after* can represent intervals of time. Note that, as

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<sup>149</sup> The relevant interpretation is the one in which *ser* / *to be* is a verb asserting identity, not the one in which this verb means something like ‘happen’, ‘occur’, ‘take place’. If the order of the arguments in (250) is reversed, only the relevant meaning is preserved (although the sentences may appear somewhat less natural):

- (i) Antes de ter deixado de estudar foi o período da minha vida em que fui mais feliz.  
Before I quit studying was the period of my life in which I felt happiest.
- (ii) Depois de 1939 foi o pior período da história da Europa.  
After 1939 was the worst period in the history of Europe.

The intended meaning is obtained in a paraphrase with *o período antes* / *the period before* not preceded by the preposition *em* / *in* (if this preposition occurs – cf. (iv) – the non-relevant meaning emerges):

- (iii) O período da minha vida em que fui mais feliz foi *o período antes* de ter deixado de estudar.  
The period of my life in which I felt happiest *was the period* before I quit studying.

was already observed (cf. sentence (228) above), other (typical) time-denoting expressions can also occur in this context:

- (251) a. O período da minha vida em que fui mais feliz foi {o Verão de 1980 / a década de 70 / o período em que andei na Universidade}.  
The period of my life in which I felt happiest was {the summer of 1980 / the seventies / the period when I was studying in the University}.

This context is somehow peculiar, however. In fact, at least some of the expressions that clearly behave as temporal locating adverbials (in most of the contexts in which they occur), such as Portuguese *durante* and *enquanto* or English *during* and *while*, can also be used in this type of identity construction:

- (251) b. O período da minha vida em que fui mais feliz foi {??em 1980 / enquanto andei na universidade / durante os meus tempos de estudante / ?até há dois anos atrás}.  
The period of my life in which I felt happiest was {??in 1980 / while I went to the University / during my school days / ??until two years ago}.<sup>150</sup>

Thus, this context does not reveal, contrary to others that will be presented in this subsection, the special status of the *before* and *after* phrases, when compared with (some of) the “true” temporal locating operators. In fact, what it seems to show is that phrases headed by operators such as (at least) *durante* / *during* and *enquanto* / *while* can also behave as mere time-denoting expressions in certain cases, namely those exemplified in (251b). These cases are however much more limited than those where *before* and *after* phrases – uncontroversially – have this property, as we will gather from the remaining examples of this section. I will not explore here the possible questions raised by these structures.

In a second type of construction where *before* and *after* phrases occur in a non-adverbial context, they are used as temporal arguments of predicates that do not express an identity relation:

- (252) a. The president rescheduled the meeting for after the elections.  
O presidente adiou a reunião para depois das eleições.  
b. The unemployment problem dates from before the war.  
O problema do desemprego data de antes da guerra.

As the subsequent examples show, the *before* and *after* phrases are, in this respect, on a par with typical time-denoting expressions – sentences *a* – and in contrast with typical temporal locating adverbials – sentences *b*:

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(iv) O período da minha vida em que fui mais feliz foi *no período antes* de ter deixado de estudar.

The period of my life in which I felt happiest was *in the period* before I quit studying.

<sup>150</sup> According to my informants, sentences with *in* (with the intended identity meaning) and *until* are very odd. The Portuguese sentence with the counterpart of *in* (*em*) is sometimes used in informal speech with the intended meaning; the Portuguese sentence with the counterpart of *until* (*até*) is slightly odd, though not unacceptable.



- (253) a. O presidente adiou a reunião para {Janeiro / a próxima semana}.  
The president rescheduled the meeting for {January / next week}.
- b. \*O presidente adiou a reunião para {durante as eleições / enquanto se estiverem a realizar as eleições / até às eleições}.  
\*The president rescheduled the meeting for {during the elections / while the elections are taking place / until the elections}.

Finally, quite revealingly, *before* and *after* phrases can also be the complement of another temporal (locating) preposition, such as *since* and *until* (*desde* and *até*, respectively, in Portuguese)<sup>151</sup>:

- (254) a. O Paulo é professor desde antes de 1980.  
Paulo has been a teacher since before 1980.
- b. O Paulo dá aulas desde antes de terminar o curso.  
Paulo has been teaching since before he graduated.
- (255) O Paulo trabalhou nesta empresa até depois de 1980.  
Paulo worked in this company until after 1980.

In this respect, *before* and *after* phrases are once more on a par with the typical time-denoting expressions – cf. (256) – and in contrast with the typical temporal locating adverbials – cf. (257):

- (256) a. O Paulo é professor desde {1980 / Janeiro / ontem}.  
Paulo has been a teacher since {1980 / January / yesterday}.
- b. O Paulo trabalhou nesta empresa até {Janeiro / agora}.  
Paulo worked in this company until {January / now}.
- (257) a. \*O Paulo é professor desde {durante 1980 / em 1980 / enquanto andava no quarto ano da Faculdade}.  
\*Paulo has been a teacher since {during 1980 / in 1980 / while he was in his fourth year at university}.
- b. \*O Paulo trabalhou nesta empresa até {durante a greve de Maio / enquanto não se licenciou / a partir de Janeiro}.  
\*Paulo worked in this company until {during the May strike / while he did not graduate / from January on}.

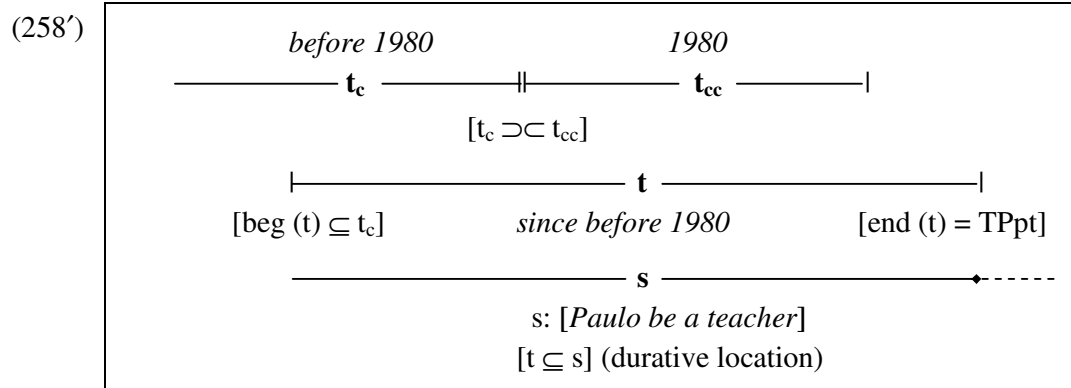
Now, the question arises what is the analysis of sentences like (254) or (255), where *before* and *after* phrases are dependent on other (explicit) temporal prepositions. For the sake of simplicity, I will only comment on examples (254), with *since before* (*desde antes*), but the observations apply, with the relevant changes, to examples like (255), with *until after* (*até depois*). On the oddity of *since after* (*desde depois*) and *until before* (*até antes*), cf. section 6.2.4.

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<sup>151</sup> For a reference to the possibility of combining *since* with *before*, and *until* with *after*, see D.C. Bennett (1970: 280-281) or Declerck (1991: 288), for instance.

In sentences of type (254), it seems rather uncontroversial that the *before* phrase merely designates an interval ( $t_c$ ) whose upper bound is determined by the complement 1980 (or, more simply, an interval that immediately precedes 1980).  $t_c$  is obviously not the location time for the eventuality described in the main clause, but an interval through which that location time is defined, via the operator *since*, namely:  $t_c$  marks the lower bound of  $t$ , [ $\text{beg}(t) \subseteq t_c$ ]. It is therefore the *since*-adverbial and not the *before*-adverbial that has (directly) the temporal location function. Schematically, for sentences (254a), repeated below, this can be represented as follows (both for Portuguese and English, modulo the lexical differences, and skipping the contribution of the perfect, for English):

- (258) O Paulo é professor desde antes de 1980.  
Paulo has been a teacher since before 1980.

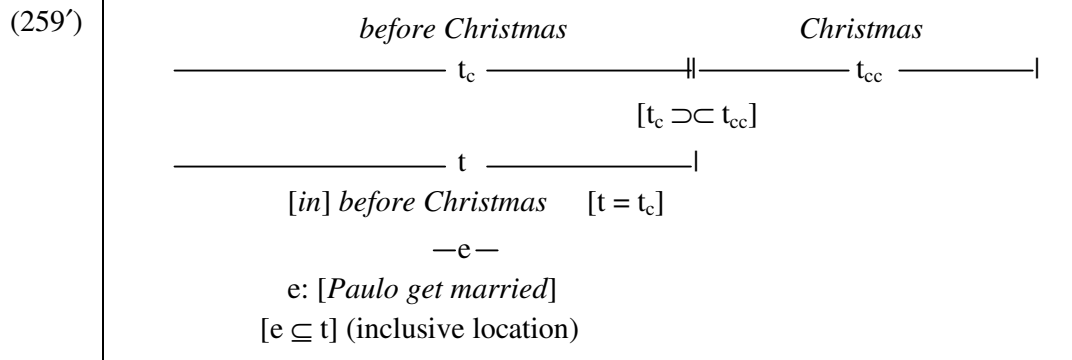


As shown in (258'), **three distinct hierarchical levels of intervals** are considered here: (i) the location interval  $t$ , (ii) the subordinating interval  $t_c$  and (iii) the “super-subordinating” interval  $t_{cc}$ . These are (interdependently) defined by *since* –  $R(t, t_c)$  –, *before* –  $R'(t_c, t_{cc})$  – and the complement of *before* –  $[COMPL(t_{cc})]$ , respectively. In sum, *before* and *after* clearly seem to denote functions from intervals to intervals, in sentences with *since* or *until* and in sentences where they head argumental phrases.

At this point, a question naturally arises, concerning the sentences in which *before* and *after* occur in adverbial position and where there is no (explicit) preposition before these operators, like (240a), repeated below:

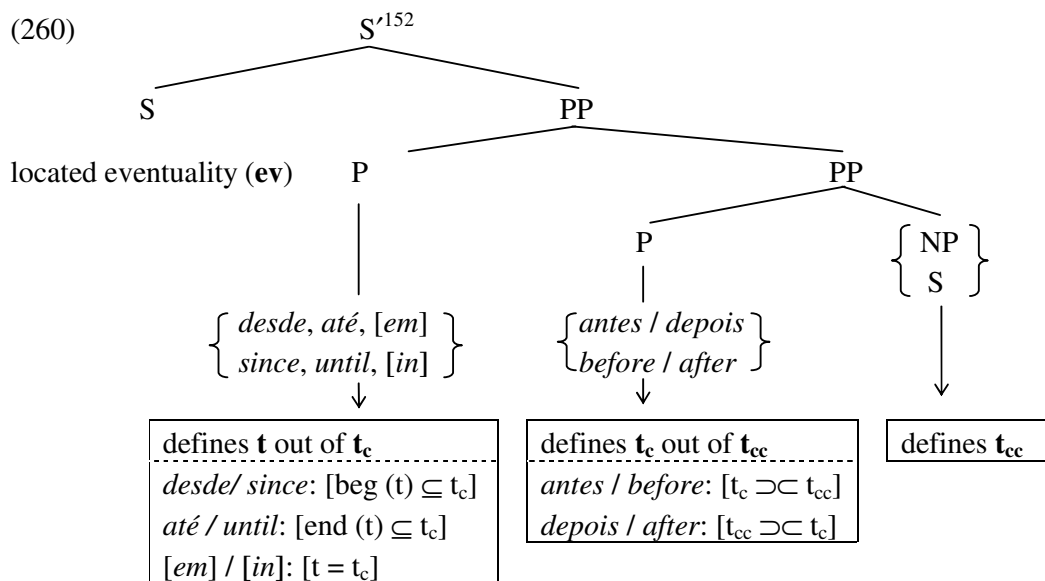
- (259) O Paulo casou antes do Natal.  
Paulo got married before Christmas.

Can an account of this type of sentences be given, which results in a **uniform treatment** of the operators at stake? As I stated before, I think yes, provided we assume that these structures contain a **null preposition** with a value close to that of *in*, i.e. one that introduces a condition stating the equivalence between location time and time of the complement ( $[t = t_c]$  – cf. section 4.2.2.2). Accordingly, the analysis of the sentence *Paulo got married before Christmas* would be as in the following schema:



Notice that (259') comprises the same three hierarchical levels of intervals as (258).

Briefly, resorting to an empty preposition in sentences like (259) has the advantage of allowing a **uniform treatment of the operators *before* and *after***. By introducing it, *before* and *after* can be taken to only denote, in all contexts considered so far, functions from intervals to intervals, that is, they can always be regarded as mere heads of time-denoting expressions. Without resort to the empty (locating) operator, *before* and *after* phrases would have to simultaneously play, in the relevant contexts, the two roles of time-denoting expressions and temporal locating expressions. Schematically, the proposed uniform treatment is:



<sup>152</sup> I concentrate here on the location of eventualities expressed by sentential means. However, as observed before, temporal locating PPs (including those of type “[*in*] *before* / *after* XP”) can also apply to nominal constituents (N’) representing eventualities – cf. (i)-(ii) – or intervals – cf. (iii):

- (i) o congestionamento do tráfego depois da abertura da nova ponte  
the traffic congestion after the opening of the new bridge
- (ii) a apresentação de candidaturas antes das eleições  
the presentation of candidacies before the elections
- (iii) um certo fim-de-semana antes das eleições  
a certain weekend before the elections

In terms of DRS-construction, the general rules defined in 4.2.2.5 for  $S'$  containing locating adverbials and for locating adverbials themselves (cf. pages 103 and 108) seem to apply<sup>153</sup>:

**DRS-CR 1'. Sentences containing a temporal locating adverbial  
(with a before/after-phrase)**

CR.S'	
Triggering configuration $\gamma \subseteq \gamma' \in \text{Con}_K$ :	$  \begin{array}{c}  S' \\  \swarrow \quad \searrow \\  S \qquad \qquad \text{PP}_{[+ \text{TEMPORAL LOCATING}]} \\  \qquad \qquad \triangle \\  \qquad \qquad \left\{ \begin{array}{l} \text{desde / since} \\ \text{até / until} \\ \text{[em] / [in]} \end{array} \right\} \left\{ \begin{array}{l} \text{antes / before} \\ \text{depois / after} \end{array} \right\} \dots  \end{array}  $
Introduce in $U_K$ :	new discourse referents <b>ev</b> and <b>t</b>
Replace $\gamma$ by:	$  \begin{array}{c}  S(\text{ev})[t] \quad \text{and} \quad \text{PP}_{[+ \text{TEMPORAL LOCATING}]}(\text{ev})[t] \\  \triangle \qquad \qquad \triangle \\  \left\{ \begin{array}{l} \text{desde / since} \\ \text{até / until} \\ \text{[em] / [in]} \end{array} \right\} \left\{ \begin{array}{l} \text{antes / before} \\ \text{depois / after} \end{array} \right\} \dots  \end{array}  $

**DRS-CR 3'. Temporal locating adverbials (with a before/after-phrase)**

CR.PP <sub>[+ TEMPORAL LOCATING]</sub>	
Triggering configuration $\gamma \subseteq \gamma' \in \text{Con}_K$ :	$  \begin{array}{c}  \text{PP}_{[+ \text{TEMPORAL LOCATING}]}(\text{ev})[t] \\  \swarrow \quad \searrow \\  P \qquad \qquad \text{PP} \\  \left\{ \begin{array}{l} \text{desde / since} \\ \text{até / until} \\ \text{[em] / [in]} \end{array} \right\} \left\{ \begin{array}{l} \text{antes / before} \\ \text{depois / after} \end{array} \right\} \dots  \end{array}  $
Introduce in $U_K$ :	new discourse referent <b>t<sub>c</sub></b>
Introduce in $\text{Con}_K$ :	new condition: $[\text{beg}(t) \subseteq t_c]$ , $[\text{end}(t) \subseteq t_c]$ , or $[t = t_c]$ (for <i>desde / since</i> , <i>até / until</i> and <i>[em] / [in]</i> , respectively)
Introduce in $\text{Con}_K$ :	new condition: $[\text{ev} \subseteq t]$ , $[t \subseteq \text{ev}]$ , $[\text{ev} \circ t]$ , or similar ones relating <b>ev</b> and <b>t</b>
Replace $\gamma$ by:	$  \begin{array}{c}  \text{PP}(t_c) \\  \triangle \\  \left\{ \begin{array}{l} \text{before} \\ \text{after} \end{array} \right\} \dots  \end{array}  $

<sup>153</sup> For simplicity, I ignore the occurrence of *before* and *after* phrases as common locators (in VP-adjunction), as in *o Paulo saiu antes das 7 horas* {*ontem / todos os dias*} / *Paulo left before 7* {*yesterday / every day*}.

Note that the level of the representation where the discourse referent  $t_c$  associated to a *before* and *after* phrase is to be introduced may vary. This issue is related to the already mentioned question (which I will not fully address here) of knowing whether these expressions have definite or indefinite properties, of whether they behave as referring expressions or as genuine predicates of times. Although I do not study this question, examples like those below seem to indicate that the (in)definiteness of *before* and *after* phrases depends primarily on the (in)definiteness of their complements. In fact, with definite complements like those in (261), *before* and *after* phrases have definite-like properties with respect to discourse referent accessibility; for instance, in (261a) and (261b) below, the discourse referent  $t_c$  is introduced in the main DRS and not in the sub-DRS (created by the negation or the *every*-operator) where the *before*-phrase is processed (note its accessibility for the subsequent discourse); in (261c), given the presence of the pronoun *seu* / *his*,  $t_c$  is introduced at a subordinate level (the *before*-phrase of (261c) behaving in this respect like the definite expression in (262), discussed in Kamp and Reyle 1993: 297):

- (261) a. Este quadro não data de [antes de 1300] $_{tc}$ .  
 Não havia quadros assim n[essa altura] $_{tc}$  / n[esse período] $_{tc}$ .  
 This painting does not date from [before 1300] $_{tc}$ .  
 There were no paintings like this at [that time] $_{tc}$  / in [that period] $_{tc}$  / [then] $_{tc}$ .
- b. Todos os estudantes que se licenciaram [antes de 1990 / do “crash” da bolsa] têm emprego actualmente. Não era muito difícil arranjar emprego n[essa altura] $_{tc}$ .  
 Every student who graduated [before 1990 / the stock market crashed] $_{tc}$  is presently employed. It was not so difficult to get a job at [that time] $_{tc}$  / [then] $_{tc}$ .
- c. Todos os estudantes leram este livro [antes do seu exame].  
 Every student read this book [before doing his examination].
- (262) Every student fears [the professor who supervises his dissertation].  
 (Kamp and Reyle 1993: 297)

With non-definite complements like those in (263), *before* and *after* phrases exhibit properties of indefinite expressions: (i) they may occur under the scope of Kamp and Reyle’s “adverbials of temporal quantification”, that is, they may introduce a time discourse referent in the restrictor of a duplex condition – (263a-b); (ii) they may take as complement a quantifying NP, which gives itself rise to a duplex condition – (263c):

- (263) a. Depois de um jogo de ténis a Mary fumava sempre um cigarro.  
 After a game of tennis Mary always smoked a cigarette.  
 (Kamp and Reyle 1993: 628)
- b. A Ana fuma dois cigarros depois do jantar todos os dias.  
 Ana smokes two cigarettes after dinner every day.
- c. A Ana fuma dois cigarros depois de cada refeição.  
 Ana smokes two cigarettes after every meal.

With respect to the rule for *before* and *after* phrases, it can be formulated as follows:

**DRS-CR 4. Before and after time-denoting expressions**

CR. <i>before/after</i> -PP	
Triggering configuration $\gamma \subseteq \gamma' \in \text{Con}_K$ :	
Introduce in $U_K$ :	new discourse referent $t_{cc}$
Introduce in $\text{Con}_K$ :	new condition: $[t_c \supset t_{cc}]$ (for <i>antes / before</i> ), or $[t_{cc} \supset t_c]$ (for <i>depois / after</i> )
Replace $\gamma$ by:	

Note that, given the algorithm proposed, if the *before* or *after* phrase occurs in adverbial position (which is the case portrayed DRS-CR 4), the discourse referent for the interval it denotes ( $t_c$ ) has already been introduced in the representation when this node is processed. Argumental *before* and *after* phrases (as [*this problem dates from*] *before the war*), like other argumental NPs, possibly introduce their referential argument ( $t_c$ ) in the representation (thus requiring the additional instruction: “introduce in  $U_K$  a new discourse referent  $t_c$ ”).

### 6.2.3. Further motivation for an analysis of *before* and *after* phrases as mere time-denoting expressions in adverbial contexts

The uniform treatment of *before* and *after* phrases suggested in the previous section was motivated by the multiple categorial behaviour of the adverbials under analysis. In this section, I will claim that independent motivation exists for the two components of such treatment: (i) the assignment of the categorial-denotational status of time-denoting expressions to the relevant expressions – section 6.2.3.1; (ii) the postulation of a higher invisible temporal locating operator – section 6.2.3.2. Note that I will focus here on the occurrence of *before* and *after* phrases only in “full adverbial contexts”, i.e. in adverbial position and not depending on any explicit preposition (as in e.g. *Paulo got married before Christmas*).

### 6.2.3.1. Association of a time discourse referent with *before* and *after* phrases in adverbial contexts

A first argument in favour of an analysis in which *before* and *after* phrases are taken to represent intervals of time ( $t_c$ ) in full adverbial contexts concerns the possibility of anaphoric reference to such intervals. Observe the examples (261a-b), repeated below:

- (264) a. Este quadro não data de [antes de 1300] $_{tc}$ . Não havia quadros assim  
n[esse período] $_{tc}$ .  
This painting does not date from [before 1300] $_{tc}$ . There were no paintings  
like this in [that period] $_{tc}$ .
- b. Todos os estudantes que se licenciaram [antes de 1990 / do “crash” da bolsa]  
têm emprego actualmente. Não era muito difícil arranjar emprego  
n[essa altura] $_{tc}$ .  
Every student who graduated [before 1990 / the stock market crashed] $_{tc}$   
is presently employed. It was not so difficult to get a job at [that time] $_{tc}$ .

A second argument in favour of the analysis under discussion concerns the similar behaviour of *before* and *after* phrases and the typical temporal locators within sequences that (arguably exclusively) express temporal location. As claimed in the literature, in such sequences of two or more typical temporal locating adverbials, the intervals associated with each adverbial are related by an inclusion relation<sup>154</sup>:

- (265) a. O Paulo nasceu às três horas, no dia de Natal, em 1967.  
Paulo was born at three o'clock on Christmas Day, 1967.
- A [as três horas] $_{t1}$  EM [o dia de Natal] $_{t2}$  EM [1967] $_{t3}$  →  $[t_1 \subseteq t_2 \subseteq t_3]$   
AT [three o'clock] $_{t1}$  ON [Christmas Day] $_{t2}$  Ø [1967] $_{t3}$  ↗

In these sequences, if any two relevant intervals are disjunct, there is no (intersecting) interval that may work as the location time, which causes ungrammaticality, as in the following example:

- (265) b. \*O Paulo nasceu às três horas, no dia de Natal, (n)o Verão passado.  
\*Paulo was born at three o'clock on Christmas Day, last summer.

The following sentences show that *before* and *after* phrases can also occur in sequences with other frame adverbials, representing smaller or bigger (location) intervals:

<sup>154</sup> Cf., for instance, Declerck (1991):

“In some sentences there is more than one time adverbial, and hence more than one TE [“time established”]. In that case the (...) relationship of inclusion will (...) hold between the different TEs. (...) in *Paulo was born at three o'clock in the morning on Christmas Day, 1967* there are four TEs, which are related in terms of inclusion (...). This appears to be a general rule in connection with the use of time adverbials” (pp. 284-285).

- (266) a. O Paulo visitou a mãe *num domingo antes do Natal*.  
Paulo visited his mother *on a Sunday before Christmas*.

EM [um domingo]<sub>t1</sub> [antes do Natal]<sub>t2</sub> → [t<sub>1</sub> ⊆ t<sub>2</sub>]  
ON [a Sunday]<sub>t1</sub> [before Christmas]<sub>t2</sub> ↗

- b. O Paulo apresentou o seu artigo *no primeiro dia da conferência, de tarde, antes do intervalo*.  
Paulo presented his paper *on the first day of the conference in the afternoon before the break*.

EM [o primeiro dia da conferência]<sub>t3</sub> DE [tarde]<sub>t2</sub> [antes do intervalo]<sub>t1</sub>  
ON [the first day of the conference]<sub>t3</sub> IN [the afternoon]<sub>t2</sub> [before the break]<sub>t1</sub>  
¬ [t<sub>1</sub> ⊆ t<sub>2</sub> ⊆ t<sub>3</sub>]<sup>155</sup>

Now, in order for the above-mentioned principle of inclusion to apply also to these sentences, it is necessary to consider that *before* and *after* phrases represent intervals (ending or beginning, according to the preposition, in the moment nailed down by the complement of the preposition).

A third argument in favour of the analysis under discussion concerns the fact that adverbials with *before* and *after* can be the suppliers of a TPpt in the same terms as typical temporal locators. This can be seen combining the Portuguese counterpart of *before* with the “pretérito imperfeito” (equivalent to the French “imparfait”) in the main sentence. As we saw in 2.2, the “pretérito imperfeito” expresses overlapping of the described eventuality **ev** with a past TPpt: [ev ∘ TPpt < n]; this past TPpt has to be defined in the discourse context<sup>156</sup>, a very common way of fixing it being to associate it with the location time specified by a temporal adverbial:

- (267) a. O Paulo vivia em Paris {em 1980 / nessa altura / quando a guerra começou}.  
Paulo habitait à Paris {en 1980 / a ce moment là / quand la guerre est commencée}.  
Paulo lived in Paris {in 1980 / by that time / when the war began}.

This adverbial can also be (the counterpart of) a *before* or an *after* phrase:

- (267) b. O Paulo vivia em Paris antes de 1940.  
Paulo habitait à Paris avant 1940.  
Paulo lived in Paris before 1940.

By associating *before* and *after* phrases (and their counterparts) with a discourse referent **t<sub>c</sub>**, the relationship between TPpt and the time set by the temporal adverbial can *always be*

<sup>155</sup> This example shows the need to define a lower bound for the interval denoted by *before* (and, for that matter, *after*) phrases. Here, the lower bound has to be within the mentioned afternoon, so that the inclusion relation holds between all intervals.

<sup>156</sup> Note that a sentence like (267) without adverbial is odd, in Portuguese or French, if it is not contextualised.



*considered as inclusive*; in other words, the time adverbial always defines a frame for the TPpt:  $[TPpt \subseteq t]$ . Without the discourse referent  $t_c$ , the TPpt cannot be defined by an inclusion condition in structures with *before* and *after*; instead, an anteriority or posteriority condition, respectively, has to apply. See the following schemes:

(267) a'. O Paulo vivia em Paris em 1980.

Paulo lived<sub>IMPERF</sub><sup>157</sup> in Paris in 1980.

$[1980(t_c)], [t_c = t], [ev \circ t]$

$[TPpt := o], [o < n], [o \subseteq t]$

$[ev \circ o]$

b'. O Paulo vivia em Paris antes de 1940.

Paulo lived<sub>IMPERF</sub> in Paris before 1940.

$[\text{before } 1940(t_c)], [t_c = t], [ev \circ t]$

$[TPpt := o], [o < n], [o \subseteq t]$

$[ev \circ o]$

vs. without the discourse referent  $t_c$  (i.e. with only  $t_{cc}$ ):

$[1940(t_{cc})], [ev < t_{cc}]$

$[TPpt := o], [o < n], [o < t_{cc}]$

$[ev \circ o]$

A fourth argument in favour of treating *before* and *after* phrases as time-denoting expressions involves the possibility of paraphrasing them (in many cases) with a temporal NP headed by the noun *period*, or similar – *the period before*, *the period after*...:

(268) a. O Paulo foi professor antes de 1980.

Paulo was a teacher before 1980.

$\Leftrightarrow$

b. O Paulo foi professor em o/um período antes de 1980.

Paulo was a teacher in the/a period before 1980.

(269) a. Este quadro data de antes da Primeira Guerra Mundial.

This painting dates from before the First World War.

$\Leftrightarrow$

b. Este quadro data de o/um período antes da Primeira Guerra Mundial.

This painting dates from the/a period before the First World War.

This contrasts with the oddity or ungrammaticality of expressions with *(the) period* in combination with (most) temporal locating operators:

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<sup>157</sup> IMPERF marks here one of the two values that, according to Kamp and Reyle (1993: 597), the English simple past can have, namely the one where  $\langle TPpt \text{ is before utterance time; described eventuality overlaps TPpt} \rangle$  – cf. chapter 2.2. Below, I will mark the other value –  $\langle TPpt \text{ coincides with utterance time; described eventuality before TPpt} \rangle$  – as PERF (not to be confused with the value PERF that in Kamp and Reyle's system marks the presence of an auxiliary verb *to have*).

- (270) a. ??o período enquanto eu estive no Brasil  
 ??the period while I was in Brazil  
 b. \*o período em 1980  
 \*the period in 1980  
 c. \*o período durante a guerra  
 \* the period during the war

And, last but not least, an additional motivation for introducing an independent time discourse referent for *before* and *after* phrases comes from the fact that this procedure allows a simpler and more uniform treatment of adverbial temporal location, namely one that includes the following two generalisations:

- (i) Events are always associated with an inclusive relation –  $[e \subseteq t]$ .  
 (ii) Atelic eventualities are always associated with an overlapping relation –  $[s \circ t]$   
 (the contrast durative / non-durative location being easily stated – cf. below).

In other words, *adverbial temporal location always involves overlapping relations between the described eventualities and the location times*, no other type of relations, namely anteriority or posteriority, being required, at least as far as assertion goes. Observe the analyses *a* of the following examples:

**I.** location of events expressed by:  $[e \subseteq t]$

- (271) Tomei o pequeno-almoço antes do meio-dia.  
 I took breakfast before noon.  
 a. representation with  $t_c$ : inclusion (i.e. overlapping) relation  
 $[e \subseteq t]$ ,  $[t = t_c]$ ,  $[t_c \supset \supset t_{cc}]$ ,  $[COMPL(t_{cc})]$   
 vs. b. representation without  $t_c$ : anteriority (i.e. non-overlapping) relation  
 $[e < t_{cc}]$ ,  $[COMPL(t_{cc})]$

**II.** location of atelic eventualities expressed by:  $[s \circ t]$

- (272) O Paulo {foi / era} feliz antes de 1980.  
 Paulo was<sub>{PERF / IMPERF}</sub> happy before 1980.  
 a. representation with  $t_c$ : overlapping relation  
 $[s \circ t]$ ,  $[t = t_c]$ ,  $[t_c \supset \supset t_{cc}]$ ,  $[COMPL(t_{cc})]$

Contribution of tense:

- $[TPpt: = o]$ ,  $[s < o]$ , where  $[o \subseteq t]$ <sup>158</sup>, for Portuguese “pretérito perfeito simples”, and the corresponding value of the English simple past (PERF).  
 –  $[TPpt: = o]$ ,  $[o < n]$ ,  $[s \circ o]$ , where  $[o \subseteq t]$ , for Portuguese “pretérito imperfeito”, and the corresponding value of the English simple past (IMPERF).

<sup>158</sup> As I said in chapter 2.2.3 (fn. 36, page 46), the Portuguese “pretérito perfeito simples” seems to allow for  $[TPpt \neq n]$ , in opposition to the (possibly) default case.

- vs. b. representation without  $t_c$ : anteriority relation  
 $[s < t_{cc}]$ <sup>159</sup>, [COMPL ( $t_{cc}$ )]

It must still be noted that the contrast durative / non-durative location of atelic eventualities can be easily expressed, in the analysis of type (272a), by the following opposition (used for other time adverbials as well):  $[t \subseteq s]$  (durative location) vs.  $[[s \circ t] \wedge [\neg[t \subseteq s]]]$  (non-durative location) – cf. section 4.2.1.2:

- (272) a'. representation with  $t_c$ : overlapping relation

**non-durative:**  $[[s \circ t] \wedge [\neg[t \subseteq s]]]$ ,  $[t = t_c]$ , [before 1980 ( $t_c$ )]

- cf. “o Paulo foi / era feliz *algures* antes de 1980”  
 “Paulo was happy *sometime* before 1980”

**durative:**  $[t \subseteq s]$ ,  $[t = t_c]$ , [before 1980 ( $t_c$ )]

- cf. “o Paulo foi *sempre* feliz antes de 1980”  
 “Paulo was *always* happy before 1980”  
 “o Paulo foi feliz *durante todo o período* que precedeu 1980”  
 “Paulo was happy *during the whole period* that preceded 1980”

- b'. representation without  $t_c$ : anteriority relation

only  $[s < t_{cc}]$ ; therefore, no distinction between durative and durative reading seems possible

In examples like (272), the non-durative reading appears (arguably) to be preferential. However, there are structures where a durative reading is clearly preferred. This occurs for example in sentences in which a causal or implicational link is established between the main and the subordinate clause<sup>160</sup>:

- (273) a. O Paulo {foi / era} um atleta de nível mundial antes de ter tido o acidente.  
 Paulo was a world-class athlete before he had the accident.  
 b. O Paulo {morou / morava} em Lisboa antes de emigrar para o Brasil.  
 Paulo lived in Lisbon before he emigrated to Brazil.

<sup>159</sup> Note, by the way, that this condition  $[s < t_{cc}]$  would be too strong (for the Portuguese “pretérito imperfeito” / English IMPERF simple past), if we assumed that the discourse referent  $s$  refers to *the whole state* described in the main clause. A sentence like

(i) O Paulo estava em casa antes de a Ana chegar.  
 Paulo was in the house before Ana arrived.

for instance, does not entail that Paulo was no longer in the house when Ana arrived. If we accepted the assumption above, the relevant temporal relation in this type of sentences would have to be expressed by the weaker condition  $[\text{beg}(s) < t_{cc}]$ . Interestingly, this is exactly the condition inferred, in the analysis I propose:  $[s \circ t] \rightarrow [\text{beg}(s) < t_{cc}]$  (cf. Table 9 below).

<sup>160</sup> The durative reading is preferably expressed in Portuguese by the “pretérito imperfeito”, the second form within curly brackets in the examples (273).

The existence of the readings at stake in sentences with *before* and *after* phrases and descriptions of atelic eventualities has been acknowledged in the literature: Heinämäki (1978), discussing Kroch (1972), refers that this author

«analyses *A before B* in terms of an existential quantifier, paraphrasable as “there is a time *t* such that *A* is true at *t*, and *t* precedes the time at which *B* is true”, but notes that in sentences like *before the arrival of the rebel army, the government forces controlled the town*, “the main clause (...) is interpreted as if there were a universal quantifier, “all the time up to *B*”» (p.107).

Declerck (1991) also refers to “the universal interpretation which is assigned to *after/before* in certain contexts”, as in *before the invention of printing all texts had to be copied by hand*, which the author considers a pragmatically induced interpretation: «In sentences like this, *before* is pragmatically interpreted as ‘all the time before’» (p. 287, fn. 62).

Given the diversity of possible temporal locations (durative and non-durative), the proposed analysis seems a better representational choice.

It is important to note that, in the overlapping analysis (as I said at the beginning of section 6.2) the anteriority or posteriority relation between the eventuality described in the main clause and the time/eventuality expressed in the complement of *before* and *after* is also obtained, although *via inference rather than via assertion*<sup>161</sup> (as is made explicit in the following table for *antes / before*, which applies also to *depois / after*, with the relevant changes):

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<sup>161</sup> There is a simplification in the Table 9. There, I only represent **loc** (**ev'**) as the interval nailed down by the complement of the *before* or *after* phrase; nevertheless, as was said, in some cases it is not **loc** (**ev'**) that is relevant to define **t<sub>cc</sub>**, but rather **beg** (**ev'**) or **end** (**ev'**), in which cases the inferences may obviously be different from those presented there. For instance, the sequences

- (i) *depois de o Paulo ser doutorado / after Paulo was a Ph.D.*

normally pick out an interval starting at the *beginning* of the described state, i.e. [**t<sub>cc</sub>** = **beg** (**ev'**)]. This phenomenon, often discussed in the literature, is not specific to *before* and *after* phrases, but affects other temporal connectives as well – e.g. *desde / since*, or *até / until*. For example, the Portuguese sequence

- (ii) *desde que a Ana vive em Lisboa* (“since Ana lives in Lisbon”)

is equivalent to *desde que a Ana começou a viver em Lisboa* (“since Mary started to live in Lisbon”). The phenomenon in question involves essentially the aktionsart of the described eventualities, in interaction with the temporal operator, but is not a fact dependent on the temporal operator alone. I will ignore this question (cf. however 6.2.4), since subordinate temporal clauses require a study of their own, and are not my central concern here. Note, though, that this fact seems responsible (as we will see in section 6.2.4) for some asymmetries between *before* and *after*, like the following, noted by Heinämäki (1974: 74):

- (iii) Bill was a boy scout after John was. (“state of Bill being a boy scout holds after John started to be a boy scout”)  
 –/→  
 John was a boy scout before Bill was. (“state of John being a boy scout holds before Bill started to be a boy scout”)

**Table 9. Temporal location (by adverbials containing antes/before-phrases) and inferences about anteriority**

[MATRIX] <sub>ev</sub> [ [∅ <sub>em</sub> / in] [antes / before [COMPL] <sub>tcc</sub> ] <sub>t</sub> ] <sub>t</sub> [t = t <sub>c</sub> ] [t <sub>c</sub> ⊃ t <sub>cc</sub> ], [COMPL (t <sub>cc</sub> )] (or [[ev': COMPL] ∧ [t <sub>cc</sub> = loc (ev')]])		
mode of location	assertion	inferences
inclusive (of telics)	[ev ⊆ t]	[ev < t <sub>cc</sub> ], [ev < ev']
durative (of atelics)	[t ⊆ ev]	[beg (ev) < t <sub>cc</sub> ], [beg (ev) < ev']
non-durative (of atelics)	[t ∘ ev] ∧ [¬[t ⊆ ev]]	

To finish this subsection, I will refer to a possible counter-argument to the time-denoting analysis of (some) *before*-phrases that has been presented (and refuted) in the literature by Heinämäki (1974). This author states: “Non-factual *before*-clauses fail to nail down any interval, since the event mentioned in the clause never took place” (p. 60):

- (274) a. Max died before he saw his grandchildren. (Heinämäki 1974: 52)
- b. The bomb exploded before it hit the target. (*ibid.* 56)
- c. John ate the apple before Bill did. (*ibid.* 58)

However, she also says:

“We can use possible worlds explanation for the fact that non-factual *before* is temporal, too. The non-factual *before*-clause expresses something that would have happened had the main clause not become true. The non-factual *before*-clause describes one of the possible futures, which, however, did not become the real one, because something that happened earlier prevented that course of events” (p. 60).

Besides, as the author points out, “non-factual *before*-clauses” occur in structures unequivocally temporal, namely with *the time at which* and with temporal measure phrases, provided they contain the conditional expression *would*:

- (275) a. The bomb exploded *before the time at which* it would have hit the target. (Heinämäki 1974: 60)  
?A bomba explodiu *antes do momento em que* {teria atingido / atingiria} o alvo.
- b. Granny died *a month before* she would have been 90. (*ibid.*)  
A avozinha morreu *um mês antes de* fazer noventa anos.<sup>162</sup>

As far as I can see it, the problem these expressions pose – the non-veridicality of the subordinate clauses (cf. e.g. Valencia *et al.* 1993) – seems orthogonal to the problem under discussion here. The status of the eventuality/time expressed by the subordinate clause is a problem for any analysis, independently of the status of *before* and *after* phrases as time-denoting expressions or as temporal locating expressions.

<sup>162</sup> In the Portuguese (infinitive) *antes*-clause of (275b), there is no explicit marker of counter-factuality (contrary to what happens in its English counterpart).

### 6.2.3.2. Presence of an empty locating operator in sentences with *before* and *after* phrases in adverbial contexts

As we have seen, in the analysis proposed so far, *before* and *after* phrases are associated in full adverbial contexts with an overlapping (sometimes inclusive) temporal relation, and not – directly – with a relation of anteriority or posteriority. In this respect, the relevant sentences behave as those containing *durante* / *during*, *em* / *in* or *enquanto* / *while*. Once we assume this analysis, two possibilities are open: (i) either associating the overlapping/inclusion relation directly with the operators *before* and *after* (the same for both!), or (ii) considering the existence of a null operator with a value close to that of *em* / *in*, to which the locating function is directly related<sup>163</sup>.

The first possibility has various drawbacks. First and foremost, it does not allow a uniform treatment of the operators at stake: in adverbial contexts, phrases headed by *before* and *after* have to be attributed the two categorial-denotational statuses of temporal locators (of the eventuality described in the main clause) and interval designators, while in other contexts, these phrases only have the second status. Secondly, the temporal location relation associated with *before* and *after* (in full adverbial contexts) has to be – rather counter-intuitively, I think – overlapping or inclusion and not anteriority/posteriority. Thirdly, the location relation is the very same for *before* and *after* (which shows that these operators are not distinguished with respect to temporal location, but only with respect to interval denotation).

The second possibility seems preferable, inasmuch as it has none of the above-mentioned shortcomings: (i) *before* and *after* are uniformly treated as mere time-denoting expressions; (ii) the relation of overlapping or inclusion is associated with an operator that normally has this value – *in*; (iii) the non-distinction of sentences with *before* and *after* with respect to temporal location is due to the fact that the locating operator is the same: null *in*. Note, by the way, that suppression appears to be an idiosyncratic property of prepositions *in* (or similar – *on*, *at*) in English, and *em* in Portuguese. In fact, “bare” *before* and *after* phrases can occur in arguments typically headed by these prepositions:

- (276) a. A batalha de Aljubarrota ocorreu *em* 1385.  
The Battle of Aljubarrota occurred *in* 1385.
- b. A batalha de Aljubarrota ocorreu *antes* do final do século XIV.  
The Battle of Aljubarrota occurred *before* the end of the 14<sup>th</sup> century.

Other argumental prepositions are, however, not omitted:

- (277) a. Por decisão do governo, as eleições passaram *de* Maio *para* Dezembro.  
By government decision, elections were postponed *from* May *to* September.

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<sup>163</sup> As I said in section 4.2.2.1, I assume that, when temporal locating adverbials occur in a sentence, the location conditions are not associated directly with aktionsart features (at the S' or VP' level – cf. Kamp and Reyle 1993: 543, 554) independently of the adverbials.

- b. Por decisão do governo, as eleições passaram *de antes do Verão para depois do Natal*.  
By government decision, elections were postponed *from before the summer to after* Christmas.

- (278) a. As reuniões agendadas *para* Novembro e Dezembro...  
The meetings that were scheduled *for* November and December...
- b. As reuniões agendadas *para antes do* final do ano...  
The meetings that were scheduled *for before* the end of the year...

The postulation of the null temporal locating operator has some other advantages (besides those involving uniformity in the treatment of *before* and *after* phrases). Firstly, it allows a uniform treatment of semantically equivalent structures like the following:

- (279) a. Isso aconteceu antes de {o Natal / eu ter deixado de estudar}.  
That happened before {Christmas / I quit studying}.
- b. Isso aconteceu *no* período antes de {o Natal / eu ter deixado de estudar}.  
That happened *in* the period before {Christmas / I quit studying}.

Note that these constructions differ only in that, when *before* and *after* phrases are preceded by a nominal expression like *(the) period*, the preposition *in* has to be obligatorily explicit.

Secondly, and quite importantly, the postulation of null operators seems to be required for other types of time-denoting expressions as well, not just for *before* and *after*. As was mentioned in 6.1.2, a null temporal preposition has been proposed by several authors in the analysis of other (relatively simpler) locating adverbials, like *now*, *yesterday* or *last Sunday*. However, there are more revealing cases. As I said, I think that an analysis along the lines advocated here for *before* and *after* is also advantageous for other (structurally complex) expressions that, like *before* and *after* phrases, are normally treated as temporal locating: this is for instance the case of expressions with *entre / between*, *quando / when* or *haver / ago*, which, with different possibly idiosyncratic restrictions, can occur in the same type of environments as *before* and *after* phrases. These will be analysed in more detail in section 6.3. In a broader perspective then, the analysis under discussion – interestingly – entails a partition (according to Table 8 above) of the class of operators that are traditionally classified as temporal locating.

#### 6.2.4. On some asymmetries between *before* and *after*

It has often been noted that *before* and *after* are not (totally) symmetric expressions<sup>164</sup>, although in some cases they are converses. The following examples, involving entailments from *before* to *after* clauses, and from *after* to *before* clauses (presented in Heinämäki 1974), illustrate the symmetry that sometimes exists between these two prepositions:

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<sup>164</sup> According to Heinämäki (1974: 80, fn. 10), “[Anscombe 1964] is the first to draw attention to the asymmetries of *before* and *after* in natural language”.

- (280) a. John arrived before Bill left.  $\leftrightarrow$  Bill left after John arrived. (*ibid.*: 74)  
 O John chegou depois de o Bill sair.  $\leftrightarrow$  O Bill saiu depois de o John chegar.
- b. It was dark before we got home.  $\leftrightarrow$  We got home after it was dark. (*ibid.*)  
 (Já) estava escuro antes de chegarmos a casa.  $\leftrightarrow$  Chegámos a casa depois de  
 (já) estar escuro.

As Heinämäki (1974) also notes, the possibility of having such entailments is conditioned by various factors, among which the (in)existence of causal or implicational links between matrix and subordinate clauses: “There are other obstacles (...) in the way of converting *before*-structures to *after*-structures and the other way round, namely, their causal implicatures, in case there are any” (p. 76). Observe the following sentences:

- (281) a. John was in a good mood before he got the letter. (*ibid.*: 76)  
 O John estava bem-disposto antes de receber a carta.
- b. ?John got the letter after he was in a good mood. (*ibid.*)  
 ?O John recebeu a carta depois de estar bem-disposto.

The first sentence strongly suggests that receiving the letter was the cause for the change in John’s mood; this causal implication is lost in the parallel structure with *after*.

The asymmetries between *before* and *after* cover a relatively wide range of phenomena. I will describe some of these differences here, although in a relatively superficial way. Except for those in I below, involving nonveridical *before*, which requires a more complex (intensional) treatment, they appear to be compatible with the DRS-construction rule proposed above, where these operators are treated as symmetric.

### **I. differences with respect to nonveridicality (or non-factuality)**

The existence of so-called nonveridical (i.e. non-factual or non-committal) clauses headed by *before*, but not by *after*, is one of the most well-studied differences between these two prepositions (cf. e.g. Heinämäki 1974, Landman 1991 and Valencia *et al.* 1993)<sup>165</sup>. According to Heinämäki, three types of *before*-(clauses) can be distinguished: factual, non-factual, and non-committal, illustrated in (282a), (282b) and (282c), respectively:

- (282) a. Sachi bought a Toyota before the price went up. (Heinämäki 1974: 52)  
 O Sachi comprou um Toyota antes de o preço subir.
- b. Max died before he saw his grandchildren (*ibid.*)  
 O Max morreu antes de ver os netos.

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<sup>165</sup> Heinämäki (1974) associates the contrast between *before* and *after* to temporal differences: “there are non-factual and non-committal *before*-clauses, but no such *after*-clauses. Why? The time relation between the clauses in *before*- and *after*-structures is different. (...) the *before*-clause is in the future with respect to the main clause. Therefore, (...) what is expressed in the main clause (...) can prevent something that would otherwise have happened, as in the case of non-factual *before*. (...) the *after*-clause expresses the earlier state of affairs (...). Therefore, it is impossible for the main clause to have any control over what happened earlier” (p. 77).



- c. I left the country before anything happened (*ibid.*: 62).  
 Antes de alguma coisa acontecer, deixei o país.<sup>166</sup>

In the first case, the truth of the *before*-clause is implied, just like that of (all) *after*-clauses, by the (whole) sentence in which they occur. Conversely, in the second case, the *before*-clause is inferred not to be true, and, in the third case, it is only possibly true.

The differences between *before* and *after* concerning veridicality obviously affect the possibility of having entailments of the type (280) above:

“If we take the non-factual or non-committal *before*, we do not get *after*-structures as entailments (...). The problem is that the non-factual *before*-clause becomes the main clause of the *after*-structure, and that clause is asserted to be true” (Heinämäki 1974: 76).

Observe the following examples:

- (283) a. John died before he saw his grandchildren. (Heinämäki 1974: 76)  
 O John morreu antes de ver os netos.  
 b. \*John saw his grandchildren after he died. (*ibid.*)  
 \*O John viu os netos depois de morrer.
- (284) a. We left before anything happened. (*ibid.*)  
 Antes de alguma coisa acontecer, partimos.  
 -/→  
 b. {\*Anything / Something} happened after we left. (*ibid.*)  
 Alguma coisa aconteceu depois de nós partirmos.

The study of the veridicality properties of *before* is beyond the scope of this dissertation. Landman (1991), for instance, proposes a unified analysis for the three “uses” of *before*. Valencia *et al.* (1993), adopting Landman’s analysis, and Montague’s (1969) concept of nonveridicality, consider that *before* (contrary to *after*) is “nonveridical in that it doesn’t force us to accept the truth of the clause it introduces” (p. 587). In this work, I have focused only on factual *before* (and will continue to do so hereafter). As said, non-factual and non-committal *before* seem to call for a more complex (intensional) treatment, which I will not attempt to do here.

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<sup>166</sup> In the three Portuguese sentences of (282), I used an infinitive verb form in the *antes*-clauses. Clauses headed by *antes* may also contain a subjunctive verb form. Infinitive and subjunctive are not in free variation, though. For instance, the *antes*-clause in (282a) with subjunctive – *o Sachi comprou um Toyota antes que o preço subisse* – strongly suggests that Max’s motivation for buying the car was the possibility that its price went up in the near future (the sentence with indicative not suggesting such motivation), but the future increase in the price need not necessarily take place; a similar “motivation reading” occurs in (282c) with subjunctive – *deixei o país antes que alguma coisa acontecesse* (note that, in the Portuguese example (282c), I put the infinitival *antes*-clause in sentence-initial position, because it seems a more natural way of expressing the reading at stake); the *antes*-clause in (282b) is very odd with subjunctive – *??o Max morreu antes que visse os netos* (it somehow suggests that Max forced his death to happen so as not to see his grandchildren). On the general differences between indicative and subjunctive in Portuguese, cf. e.g. Marques (1995).

## II. differences between (factual) *before* and *after* concerning *aktionsart*

According to Heinämäki (1974):

“*A before B* and *B after A* are converses if and only if *B* defines an interval that is a moment” (p. 76)<sup>167</sup>.

This asymmetry results directly from the differences in temporal location conditions that the author attributes to these operators, which, with some adaptations, may be expressed as follows: (i) *before* indicates an anteriority relation between the beginning<sup>168</sup> of the eventuality *ev'* represented in the subordinate structure, and either the end (for accomplishments) or the beginning (for other *aktionsart* types) of the eventuality *ev* represented in the main clause; (ii) *after* indicates a posteriority relation between *some subinterval* of the eventuality *ev* represented in the main clause and either the end (for accomplishments) or the beginning (for other *aktionsart* types) of the eventuality *ev'* represented in the subordinate clause:

- (285) a. *before*: [beg/end (*ev*) < beg (*ev'*)] (cf. Heinämäki 1974: 49)  
b. *after*: [*t'* ⊆ *ev*] ∧ [*t'* > beg/end (*ev'*)] (cf. *ibid.*: 72)

In order to discuss this issue, a general phenomenon involving subordinate temporal clauses (that has received considerable attention in the literature) has to be mentioned. I will just shortly describe it, since it is quite crucial to understand the asymmetries between sentences with *before* and *after* under discussion (a more thorough analysis being however beyond the scope of this dissertation). Observe the following pair of sentences with the temporal operators *desde / since*, which illustrate the phenomenon in question:

- (286) a. Desde *que a casa está ocupada*, os “poltergeists” têm estado activos.  
Ever since *the house has been occupied*, poltergeists have been acting up.  
(Heinämäki 1974: 90)  
a'. <sup>OK</sup>O Paulo publicou vários artigos desde *que é doutorado*.  
\*Paulo has published several papers since *he is a Ph.D.*  
b. O Charles está na Austrália desde *que escreveu a tese*.  
Charles has been in Australia since *he wrote his thesis*.  
(Heinämäki 1974: 90)

The subordinate clauses of the sentences *a* describe the state (*s*) of the house being (or having been) occupied, or of Paulo being a Ph.D. However, it is not the smallest closed interval that contains this state – **loc (s)** – that defines the lower bound of the location time,

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<sup>167</sup> *A* and *B* are sentential constituents.

<sup>168</sup> For accomplishments, the author admits that the end of *ev'* may set the relevant boundary (cf. discussion later on in this section).

but rather its beginning – **beg (s)**. In other words, these sentences mean that “poltergeist have been acting up since the house *started to be* occupied”, and “Paulo has published several papers since he *began to be* a Ph.D.”<sup>169</sup>. The subordinate clauses of sentences *b* describe the accomplishment (**e**) of Charles writing his thesis. However, it is not the smallest closed interval that contains this accomplishment – **loc (e)** – that defines the lower bound of the location time, but rather its end – **end (e)**. In other words, the sentence means that “Charles has been in Australia since he *finished (writing)* his thesis”. What is common to all these examples is the fact that it is not the (temporally extended) eventuality represented in the subordinate clause – state or accomplishment – that is relevant for the definition of the location time, but rather some related (punctual) eventuality – an achievement. This may indicate that, in the relevant contexts, situational complements may be affected by a (kind of) **aktionsart shift**.

With *before* and *after* subordinate clauses a similar phenomenon occurs. The non-trivial cases involve [*after* + state], which are interpreted as [*after* + beginning of state], and [*before* + accomplishment], which may (though curiously need not, as we will see later on) be interpreted as [*before* + end of accomplishment]; obviously, [*after* + accomplishment] is equivalent to [*after* + end of accomplishment], and [*before* + state] is equivalent to [*before* + beginning of state] (even under the assumption that in these cases [ $t_{cc} = \text{loc}(\text{ev}')$ ], where **ev'** is the eventuality described in the subordinate clause).

(287) a. Paulo published several papers after *he was a Ph.D.*

Paulo publicou vários artigos depois de *ser doutorado*.

b. Paulo published several papers before *he wrote his thesis*.

Paulo publicou vários artigos antes de *escrever a tese*.

The issue is complex and no clear-cut rules can be defined here. The relevant aspect to take into account, in order to understand the asymmetries that will be discussed, is that: (i) the interval  $t_{cc}$  defined by the sentential complement of *before* and *after* is not necessarily the **loc** of the described eventuality, but may be its beginning or end; (ii) this choice seems to depend mainly on the aktionsart of the described eventualities, probably in interaction with the temporal operator (but is not a fact dependent on the temporal operator alone).

As we will see below, Heinämäki’s analysis of *before* and *after*, presented in (285), predicts symmetry in the achievement-achievement combinations and in the atelic-*before*-achievement combinations. The analysis I advocate yields the same results:

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<sup>169</sup> In English, the use of stative descriptions in the subordinate clause seems to be strongly restricted. Heinämäki (1974: 98, fn. 6) notes that “not everyone likes sentences such as” (286a); the English sentence (286b), with simple present, was judged ungrammatical by my informants. In Portuguese, these restrictions do not apply. It is perfectly normal to use a stative description in the subordinate *desde*-clause (with e.g. “presente”, as in (286a-b), or “pretérito imperfeito”), with “desde (since) **x**” interpreted as “since the beginning of **x**”.

### A. ACHIEVEMENT-ACHIEVEMENT

(288) John arrived before Bill left.  $\leftrightarrow$  Bill left after John arrived. (Heinämäki 1974: 74)  
O John chegou antes de o Bill sair.  $\leftrightarrow$  O Bill saiu depois de o John chegar.

Consider [ev<sub>1</sub>: John arrive] and [ev<sub>2</sub>: Bill leave].

Heinämäki's analysis (according to (285)):

- sentence with *before*: [ev<sub>1</sub> < ev<sub>2</sub>]
- sentence with *after*: [ev<sub>2</sub> > ev<sub>1</sub>]

Note that these are the formulae in (285), but simplified, taking into account that, with achievements, [beg/end (ev) = ev] and [t' = loc (ev)]

My analysis:

- sentence with *before*: [ev<sub>1</sub>  $\subseteq$  t], [t = t<sub>c</sub>], [t<sub>c</sub>  $\supset$  t<sub>cc</sub>], [t<sub>cc</sub> = loc (ev<sub>2</sub>)];  
therefore: [ev<sub>1</sub> < ev<sub>2</sub>]
- sentence with *after*: [ev<sub>2</sub>  $\subseteq$  t], [t = t<sub>c</sub>], [t<sub>cc</sub>  $\supset$  t<sub>c</sub>], [t<sub>cc</sub> = loc (ev<sub>1</sub>)];  
therefore: [ev<sub>2</sub> > ev<sub>1</sub>]

### B. STATE-BEFORE-ACHIEVEMENT / ACHIEVEMENT-AFTER-STATE

(289) It was dark before we got home.  $\leftrightarrow$  We got home after it was dark.  
(Heinämäki 1974: 74)  
Estava escuro antes de chegarmos a casa.  $\leftrightarrow$  Chegámos a casa  
depois de estar escuro.

Consider [ev<sub>1</sub>: be dark] and [ev<sub>2</sub>: we get home].

Heinämäki's analysis (according to (285)):

- sentence with *before*: [beg (ev<sub>1</sub>) < ev<sub>2</sub>]
- sentence with *after*: [ev<sub>2</sub> > beg (ev<sub>1</sub>)]

My analysis:

- sentence with *before*: [ev<sub>1</sub>  $\circ$  t], [t = t<sub>c</sub>], [t<sub>c</sub>  $\supset$  t<sub>cc</sub>], [t<sub>cc</sub> = loc (ev<sub>2</sub>)];  
therefore: [beg (ev<sub>1</sub>) < ev<sub>2</sub>]
- sentence with *after*: [ev<sub>2</sub>  $\subseteq$  t], [t = t<sub>c</sub>], [t<sub>cc</sub>  $\supset$  t<sub>c</sub>], [t<sub>cc</sub> = beg (ev<sub>1</sub>)];  
therefore: [ev<sub>2</sub> > beg (ev<sub>1</sub>)]

Note that [*after* + state] is interpreted as [*after* + beginning of state], as already said.

Heinämäki's analysis predicts asymmetry in the atelic-atelic combinations and in the achievement-*before*-atelic combinations, as the following examples show. The analysis I advocate yields the same results:

### C. STATE-STATE

(290) John was a boy scout before Bill was. (Heinämäki 1974: 74)  
O John {foi / era} escuteiro antes de o Bill ser (escuteiro).  
 $\rightarrow$  but  $\leftarrow$  /  $\leftarrow$   
Bill was a boy scout after John was.  
O Bill {foi / era} escuteiro depois de o John ser (escuteiro)

Consider [ev<sub>1</sub>: John be a boy scout] and [ev<sub>2</sub>: Bill be a boy scout].

Heinämäki's analysis:

- sentence with *before*: [beg (ev<sub>1</sub>) < beg (ev<sub>2</sub>)]
- sentence with *after*: [t' ⊆ ev<sub>2</sub>] ∧ [t' > beg (ev<sub>1</sub>)]; therefore, it cannot be inferred from the sentence with *after* that [beg (ev<sub>2</sub>) > beg (ev<sub>1</sub>)]

My analysis:

- sentence with *before*: [ev<sub>1</sub> ∘ t], [t = t<sub>c</sub>], [t<sub>c</sub> ⊃ t<sub>cc</sub>], [t<sub>cc</sub> = loc (ev<sub>2</sub>)];  
therefore: [beg (ev<sub>1</sub>) < beg (ev<sub>2</sub>)]  
Note that [t<sub>cc</sub> = beg (ev<sub>2</sub>)], instead of [t<sub>cc</sub> = loc (ev<sub>2</sub>)], yields equivalent results.
- sentence with *after* [ev<sub>2</sub> ∘ t], [t = t<sub>c</sub>], [t<sub>c</sub> ⊃ t<sub>cc</sub>], [t<sub>cc</sub> = beg (ev<sub>1</sub>)];  
therefore, nothing can be inferred with respect to [R (beg (ev<sub>1</sub>), beg (ev<sub>2</sub>))].

The assessment of the (in)validity of the entailments in (290) seems complicated, and a matter of some subtlety in judgements. Furthermore, it is complicated by the double value of the English simple past, expressable in Portuguese by the two forms “pretérito perfeito simples” and “pretérito imperfeito”, resulting in eight possible entailment combinations. I will not try to evaluate here all these combinations (some of which may include odd sentences). The crucial point here is that the sentence *Bill was a boy scout after John was* does not necessarily entail, according to the Heinämäki's judgements, that Bill was not a boy scout already when John became one. In Portuguese, this interpretation (which results in asymmetry) seems also possible, specially for the counterpart with “pretérito imperfeito” (*era*) in the main clause; with “pretérito perfeito simples” (*foi*), the most natural interpretation is the one where he became a boy scout *only after* John became one. Heinämäki also admits that this is the preferred reading of the English sentence (a fact that the author attributes to an implicature): “The implicature that *A after B* means *A only after B* has the effect that one tends to interpret *after* as a converse relation of *before*, although this is not the only possible interpretation” (p. 76).

As we can see above, the symmetric analysis of *before* and *after* that I advocated in the previous sections is compatible with this asymmetry. In fact, the asymmetry is assumed to result, in these cases, not from the operators themselves, but from: (i) differences with respect to the part of the eventuality represented in the subordinate clause that is relevant for temporal location (e.g. **loc**, **beg** or **end**), depending crucially on the aktionsart of the subordinate clause; (ii) differences in the temporal location of the main-clause-eventualities, which depend essentially on their aktionsart – typically, atelic eventualities *overlap with* the location time, while telic eventualities *are included in* the location time.

#### D. ACHIEVEMENT-BEFORE-STATE / STATE-AFTER-ACHIEVEMENT

In order to consider the achievement-*before*-atelic combination, I will slightly modify Heinämäki's (1974) example *Doris finished her studies before she travelled all over the world*<sup>170</sup> (p. 74), since [*Doris*] *travel all over the world* seems to qualify more easily as an accomplishment than as an atelic eventuality:

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<sup>170</sup> This example is even more complex because it may involve (covert) quantification over events – *Doris finished her studies before she travelled all over the world* (*a Doris terminou os estudos*

(291) Doris finished her studies before she was a girl scout.

A Doris terminou os estudos antes de ser escuteira.

→ but ←/–

Doris was a girl scout after she finished her studies.

A Doris {foi / era} escuteira depois de terminar os estudos.

Consider: [ev<sub>1</sub>: Doris finish her studies] and [ev<sub>2</sub>: Doris be a girl scout].

Heinämäki's analysis:

- sentence with *before*: [ev<sub>1</sub> < beg (ev<sub>2</sub>)]
- sentence with *after* [t' ⊆ ev<sub>2</sub>] ∧ [t' > ev<sub>1</sub>];  
therefore, it cannot be inferred from the sentence with *after* that [beg (ev<sub>2</sub>) > ev<sub>1</sub>]

My analysis:

- sentence with *before*: [ev<sub>1</sub> ⊆ t], [t = t<sub>c</sub>], [t<sub>c</sub> ⊃ t<sub>cc</sub>], [t<sub>cc</sub> = loc (ev<sub>2</sub>)];  
therefore, by inference: [ev<sub>1</sub> < beg (ev<sub>2</sub>)]  
Note that [t<sub>cc</sub> = beg (ev<sub>2</sub>)], instead of [t<sub>cc</sub> = loc (ev<sub>2</sub>)], yields equivalent results.
- sentence with *after* [ev<sub>2</sub> ⊃ t], [t = t<sub>c</sub>], [t<sub>c</sub> ⊃ t<sub>cc</sub>], [t<sub>cc</sub> = loc (ev<sub>1</sub>)];  
therefore, nothing can be inferred with respect to [R (beg (ev<sub>1</sub>), beg (ev<sub>2</sub>))]

Here, again, the asymmetry results from the fact that the sentence *Doris was a girl scout after she finished her studies* (allegedly) is true even if Doris became a girl scout before she finished her studies. The same that was said above for state-state combinations in Portuguese with respect to this issue applies here (namely, this interpretation seems normal with “pretérito imperfeito” – *era* – in the main clause, but hard to get with “pretérito perfeito simples” – *foi*). Once more, the analysis I advocate predicts this asymmetry.

#### E. EVENTUALITY-BEFORE-ACCOMPLISHMENT/ACCOMPLISHMENT-AFTER-EVENTUALITY

Asymmetry may also occur in combinations involving an accomplishment in the *before*-clause. Firstly, it must be said that, when a *before*-clause is an accomplishment, Heinämäki (1974: 49-50) allows for two choices with respect to the part of this eventuality that is relevant for the temporal relation of anteriority: it may either be the beginning of this accomplishment (normal interpretation, for the author) – say, interpretation BEF<sub>beg</sub> – or its end (interpretation accepted by some speakers, according to the author) – say, interpretation BEF<sub>end</sub>. The sentence *Eva wrote her dissertation before Jan wrote his*, for instance, may be interpreted as: “before Jan started to write his” (BEF<sub>beg</sub>) or “before Jan finished his” (BEF<sub>end</sub>). Secondly, it should be noted that in the parallel structures with *after*, the accomplishments occur in the main clause position, where Heinämäki also admits two different options regarding the “reference point” involved in the relation of posteriority: (i) an arbitrary subinterval of the accomplishment is posterior to what is described in the subordinate clause (and therefore its end is posterior, though not necessarily its beginning) – say, interpretation endAFT; (ii) the whole accomplishment is posterior to what is described

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*antes de viajar pelo mundo inteiro*) may be interpreted as *Doris finished her studies before she EVER travelled all over the world* (a Doris terminou os estudos antes de ALGUMA VEZ viajar pelo mundo inteiro).

in the subordinate clause (and therefore necessarily its beginning) – say, interpretation  $_{\text{begAFT}}$ . The sentence *John wrote a novel after he got inspiration*, for instance, may be interpreted as “he finished the novel after he got inspiration” ( $_{\text{endAFT}}$ ) or “he started writing it after he got inspiration” ( $_{\text{begAFT}}$ ). Four combinations involving  $_{\text{begAFT}}$ ,  $_{\text{endAFT}}$ ,  $\text{BEF}_{\text{beg}}$ ,  $\text{BEF}_{\text{end}}$  are therefore theoretically possible. The (a)symmetric behaviour of the operators *before* and *after* in entailments such as those presented in (280) naturally depends on the interpretation made. Let us take for instance the following pair of sentences (involving a combination achievement-before-accomplishment / accomplishment-after-achievement<sup>171</sup>):

- (292) a. John got married before he wrote this novel.  
           O John casou antes de escrever este romance.  
       b. John wrote this novel after he got married.  
           O John escreveu este romance depois de casar.

These sentences entail each other, except in the following two (combinations of) interpretations:

(i) The sentence with *before* in the  $\text{BEF}_{\text{end}}$  interpretation (the achievement “get married” is anterior to the end of the accomplishment “write the novel”; it need not be anterior to its beginning) does not entail the sentence with *after* in the  $_{\text{begAFT}}$  interpretation (all the accomplishment “write the novel” is posterior to the achievement “get married”) – compare with:

- (293) John got married before he finished this novel.  
           O John casou antes de acabar de escrever este romance.  
            $\neg/\rightarrow$   
           John started this novel after he got married.  
           O John começou a escrever este romance depois de casar.

(ii) The sentence with *after* in the  $_{\text{endAFT}}$  interpretation (an arbitrary subinterval of the accomplishment “write the novel” is posterior to the achievement “get married”; its beginning need not be posterior, though its end is) does not entail the sentence with *before* in the  $\text{BEF}_{\text{beg}}$  interpretation (all the accomplishment “write the novel” is anterior to the achievement “get married”) – compare with:

- (294) John finished (writing) this novel after he got married.  
           O John acabou (de escrever) este romance depois de se casar.  
            $\neg/\rightarrow$   
           John got married before he started this novel.  
           O John casou antes de começar a escrever este romance.

In sum, the asymmetries observed under **II** seem to involve not the connectives *before* and *after* directly (which I take to impose a simple abutting relation), but the (possibly more general) mechanisms that select part of the eventualities described in the subordinate

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<sup>171</sup> What is said about this pair of sentences applies, with the relevant adaptations, to pairs involving eventuality-descriptions of other aktionsart types in the position of the achievement-description.

clauses (e.g. their beginning or end), together with distinctions at the level of temporal location relations according to aktionsart properties (simple overlapping, for atelics, or inclusion, for events).

### III. differences in combination with nominal complements

As Heinämäki (1974: 50) points out, with *before*, it is the *beginning* of the interval nailed down by the complement of the preposition that is relevant for temporal location (*before the war* being normally equivalent to *before the beginning of the war*, for instance). Conversely, with *after*, it is the *end* of this interval that is relevant (*after the war* meaning normally *after the end of the war*):

(295) a. Life was much pleasant before the war. (Heinämäki 1974: 50)

( $\Leftrightarrow$  [... before the war started])

A vida era mais agradável antes da guerra.

( $\Leftrightarrow$  [... antes de a guerra começar])

b. John lived in London after the war. (*ibid.*: 72)

( $\Leftrightarrow$  [... after the war ended])

O John viveu em Londres depois da guerra.

( $\Leftrightarrow$  [... depois de a guerra terminar])

The condition I postulated –  $[t_c \supset t_{cc}]$  (for *before*) and  $[t_{cc} \supset t_c]$  (for *after*) – entails this difference.

### IV. differences in the possibility of combination with *until* and *since*: the oddity of *since after* and *until before*<sup>172</sup>

The sequences *since before* and *until after* have already been considered in previous sections. The two other possible combinations of these operators – *since after* and *until before* – are normally quite marginal (a difference that, to my knowledge, has not been discussed in the literature):

(296) a. O Paulo é médico desde {??/depois de 1980 / antes de 1980}.

Paulo has been a doctor since {??/after 1980 / before 1980}.

b. O Paulo trabalhou nesta empresa até {depois de 1980 / ??antes de 1980}.

Paulo worked in this company until {after 1980 / ??before 1980}.

In this section, I will briefly discuss the oddity (or ungrammaticality) of these combinations.

A first observation relevant for this discussion concerns a general property of *since* and *until* phrases, to wit: the time associated with their complement ( $t_c$ ), which defines one of the boundaries of the location time ( $t$ ), has to be disjunct from the “opposite bound”.

<sup>172</sup> For simplicity, I will mention in the following text only the English expressions *since* (*before* / *after*) and *until* (*before* / *after*). However, what is said applies in like manner to their counterparts in Portuguese, *desde* (*antes* / *depois*) and *até* (*antes* / *depois*).



- (297) a. *desde / since*:  
           condition associated:  $[\text{beg}(t) \subseteq t_c]$ ; requirement:  $[\neg[\text{end}(t) \subseteq t_c]]$
- b. *até / until*:  
           condition associated:  $[\text{end}(t) \subseteq t_c]$ ; requirement:  $[\neg[\text{beg}(t) \subseteq t_c]]$

This restriction seems comparable to the one noted by Kamp and Reyle (1993: 616 ff.) with respect to the “origin of computation” for adverbials like *on Sunday*: “**on Sunday** cannot be used to refer to a day which contains the utterance time” (p. 617). The force of these requirements, which have obviously to do with general implicature that the temporal information be relevant, can be seen, for *since* and *until*, in sentences like the following:

- (298) a. O Paulo está doente desde segunda-feira.  
           Paulo has been ill since Monday. [durative reading]
- b. O Paulo esteve doente até segunda-feira.  
           Paulo was ill until Monday.

The requirements at stake result in the following: (i) sentence (298a) cannot be uttered on the same Monday that is mentioned in the sentence – if it were, we would have:  $[\text{Monday}(t_c)]$ ,  $[\text{beg}(t) \subseteq t_c]$ ,  $[\text{end}(t) = n]$ ,  $[n \subseteq t_c]$  and, therefore,  $[\text{end}(t) \subseteq t_c]$ ; (ii) the illness described in (298b) cannot have started on the same Monday that is mentioned in the sentence – if it had, we would have  $[\text{Monday}(t_c)]$ ,  $[\text{end}(t) \subseteq t_c]$  and  $[\text{beg}(s) \subseteq t_c]$  and, therefore, assuming that  $[\text{beg}(s) = \text{beg}(t)]$ ,  $[\text{beg}(t) \subseteq t_c]$ .

The oddity of the sequences *since after* and *until before* is correctly predicted if we take the requirements of (297) together with the assumption that *before* and *after* phrases denote “open-begun” or open-ended intervals, as those schematically represented below:

- (299) a. ————— before COMPL ( $t_c$ ) —————  $\parallel$  COMPL
- b. COMPL  $\parallel$  ————— after COMPL ( $t_c$ ) —————

What seems to cause the oddity of the sequences (296) is that  $t_c$  fails to be an adequate temporal boundary – lower or upper, according to the case – for the location time ( $t$ ), because it can “stretch” (forwards or backwards) up to the opposite boundary of this location time, in contradiction with the requirements expressed in (297): in sentence (296a), *??\*Paulo has been a doctor since after 1980*, *after 1980* refers to an interval that can stretch up to the utterance time, i.e. up to the upper bound of the location time; in the sentence (296b), *??Paulo worked in this company until before 1980*, *before 1980* refers to an interval that can stretch backwards to the beginning of the working period (that I take to be coincident with the lower bound of the location time) or even past it.

Finally, note that I avoided completely ruling out the sequences at stake. In fact, a theoretically possible interpretation of these sentences (apparently quite unnatural, in most cases) exists in which *before* and *after* are interpreted as meaning roughly the same as *shortly before* or *shortly after*, respectively. The meaning at stake seems to require

normally the explicit presence of the quantifier *shortly* (*pouco*, in Portuguese), or a comparable measure expression<sup>173</sup>:

- (300) a. O Paulo é médico desde {??/\*Ø / <sup>OK</sup>pouco} depois de 1980.  
 Paulo has been a doctor since {??/\*Ø / <sup>OK</sup>shortly} after 1980.  
 b. O Paulo trabalhou nesta empresa até {??Ø / <sup>OK</sup>pouco} antes de 1980.  
 Paulo worked in this company until {??Ø / <sup>OK</sup>shortly} before 1980.

This type of structures, where *before* and *after* are combined with predicates of amounts of time (and arguably have a different analysis, not as heads of structurally complex time-denoting expressions), will be referred to in the next subsection and in chapter 7.

### 6.2.5. Some observations on the semantic diversity of the temporal operators *before* and *after*: *before* and *after* in combination with predicates of amounts of time

So far, I have only considered the occurrence of *before* and *after* in structures where they are not combined with predicates of amounts of time. As I said, the reason was that the structures with these predicates have specific properties, and ultimately some of them seem to indicate that *before* and *after* do not have the same behaviour in every context. I will proceed now to a relatively superficial analysis, in order to compare these structures with those discussed so far, and leave a more detailed analysis for chapter 7.

*Before* and *after* may occur in combination with predicates of amounts of time in two different types of construction, exemplified in the groups of sentences below. For simplicity, I will henceforth only give examples with *before*, and will only make reference this preposition, but the observations made apply, with the relevant adaptations, to *after*.

- (301) a. As *duas semanas antes das eleições* foram especialmente agitadas.  
 The *two weeks before the elections* were particularly hectic.  
 b. Dois candidatos desistiram nas *duas semanas antes das eleições*.  
 Two candidates gave up in the *two weeks before the elections*.  
 (302) a. Houve um ataque bombista *duas semanas antes das eleições*.  
 A bomb attack occurred *two weeks before the elections*.  
 b. Este candidato foi à frente nas sondagens até *duas semanas antes das eleições*.  
 This candidate led in the polls until *two weeks before the elections*.

<sup>173</sup> In this connection, it would be interesting to explore contrasts involving the use of *pouco* / *shortly* and *muito* / *long*, namely: the oddity of *desde muito depois* / *since long after* and *até muito antes* / *until long before* vs. the grammaticality of *desde pouco depois* / *since shortly after* and *até pouco antes* / *until shortly before* (vs. still the grammaticality of the forms *desde {pouco/muito} antes* / *since {shortly/long} before* and *até {pouco/muito} depois* / *until {shortly/long} after*). I leave the analysis of such contrasts for further research.

(303)

||-----||

↓

*duas semanas antes das eleições*  
*two weeks before the elections*

(302)

(as) *duas semanas antes das eleições*  
(the) *two weeks before the elections*

(301)

*eleições*  
*elections*

The syntax of the sequences (301)-(302), specially of those in (302), is relatively complex, and poses questions that are beyond the scope of this dissertation. Therefore, I will adopt simplified structures, making some assumptions without argumentation. In particular, I assume that: in sentences (301), the predicate of amounts of time *duas semanas* / *two weeks* is the nuclear element of the NP (*as duas semanas antes das eleições* / *the two weeks before the elections*) that has the *before*-phrase as a modifier (on the surface):

(301') [ [duas semanas]<sub>N'</sub> [antes das eleições] ]<sub>N'</sub>  
[ [two weeks]<sub>N'</sub> [before the elections] ]<sub>N'</sub>

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In sentences (302), the predicate of amounts of time *duas semanas* / *two weeks* is a kind of modifier of the preposition *antes* / *before*<sup>175</sup>, and the sequence *antes das eleições* / *before the elections* is not a constituent of the sentence. For simplicity, I will sometimes use the term “modification” to express the relationship between the predicate of amounts of time and *before*, and make reference to the (complex) operator “X-TIME *before*”. However, I do not intend with this to commit to any specific syntactic configuration. In fact, in order to avoid syntactic complexities, I will adopt a tripartite (simplified) structure:

- (302') [ [duas semanas] [antes] [das eleições] ]<sub>XP</sub>  
 [ [two weeks] [before] [the elections] ]<sub>XP</sub>

I will consider the two uses of *before* at stake separately, in the following two subsections. First, I will consider the occurrences *before* in structures like (301), given that it seems possible to tackle them with the rule for *before* that was already presented (once some general assumptions are made). Structures like (302) will be superficially analysed in 6.2.5.2 (and reconsidered, in a broader perspective, in chapter 7).

### 6.2.5.1. Temporal location of intervals involving *before* and *after* phrases

Let us consider again the sentences in (301a), renumbered below:

- (304) As duas semanas antes das eleições foram especialmente agitadas.  
 The two weeks before the elections were particularly hectic.

In (304), *before* surfaces as a modifier of a predicate of amounts of time. In this context, the predicate of amounts of time represents the size of an interval *t'* that abuts the time nailed down by the complement of *before*, these sentences being equivalent to:

- (305) O período de duas semanas antes das eleições foi especialmente agitado.  
 The two-week period before the elections was particularly hectic.

In order to explain why I consider that the analysis proposed in sections 6.2.1-2 can also apply to these structures, I will first observe some general facts about temporal location and then consider some structures comparable with these. As was mentioned in chapters 1 and 4, the same temporal adverbials that are used to locate eventualities described via main clauses (e.g. *in 1980*) can normally also be used (adnominally) to locate eventualities described via nominal expressions – cf. (306a) – or to locate intervals – cf. (306b):

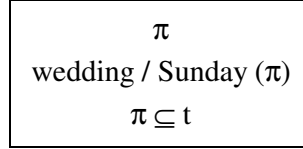
- |  |  |
|--|--|
| (306) a. um casamento em 1980<br>a wedding in 1980 | a'. casamentos em 1980<br>weddings in 1980 |
| b. um domingo em 1980<br>a Sunday in 1980          | b'. domingos em 1980<br>Sundays in 1980    |

<sup>175</sup> In this respect, *before* (and *after*) parallel a large group of expressions that include in English, for instance, comparative temporal expressions like *later* (*two months later*) or *earlier*, and spatial expressions like *into* (*six feet into*) or *behind* (*two metres behind*).

Plural nominal expressions like those in *a'* and *b'* seem to involve reference to the **supremum** ( $\Pi$ ) of the eventualities or times of the described type that are contained in the location time **t** (in the terminology I use and will comment more thoroughly in chapter 9, a “full-scanning” of the location time takes place in these structures):

- (307) casamentos / domingos em 1980  
weddings / Sundays in 1980

$\Pi = \Sigma\pi$ :



In accordance with what was said before, the location time **t** is defined by the conditions  $[t = t_c]$  and  $[1980(t_c)]$ , and is introduced in the main DRS.

The relevance of this abstraction becomes particularly evident in universally quantified NPs (although other types of quantification are possible<sup>176</sup>), which seem to refer to this kind of plural entities:

- (308) a. (all) the weddings in 1980  
b. (all) the Sundays in/of 1980  
b'. (all) the 52 Sundays in/of 1980  
cf. b''. \*the three Sundays in/of 1980

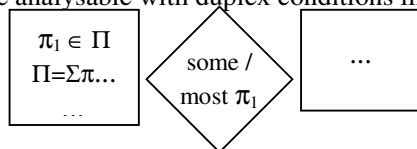
Now, we observe that *before*-phrases may occur in the same type of environments as *in*-adverbials:

- (309) a. um casamento antes de 1980  
a wedding before 1980  
b. um domingo antes de 1980  
a Sunday before 1980  
cf. c. O Paulo casou antes de 1980.  
Paulo got married before 1980.

For the uniformity reasons already pointed in previous sections for sentences like (309c), a null locating preposition  $\emptyset$  can also be postulated for structures like (309a-b):

- |   |   |   |
|---|---|---|
| (309) a'. um casamento antes de 1980<br>a wedding before 1980<br>b'. um domingo antes de 1980<br>a Sunday before 1980 | → | um casamento $\emptyset_{em}$ antes de 1980<br>a wedding $\emptyset_{in}$ before 1980<br>um domingo $\emptyset_{em}$ antes de 1980<br>a Sunday $\emptyset_{in}$ before 1980 |
|---|---|---|

<sup>176</sup> Cf. {*alguns / a maioria dos*} *casamentos antes de 1980* / {*some / most*} *weddings before 1980*. These structures are analysable with duplex conditions like the following (where  $\Pi$  is as in (307)):



Structures with plural nouns can be associated with the same abstraction operation that was described in (307):

- (310) casamentos / domingos  $\emptyset_{em}$  antes de 1980  
 weddings / Sundays  $\emptyset_{in}$  before 1980

$$\Pi = \Sigma\pi: \begin{array}{c} \pi \\ \text{wedding / Sunday } (\pi) \\ \pi \subseteq t \end{array}$$

In accordance with what was said before, the location time  $t$  is defined by the conditions  $[t = t_c]$ ,  $[t_c \supset \supset t_{cc}]$  and  $[1980(t_c)]$ , and is introduced in the main DRS.

Definite constructions also clearly seem to refer to this type of maximal entities:

- (311) a. (todos) os casamentos antes de esta nova lei ser aprovada  
 (all) the weddings before this new law was approved  
 b. (todos) os domingos antes das eleições  
 (all) the Sundays before the elections

Now, let us consider definite structures with specified cardinality  $n$ :

- (312) os três domingos  $\emptyset_{em}$  antes das eleições  
 the three Sundays  $\emptyset_{in}$  before the elections

The normal presupposition associated with these quantificational structures is that only  $n$  relevant entities exist (in the context of utterance) that have the property expressed by the modifier (cf. contrasts (308b')-(308b'')), i.e. in this case that only three Sundays exist in the interval denoted by *before the elections*. Formally this is expressed by a cardinality restriction on the sum  $\Pi$  (defined as in (310)), namely  $[|\Pi| = 3]$  (the supremum of Sundays contained in the referred interval that abuts the elections is formed only by three Sundays). This has a further interesting effect – in such a context, a *constraint on the interval represented by the before-phrase* ( $t_c$ ) is automatically posed, to wit: that it does not stretch backwards in time more than as to contain exactly three Sundays. In other words, the beginning of the interval denoted by the *before-phrase*, which the operator alone does not define, is restricted: minimally, it has to lie between the beginning of the third Sunday (inclusive) and the beginning of the fourth Sunday (exclusive) in the past of the elections. I will return to this analysis of structures (312) in chapter 7.1.2.

Finally, let us consider structures with predicates of amounts of times such as:

- (313) as três horas antes das eleições  
 the three hours before the elections

I think that these structures with predicates of amounts of time can be analysed as just a special case of the construction with predicates of times exemplified in (312)<sup>177</sup>. As was said, the structure (312), *os três domingos antes das eleições / the three Sundays before the elections*, has the presupposition that there are only three Sundays in the time denoted by *antes das eleições / before the elections*, where from a restriction on the lower bound of the interval denoted by the *before*-phrase is derived. The parallel presupposition associated with structure (313), *as três horas antes das eleições / the three hours before the elections*, is that there are only three hours in the interval preceding the elections that is being referred to; in general, the normal presupposition associated with these definite constructions seems to be that the amount of time expressed by the nuclear predicate (three hours, here) is coincident with the size of the interval expressed by the modifier<sup>178</sup>, which is the *before*-phrase, in this case. From this, a restriction on the lower bound of the interval denoted by the *before*-phrase is also derived, and a stronger one, for that matter: that it stretches backwards from the elections (exactly) three hours. The *before*-phrases represent thus, in these contexts, completely bounded intervals.

As I will show in 7.1.1, the analysis just sketched is compatible with a uniform treatment of *before*-phrases in all contexts considered so far, i.e. a treatment that resorts to a null locating operator  $\emptyset$ :

- (314)    *as três horas*  $\emptyset_{em}$  *antes das eleições*  
               the three hours  $\emptyset_{in}$  before the elections

Alternatively, for these cases with predicates of amounts of time, a simpler analysis without resort to the null operator is possible (though it is not for cases with predicates of times like *the three Sundays before...*, unless the rule for processing *before* and *after* phrases presented in 6.2.2 is altered). This alternative analysis involves simply passing down the time discourse referent associated with the whole NP (*as três horas antes das eleições / the three hours before the elections*) to the PP headed by *before* (*antes das eleições / before the elections*), and identifying it with its referential argument. The rule associated with *before* in section 6.2.2 can then apply and produce the desired final result (see chapter 7.1.1 for details):

- (315)    [the three hours before the elections ( $t_c$ )]  $\Rightarrow$   
               [three hours ( $mt$ )]  $\wedge$  [dur ( $t_c$ ) =  $mt$ ]  $\wedge$  [before the elections ( $t_c$ )]

---

<sup>177</sup> A property that distinguishes predicates of amounts of time (like *três horas / three hours*) from predicates of times (like *domingo / Sunday*) is that they only seem to occur in this type of nominal nuclear position with definite quantifiers:

- (i) {alguns / a maioria dos / (todos) os} domingos antes das eleições  
       {some / most / (all) the} Sundays before the elections
- (ii) {\*algumas / \*a maioria das / \*todas as / as} três horas antes das eleições  
       {\*some / \*most / \*all the / the} three hours before the elections

<sup>178</sup> Cf. also *the 24 hours in/of a day* vs. *\*the 12 hours in/of a day*.

### 6.2.5.2. *Before* and *after* modified by predicates of amounts of time

In this subsection, I will superficially analyse structures like (302), repeated below:

- (316) a. Houve um ataque bombista duas semanas antes das eleições.  
 A bomb attack occurred two weeks before the elections.
- b. Este candidato foi à frente nas sondagens até duas semanas antes das eleições.  
 This candidate led in the polls until two weeks before the elections.

I will focus on the fact that the analyses proposed so far do not seem to apply to these occurrences of *before*, therefore raising the question of the ambiguity of this temporal operator.

A first observation to be made is that *before*-phrases modified by predicates of amounts of time can occur as the complement of an explicit temporal proposition, as *until* – cf. (316b). In fact, they can occur in the same types of environments of simple *before*-phrases – in non-adverbial argumental position, as part of an adverbial introduced by an explicit temporal preposition, or as a complete temporal locating adverbial on the surface (cf. section 6.3). Thus, an analysis similar to the one sketched for simple *before*-phrases in section 6.2.1-2 seems adequate, that is, we can consider that the expression “X-TIME before COMPL” is a *mere* time-denoting expression and that the location function in full adverbial contexts, such as in (316a), is associated with an empty preposition. However, the crucial difference to note about this expression “X-TIME before COMPL” is that (arguably) the sequence “before COMPL” that it contains *does not* represent an interval. In fact, it is even doubtful that this sequence is a constituent of the structure – cf. configuration suggested in (302') above. In this view, it is the whole phrase “X-TIME before COMPL” that represents an interval ( $t_c$ ), which, as conveyed by *before*, lies a given amount of time (referred to by “X-TIME”) in the past of the interval represented by COMPL ( $t_{cc}$ ). A sentence like (317) below can possibly be associated with the appended DRS-conditions:

- (317) O Paulo casou  $\emptyset_{em}$  dois meses antes de se licenciar.  
 Paulo got married  $\emptyset_{in}$  two months before he graduated.  
 [e: Paulo get married], [e  $\subseteq$  t], [t =  $t_c$ ], [dur (t') = mt], [2 months (mt)],  
 [beg (t') =  $t_c$ ]<sup>179</sup>, [end (t') =  $t_{cc}$ ], [ $t_{cc}$  = loc (e')], [e': he graduate]

The sole function of *before* in these structures seems to be the *indication of the direction* from  $t_{cc}$  in which the measurement must be made (in the formalisation above, via the “instrumental” interval  $t'$ ), in order to define  $t_c$ : *before* indicates anteriority (by contributing the condition [end (t') =  $t_{cc}$ ]), while *after* indicates posteriority (by contributing the symmetric condition [beg (t') =  $t_{cc}$ ]). In this aspect, these operators *before* and *after* are

<sup>179</sup> As I will show in chapter 7.2.1.1, the condition [beg (t') =  $t_c$ ] is too strong for some occurrences of these adverbials – cf. *John was in the hospital for two days two months before he graduated*. Cases like these seem to indicate that the adverbials at stake are not punctual (at least, not in every context), a looser condition – [beg (t')  $\subseteq$   $t_c$ ] – therefore applying. However, this condition proves too weak, and requires complementation with further restrictions, defining the extent of  $t_c$ .



comparable to others that allow measurement from an anchor point, like *ago* or *from*, as we will see in chapter 7.

It must be stressed that, by adopting this analysis, the operators *before* and *after* are assumed to have two different values each, thus being genuine examples of homonymous expressions. In structures without modifying predicates of amounts of time, they denote functions from intervals to (preceding or following) intervals. In structures with modifying predicates of amounts of time, they are markers that merely indicate the direction (backwards or forwards in time) for an operation of temporal measurement from a given anchor point<sup>180</sup>.

A uniform semantic treatment of *before* and *after* in the two types of structures is possible, though its complexity seems, at least at first sight, uncompensating. This uniform analysis consists in postulating an **empty predicate of amounts of time**, with an indeterminate value close to that of *some time* or *some amount of time*, in structures that do not exhibit these predicates. See the examples below, where the brackets indicate the empty elements required by this uniform treatment of all occurrences of *before* and *after*:

- (318) a. O Paulo casou [em] [X-TIME] antes de 1980.  
Paulo got married [in] [X-TIME] before 1980.
- b. O Paulo é médico desde [X-TIME] antes de 1980.  
Paulo has been a doctor since [X-TIME] before 1980.
- c. O Paulo casou [em] dois meses antes de terminar o curso.  
Paulo got married [in] two months before he graduated.
- d. O Paulo dá aulas desde exactamente dois meses antes de terminar o curso.  
Paulo has been teaching since exactly two months before he graduated.

Under this analysis, the operators *before* and *after* act, in all cases, as direction markers (for an operation of time measurement), in the way defined above. I set a more thorough discussion of this hypothesis aside, for further investigation.

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<sup>180</sup> An operation of counting of temporally ordered entities, instead of time measurement, may apply in structures with *before* and *after*:

- (i) Três *domingos* antes das eleições [a Ana decidiu não votar].  
Three *Sundays* before the elections [Ana decided not to vote].
- (ii) Três *aulas* antes do exame [o professor começou a discutir um novo livro].  
Three *classes* before the examination [the teacher started to discuss a new book].

As was already noted (cf. footnote 135), this is also valid for other temporal expressions, such as those with *há* / *ago*. This issue will be analysed in more detail in chapter 7.

Observe still that structures like *três domingos antes das eleições* / *three Sundays before the elections* may be ambiguous between an interpretation of the type under discussion, as in (i) above, and an interpretation involving temporal location of intervals, of the type discussed in 6.2.5.1, as in

- (iii) Três domingos antes das eleições [foram especialmente agitados].  
Three Sundays before the elections [were particularly hectic].

### 6.2.6. Conclusions

In subchapter 6.2, I argued for the two following interrelated hypotheses:

- *Before* and *after* phrases are essentially, in every context in which they occur (except when modified by predicates of amounts of time, or comparable expressions), **time-denoting expressions**. In DRT-terms, this means *before* and *after* phrases (as a whole) are associated with a time discourse referent ( $t_c$ ) which is distinct from the one associated with the complement of the preposition ( $t_{cc}$ ).
- In sentences where the interval associated with the *before* or *after* phrase coincides with the location time for the eventuality described in the main clause, there is an empty temporal locating preposition –  $\emptyset_{in}$  – with which the temporal location function is directly associated. Accordingly, *before* and *after* phrases are never, in a direct way, **temporal locating expressions**.

As a consequence of these hypotheses, the location relation associated with *before* and *after* phrases in (full) adverbial contexts is not an anteriority or posteriority relation (between the eventuality described in the main clause **ev** and the interval represented in the complement of *before* or *after*). Rather, it is conceived of, in line with several proposals in the literature, as an **overlapping relation** established between **ev** and the interval represented by the *before* or *after* phrase as a whole ( $t_c$ , or rather,  $t$  such that  $[t = t_c]$ ). In this overlapping analysis, the anteriority or posteriority relation (between **ev** and the time, or eventuality, expressed in the complement of *before* or *after*) is also obtained, although via inference rather than via assertion.

An interesting consequence of the proposed analysis is, as was noted at the end of 6.1.2, that it seems to favour a partition of the set of operators that are traditionally classified as temporal locating into two different classes: (strictly) temporal locating operators, such as *em / in*, *desde / since* or *até / until*, and heads of structurally complex time-denoting expressions, such as *antes / before* or *depois / after* (cf. Table 8, on page 163). The pertinence of this partition will be more strongly supported by the data presented in the next section.

In a nutshell, the analysis of *before* and *after* phrases as mere time-denoting expressions that in some contexts are preceded by an empty temporal operator seems preferable, when compared to the simple anteriority / posteriority analysis, insofar as it can be given motivation that cannot be found for the latter, while still being able to account, via inference, for the anteriority / posteriority relation. The most relevant piece of motivation is given by the uniform semantic treatment of the relevant operators.

### 6.3. The categorisation of adverbials with *entre / between*, of adverbials with *quando / when*, and of adverbials that measure and count from anchor points

As said above, I think that an analysis along the lines advocated for *before* and *after* phrases is possibly adequate for several other expressions that are commonly treated as temporal locating adverbials, namely the following three:

- A. Expressions with Portuguese preposition *entre* and its English counterpart, *between*.
- B. Expressions with operator *quando* and its English counterpart, *when*.
- C. Expressions involving time measurement (or counting of temporally ordered entities<sup>181</sup>) from anchor points.

With respect to group C, I chose a sample of expressions, that is meant to be illustrative of the class:

- C<sub>1</sub>. Portuguese expressions “*haver X-TIME*” and their English counterparts, “*X-TIME ago*”.
- C<sub>2</sub>. Portuguese expressions “*de COMPL a X-TIME*” and their English counterparts, “*X-TIME from COMPL*” (to be compared with Portuguese “*dentro de X-TIME*” and English “*in X-TIME*”).
- C<sub>3</sub>. Portuguese expressions “*X-TIME antes/depois COMPL*” and their English counterparts, “*X-TIME before/after COMPL*”.

Other expressions in this group (e.g. Portuguese “*a X-TIME de COMPL*”, “*passado X-TIME*”, “*X-TIME mais tarde*”, or English “*X-TIME later / earlier*”), possibly with different distributional properties, will be ignored. I will also ignore the expression “*within X-TIME*” (that I hypothesise can be a true locating adverbial).

The presumption that all these expressions are merely time-denoting is essentially based on the fact that they can normally occur, like *before* and *after* phrases, in the environments which are typical of time-denoting expressions (as well as, on the surface, as “complete” temporal locating expressions).

In this subchapter, I will address only the categorisation issue, which is directly related to the central theme of chapter 6. The issue of how to characterise (and formally define) the interval represented by these expressions requires a study of its own and is beyond the scope of this dissertation<sup>182</sup>. However, in chapter 7, I will attempt to characterise these intervals for the group of expressions C above.

Given all the observations made so far, the question will be dealt with in a very simplified manner. I will basically present some of the relevant contexts in which these expressions can occur, which show the distributional similarity with *before* and *after* phrases. The four types of (illustrative) contexts that will be presented have the following description:

- I. The relevant expressions surface as complete temporal locating expressions.
- II. The relevant expressions occur as arguments of the equative verb *ser / to be*, with a time-denoting expression as the other member of the equation.

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<sup>181</sup> Cf. footnotes 135 and 180. In this chapter, I will only take into account structures that involve time measurement, i.e. with predicates of amounts of time, X-TIME, because the type of operation involved (measurement or counting) is irrelevant for the categorisation issue.

<sup>182</sup> The well-studied case of *when* (*quando*) is a good example of how complicated this analysis can be. Under the time-denoting analysis that the data to be presented here seems to favour, *when*-clauses denote an interval ( $t_{cc}$ ); however, the relationship between this interval and the eventuality  $ev'$  described in the *when*-clause –  $[R(t_{cc}, ev')]$  – cannot always be described as  $[t_{cc} = loc(ev')]$ ,  $[t_{cc} = beg(ev')]$  or  $[t_{cc} = end(ev')]$ , which are the cases we have come across so far (cf. below).

- III. The relevant expressions occur as arguments of temporal predicates (that do not express an identity relation).
- IV. The relevant expressions occur as complements of an (explicit) temporal locating preposition, such as *desde / since* or *até / until*.

The presentation will be schematic, and very superficial in some aspects. In particular, the data shows that the use of these expressions in the characteristic contexts of time-denoting expressions is, in some cases, more restricted than that of relatively simpler expressions like *1980*, *Março / March* or *esta semana / this week*. I will only cursorily discuss these restrictions, which are possibly due to idiosyncratic properties of the relevant temporal operators, leaving their study for further research.

Let us then consider the data, which involves the three types of expressions (A–C) and the four illustrative contexts (I–IV) mentioned above:

#### A. EXPRESSIONS WITH *ENTRE / BETWEEN*

##### I.

- (319) A Europa esteve em guerra entre 1914 e 1918.  
Europe was at war between 1914 and 1918.

Symptomatically, the NP *o período entre... e... / the period between...and...*, synonymous with *entre... e... / between...and...*, is very commonly used; in this adverbial context, an explicit locating operator (*em / in*) would be used before this NP:

- (320) A Europa esteve em guerra *no* período entre 1914 e 1918.  
Europe was at war *in* the period between 1914 and 1918.

##### II.

- (321) a. O período da minha vida em que fui mais feliz *foi* entre 1980 e 1985.  
The period of my life in which I was happiest *was* between 1980 and 1985.  
b. Entre 1980 e 1985 *foi* o período da minha vida em que fui mais feliz.  
Between 1980 and 1985 *was* the period of my life in which I was happiest.

Observe also the following context of apposition, in the newspaper *Público* (5.07.98, p. 20): «Quanto ao período comunista pré-Primavera de Praga, ou seja, entre 1948 e 1968» [“In what concerns the communist period before Praga’s Spring, that is, between 1948 and 1968”].

##### III.

- (322) a. Este quadro *data de* entre 1100 e 1300.  
This painting *dates from* between 1100 and 1300.  
b. As pinturas *datadas de* entre 1100 e 1300 são extremamente raras.  
The paintings *dating from* between 1100 and 1300 are extremely rare.  
c. ?O problema *remonta a* entre 1930 e 1950, quando...  
The problem *dates back to* between 1930 and 1950, when...  
d. ?A reunião *foi marcada para* entre as duas e as três da tarde.  
The meeting *was scheduled for* between 2 and 3 p.m.

- e. ?O presidente *transferiu* a reunião *para* entre as duas e as três da tarde.

The president *rescheduled* the meeting *for* between 2 and 3 p.m.

In Portuguese, the constructions with adjacent prepositions *a entre* and *para entre* tend to be avoided. In these cases, the forms with *o período entre* (*the period between*) – e.g. *remonta ao período entre* (*dates back to the period between*) – seem to be preferred.

#### IV.

- (323) a. ?O Paulo está no aeroporto *desde* entre as duas e as três da tarde.

Paulo has been in the airport *since* between 2 and 3 p.m.

- b. ?O Paulo diz que fica no aeroporto *até* entre as duas e as três da tarde.

Paulo says that he will stay in the airport *until* between 2 and 3 p.m.

The combination at stake only makes sense in an “uncertainty reading”, that is, whenever the speaker is not sure about the exact interval that sets the relevant boundary of the eventuality described, but knows that it lies between two given points. In Portuguese, this construction tends to be avoided. More natural constructions are: (i) structures with disjunction, expressing some vagueness (e.g. *desde as duas ou três da tarde* / *since 2 or 3 p.m.*), or (ii) structures like (323) with the addition of *algures* (*some time*):

- (323) a’. O Paulo está no aeroporto *desde algures* entre as duas e as três da tarde.

Paulo has been in the airport *since some time* between 2 and 3 p.m.

- b’. O Paulo diz que fica no aeroporto *até algures* entre as duas e as três da tarde.

Paulo says that he will stay in the airport *until some time* between 2 and 3 p.m.

In all the examples given above, the preposition *entre* / *between* occurs with a structure of coordination: “between X and Y”. Structures with a simple plural (dual) complement are however also possible:

- (324) a. A Europa passou por um período de crise *entre* as duas guerras mundiais.

Europe went through a period of crisis *between* the two world wars.

[context I]

- b. A invenção da televisão *data de* *entre* as duas grandes guerras.

The invention of the television *dates from* *between* the two world wars.

[context III]

Symptomatically, some of these structures can be preceded by an explicit locating preposition (*in*) in English, though not in Portuguese:

- (325) Berlin was well known for its good living *in between* the two world wars.

(in *Collins Cobuild English Dictionary*)

\*Berlim era famosa pelo seu elevado nível de vida *em entre* as duas guerras mundiais.

Time-denoting expressions with *entre* / *between* are comparable to those with *antes* / *before* and *depois* / *after* in that they all define intervals by **reference to boundaries**. Phrases headed by *antes* / *before* and *depois* / *after*, according to the analysis proposed in section 6.2, could be termed **single boundary time-denoting expressions**, i.e. expressions

that define intervals of time by explicitly setting one of its boundaries, be it the upper or the lower bound:

- (326) a. [antes / before COMPL ( $t_c$ )]  $\rightarrow$  [COMPL ( $t_{cc}$ )]  $\wedge$  [ $t_c \supset \subset t_{cc}$ ]  
 b. [depois / after COMPL ( $t_c$ )]  $\rightarrow$  [COMPL ( $t_{cc}$ )]  $\wedge$  [ $t_{cc} \supset \subset t_c$ ]

Similarly, *between*-phrases could be termed **double boundary time-denoting expressions**, i.e. expressions that define intervals by explicitly setting both of its boundaries. As we have seen, these boundaries can be represented by two conjoined expressions – cf. (327a) – or by a plural (in principle dual) non-conjoined expression, like *as duas guerras* / *the two wars*, or *esses dois anos* / *those two years* – cf. (327b):

- (327) a. [entre / between COMPL<sub>1</sub> and COMPL<sub>2</sub> ( $t_c$ )]  $\rightarrow$   
 [COMPL<sub>1</sub> ( $t_{cc1}$ )]  $\wedge$  [COMPL<sub>2</sub> ( $t_{cc2}$ )]  $\wedge$  [beg ( $t_c$ )  $\subseteq$   $t_{cc1}$ ]  $\wedge$  [end ( $t_c$ )  $\subseteq$   $t_{cc2}$ ]  
 b. [entre / between COMPL ( $t_c$ )]  $\rightarrow$   
 [COMPL ( $T_{cc}$ )]<sup>183</sup>  $\wedge$  [ $T_{cc} = t_{cc1} \oplus t_{cc2}$ ]  $\wedge$  [beg ( $t_c$ )  $\subseteq$   $t_{cc1}$ ]  $\wedge$  [end ( $t_c$ )  $\subseteq$   $t_{cc2}$ ]

An analysis similar to (327b) can be adopted for the case of coordinated complements:

- (327) a'. [entre / before [COMPL<sub>1</sub> and COMPL<sub>2</sub>]<sub>COMPL</sub> ( $t_c$ )]  $\rightarrow$   
 [COMPL ( $T_{cc}$ )]  $\wedge$  [ $T_{cc} = t_{cc1} \oplus t_{cc2}$ ]  $\wedge$  [COMPL<sub>1</sub> ( $t_{cc1}$ )]  $\wedge$  [COMPL<sub>2</sub> ( $t_{cc2}$ )]  $\wedge$   
 $\wedge$  [beg ( $t_c$ )  $\subseteq$   $t_{cc1}$ ]  $\wedge$  [end ( $t_c$ )  $\subseteq$   $t_{cc2}$ ]

It is interesting to note that, in what concerns the definition of intervals, structurally complex time-denoting expressions with *before*, *after* and *between* parallel (though with some differences) the behaviour of some (truly) temporal locating expressions (cf. section 4.2.2.2): *before*-phrases parallel *until* or *by* phrases, *after*-phrases parallel *since* or (locating) *from* phrases, and *between*-phrases parallel *from...to*-phrases. The most remarkable difference is that the temporal expressions with *before*, *after* and *between* are (in the analysis advocated here) mere time-denoting expressions, that is, contrary to those with e.g. *until*, *since* or *from...to*, they are assumed not to have a location function on their own. The same obviously applies for the Portuguese counterparts of the mentioned prepositions.

## B. EXPRESSIONS WITH *QUANDO* / *WHEN*

### I.

- (328) O Paulo saiu quando a Ana entrou.  
 Paulo left when Ana came in.

### II.

- (329) a. O período da minha vida em que fui mais feliz *foi* quando vivi em Estugarda.  
 The period of my life in which I was happiest *was* when I lived in Stuttgart.  
 b. Quando vivi em Estugarda *foi* o período da minha vida em que fui mais feliz.  
 When I lived in Stuttgart *was* the period of my life in which I was happiest.

<sup>183</sup> **T** is a non-atomic time discourse referent. On this type of discourse referents, cf. section 7.1.2.

### III.

- (330) a. Este quadro *data de* quando Picasso viveu em Barcelona.  
This painting *dates from* when Picasso lived in Barcelona.
- b. Os quadros de Picasso *datados de* quando o pintor vivia em Barcelona...  
Picasso's paintings *dating from* when the artist lived in Barcelona...
- c. O problema *remonta a* quando o Iraque invadiu o Kuwait.  
The problem *dates back to* when Iraq invade Kuwait.
- d. A reunião *foi marcada para* quando o presidente regressar do Brasil.  
The meeting *was scheduled for* when the president returns from Brazil.
- e. O presidente *transferiu* a reunião *para* quando regressar do Brasil.  
The president *rescheduled* the meeting *for* when he returns from Brazil.

### IV.

- (331) a. ??O Paulo é professor *desde* quando se licenciou.  
??Paulo has been a teacher *since* when he graduated.
- b. ??Fico aqui *até* quando vieres.  
??I'll stay here *until* when you return.

These examples indicate that the combination of *desde / since* or *até / until* with *quando / when* is normally ungrammatical; in Portuguese declarative sentences, a complementiser *que (that)* occurs; in English, the clausal complement follows directly the prepositional operator:

- (331) a'. O Paulo é professor *desde que* se licenciou.  
Paulo has been a teacher *since* he graduated.
- b'. Fico aqui *até que* venhas.  
I'll stay here *until* you return.

In interrogative sentences, however, the occurrence of the operator *quando / when* is required (the complementiser *que* not occurring in this context, in Portuguese):

- (332) a. *Desde quando* é que o Paulo é professor?  
*Since when* has Paulo been a teacher?
- b. *Até quando* (é que) ficas aqui?  
*Until when* do you stay here?

However, there are some cases of declarative sentences, at least in Portuguese, where the combination of the locating prepositions *desde / até* and *quando* seems accepted:

- (333) Fico aqui *até quando* {for possível / quiser}.  
"I'll stay here *until when* {it's possible / I want}"

I will not pursue the issue of the specially restricted distribution of *quando / when* phrases in typical contexts of time-denoting expressions, since the study of the specific properties of this operator is not my central concern.

As is well-known, *quando* / *when* phrases are particularly complex, both from a semantic and a syntactic<sup>184</sup> viewpoint, and have been the topic of many studies in the literature. Given the natural limits of this dissertation, it is therefore not possible to pursue a serious analysis of these expressions here. I will stick to a few comments directly pertaining to the issue at stake (assuming that a time-denoting analysis of these phrases, or at least of some of them<sup>185</sup>, is confirmed by further research). For simplicity, I will mention only the English expression *when*, but the observations apply to Portuguese *quando* as well.

The process by which *when*-phrases refer to an interval of time is quite different from those observed so far: they do it not by setting boundaries, but by directly indicating an interval, via an eventuality. The relationship between the eventuality described in the *when*-phrase (*ev'*) and the relevant interval (*t<sub>c</sub>*) is however not straightforwardly expressed by the

<sup>184</sup> In Mória (1992: 147 ff.), adapting some suggestions in the literature, I argued that *quando*-phrases are analysable as NPs or PPs that contain free relative clauses. In particular, assuming a generative syntactic framework (GB-Theory), I considered that *quando* is a complex element resulting from the morphophonological fusion of several components, two cases being distinguishable: (i) fusion of a null nominal antecedent (*pro*), a temporal preposition (*P<sub>i</sub>*) and an (abstract form of a) relative operator (*RelOp*), when the *quando*-phrase occurs in an NP-position, as in the complement of an explicit (argumental) preposition – cf. (i'); (ii) fusion a null temporal preposition, a null nominal antecedent, a temporal preposition and an (abstract form of a) relative operator, when they occur in full adverbial position – cf. (ii'):

- (i)' O presidente decidiu transferir a reunião para *quando houvesse quorum*. (Mória 1992: 147)  
The president decided to reschedule the meeting for *when there was a quorum*.

[<sub>NP</sub> *pro* [<sub>SCOMP</sub> [<sub>ESP=SP</sub> *P<sub>i</sub>* *RelOp*]] ⇒ *quando*<sub>1</sub>  
cf. equivalence with “uma altura em que” (“a time at which”)

- (ii)' O Luís saiu *quando a Ana entrou*. (*ibid.*: 152)  
Luís came in *when Ana left*.

[<sub>PP</sub> *P<sub>i</sub>* [<sub>NP</sub> *pro* [<sub>SCOMP</sub> [<sub>ESP=SP</sub> *P<sub>i</sub>* *RelOp*]]] ⇒ *quando*<sub>2</sub>  
cf. equivalence with “EM a altura em que” (“AT the time at which”)

<sup>185</sup> Some cases may be hard to make compatible with this analysis, in particular those that involve a generic correlation between two properties:

- (i) A vida é impossível quando a superfície do planeta tem mais de 80 graus centígrados.  
Life is impossible when the surface of the planet is hotter than 80 degrees Centigrade.  
(Declerck 1988, *apud* Carecho 1996: 126)
- (ii) Quando a bola é boa salta muito alto. (Carecho 1996: 122)  
When a ball is good it jumps high.

In these type of contexts, studied for Portuguese *quando* by Carecho (1996), the *quando* / *when* clause cannot be paraphrased by “nos momentos/ocasiões em que” / “at the moments/occasions at which”; rather, it has a meaning closer to that of a conditional clause. Note that these sentences do not instantiate the strictly locating use of *quando* (insertion of a single location time), but rather a quantificational use (possibly representable with a duplex condition). They seem comparable with Swart's (1993) cases of “atemporal readings” of adverbs like *souvent* (*often*):

- (iii) Les chats ont souvent les yeux verts. (Swart 1993: 14)  
Os gatos têm muitas vezes os olhos verdes.  
Cats have often green eyes.



function **loc** –  $[t_c = \text{loc}(\text{ev}')] ]$  (that is, the time denoted by *when*-phrases not always is the smallest closed interval that contains the described eventuality). As many authors have pointed out, the preparatory phase (PP) of **ev'** or its consequent state (CS) may be involved in determining the relevant interval:

- (334) When they built the 49<sup>th</sup> Street bridge...
- a. ...they used the best materials.
  - b. ...a local architect drew up the plans.
  - c. ...they solved most of their traffic problems. (Moens 1987: 77)

There are several ways of looking at this data, under the time-denoting analysis suggested here. One way is to assume that a *when*-phrase can designate different intervals (related with the eventuality described in it) and that, according to the context, one of them is selected. More specifically, following Moens's analysis of these sentences, we could say that: in *a*, the relevant interval is the preparatory phase (possibly together with the culmination) of the basic accomplishment of building the bridge; in *b*, the relevant interval is the preparatory phase of a derived accomplishment (the basic accomplishment is shifted into a culmination and added a preparatory phase, the preparation for starting to build the bridge (cf. Moens 1987: 78), this phase being what the *when*-phrase refers to in the context of *b*); in *c*, the relevant interval is the consequent state of either the basic or the derived accomplishment (pragmatically, the derived one appearing to be the relevant one). If we assume this line of analysis, the interpretation of *when*-phrases could be expressed along the following lines:

- (335) [quando / when COMPL ( $t_c$ )]  $\rightarrow$  [COMPL:  $\text{ev}'$ ]  $\wedge$  [ $t_c = \mathbf{R}(\text{ev}')$ ]

Note that **R** in (327) can stand for more or less complex relations, like **loc**, **CS**, or **PP**, among possibly others; it may also involve, in principle, the **loc**, **CS**, **PP**, etc. of a related eventuality **ev''**, if any aktionsart shift occurs.

## C. EXPRESSIONS THAT MEASURE AND COUNT FROM ANCHOR POINTS

### C1. EXPRESSIONS WITH *HAVER (HÁ) / AGO*

#### I.

- (336) O Paulo casou há dois anos.  
Paulo got married two years ago.

#### II.

- (337) ?O momento mais emocionante da campanha eleitoral *foi* há dois meses  
(quando os dois principais candidatos se encontraram frente a frente na televisão).  
?The most exciting moment of the election campaign *was* two months ago  
(when the two main candidates met on TV).

In the most natural interpretation of these sentences, the verb *ser* / *to be* means something like “occur”, “take place”. This is not the relevant interpretation here, though. With the intended “equative interpretation”, these sentences with *há* / *ago* seem somewhat odd (cf. effect of reversing the order of the arguments). I will not try to account for these restrictions here.

### III.

- (338) a. O problema do desemprego *data de* há dois anos (atrás).  
The unemployment problem *dates from* two years ago.  
b. A reunião estava *marcada para* há duas horas (atrás).  
The meeting was *scheduled for* two hours ago.

### IV.

- (339) a. <sup>OK</sup>O Paulo está doente *desde* há três meses.  
?Paulo has been sick *since* three months ago.  
b. O Paulo esteve doente *até* há três meses.  
Paulo was sick *until* three months ago.

The oddity of the combination *since-ago* in English, illustrated in (339a), will be considered in some detail in chapter 7.3.

## C<sub>2</sub>. EXPRESSIONS WITH *DE... A / FROM* AND *DENTRO DE / IN*

The Portuguese expressions with *de...a* that belong in this group are e.g. *daqui / daí a três horas*, or *de domingo a duas semanas*, which translate literally as “from here / there to three hours”, and “from Sunday to two weeks”, respectively. They are comparable to English expressions with *from*, like *three hours from now / from then (that moment)*<sup>186</sup>, or *two weeks from next Sunday*. The examples given below are all with *daqui a* and *from now*. These Portuguese expressions “*de COMPL a X-TIME*” (where COMPL marks the anchor point for the time measurement operation associated with X-TIME) must not be confused with the locating adverbials “*de COMPL<sub>1</sub> a COMPL<sub>2</sub>*” considered in chapter 4 – e.g. *de 1980 a 1985* (*from 1980 to 1985*) – where COMPL<sub>1</sub> and COMPL<sub>2</sub> mark the lower and the upper bound of the location time, respectively.

The Portuguese expressions “*dentro de X-TIME*” (literally “inside of X-TIME”) are closer to the English expressions “*in X-TIME*”, as in *Ana will leave in five minutes*, in that the utterance time is normally taken as the anchor point for time measurement (shifted anchor points are possible, though – cf. chapter 7). Note that these English *in*-adverbials do not qualify as temporal measure adverbials. The relevant interpretation of the sentence above is the one where the (punctual) leaving-achievement is said to occur five minutes after the utterance time.

<sup>186</sup> The use of English “X-TIME *from then / that time*” seems very restricted (the form “X-TIME *later*” being more commonly used), but not impossible, as the following examples from the British National Corpus show:

«After they’d gone, Forster felt the silence physically settle around him. He’d never been one to exercise an over-imagination, yet the conditions were like the feeling of a tomb – of an interment. Would he be found, he mused, a thousand years from then, a dust-covered skeleton?» (<bncDoc id=BDBPA n=Titron>).

«He lamented the ‘modernizing’ of the old buildings. In fifty years from then began the great wave of late Victorian building (...)» (<bncDoc id=BDB3H n=WillGn>).

«Oh what I’ll do when I’m ready I’ll give you a bell which means it’ll be what ten, fifteen minutes from then to picking you up» (<bncDoc id=BDKCY n=XKe0H9>).

There are important differences in the semantic properties and distribution of the mentioned Portuguese and English expressions, but I will ignore this issue here (cf. some observations in chapter 7, though). As will be seen below, the distribution of the Portuguese expressions is similar to the English ones. However, English *in* stands out for its particularly restricted distribution. In fact, the ungrammaticality of the English structures with *in* below may cast serious doubts on the adequacy of treating the relevant *in*-adverbials as (mere) time-denoting expressions.

#### I.

- (340) O Paulo casará {daqui a / dentro de} dois meses.  
Paulo will get married {two months from now / in two months}.

#### II.

- (341) ?{Daqui a / dentro de} quinze minutos (quando o réu for chamado a testemunhar) será o momento mais importante da julgamento.  
?{Fifteen minutes from now / in fifteen minutes} (when the accused is called to testify) will be the most important moment of the trial.

What was said above about the parallel structures with *há / ago* also applies in this case – an interpretation according to which *ser / to be* means “occur” is possible, but an interpretation according to which *ser / to be* is a predicate expressing identity is somewhat odd.

#### III.

- (342) A reunião foi *adiada para* {daqui a / ?dentro de} dois meses.  
The meeting was *rescheduled for* {two months from now / \*in two months}

#### IV.

- (343) A lei estará em vigor *até* {daqui a / ?dentro de} dois anos.  
The law will be in force *until* {two years from now / \*in two years}.

### C<sub>3</sub>. EXPRESSIONS WITH “X-TIME ANTES/DEPOIS” / “X-TIME BEFORE/AFTER”

#### I.

- (344) a. O Paulo casou dois meses antes de terminar o curso.  
Paulo got married two months before he graduated.  
b. O Paulo {morava / morou} em Angola dois anos antes do 25 de Abril.  
Paulo lived in Angola two years before the Revolution of the 25<sup>th</sup> of April.

#### II.

- (345) Dois meses depois de escrever a tese *foi* o momento em que o Paulo se sentiu mais descansado (antes ainda estava a recuperar da pressão de terminar a tese e a seguir começou a trabalhar arduamente num novo emprego).  
Two months after writing his thesis *was* the moment in which Paulo felt more relaxed (before that he was still recovering from the pressure of finishing the thesis and after that he started to work very hard on a new job).

### III.

- (346) O presidente *transferiu* a reunião *para* dois dias depois da assembleia geral de accionistas.  
The president *rescheduled* the meeting *for* two days after the general assembly of stockholders.

### IV.

- (347) a. ?O Paulo dá aulas *desde* dois meses antes de terminar o curso.  
?Paulo has been teaching *since* two months before he graduated.<sup>187</sup>  
b. O Igor mora em Portugal *desde* muito antes da Queda do Muro de Berlim.  
Igor has been living in Portugal *since* long before the Fall of the Berlin Wall.  
c. O Igor viveu na Rússia *até* dois meses depois da morte da mãe.  
Igor lived in Russia *until* two months after his mother's death.

All the structurally complex time-denoting expressions in class **C** define intervals in a relatively complex way, with resort to an anchor point and an operation of time measurement (or counting of ordered entities) from that point. This will be analysed in more detail in chapter 7.

In addition to the distributional facts illustrated above, and the arguments presented in section 6.2, a further argument can be invoked in favour of the analysis of all the relevant operators mentioned here as mere heads of time-denoting expressions, to wit: the (correctly predicted) **possibility of recursion** of these operators. In fact, in contrast with the impossibility of recursion of the true temporal locating operators (cf. *\*desde em* / *\*since in*, *\*em desde* / *\*in since*, *\*até ao longo de* / *\*until throughout*, for instance), those that I am classifying here as heads of (structurally complex) time-denoting expressions may occur in sequences:

- (348) a. antes de há dois meses  
before two months ago  
b. (no período) entre há dois anos e há seis meses  
(in the period) between two years ago and six months ago  
c. entre dois meses antes do começo da guerra e a segunda semana de combates  
between two months before the start of the war and the second week of the fighting  
(349) Passaram-se mais de três meses...  
More than three months elapsed...  
a. ...?entre quando a ponte foi construída e quando os primeiros automóveis a cruzaram.  
...between when the bridge was built and when the first vehicles crossed it.

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<sup>187</sup> Some structures with *desde* / *since* and non-vague predicates of amounts of time seem slightly odd. Curiously, the addition of *exactamente* / *exactly* seems to improve the grammaticality of the construction: *O Paulo dá aulas desde exactamente dois meses antes de terminar o curso* / *He has been teaching since exactly two months before he graduated*.

- b. ...entre a conclusão da ponte e a passagem dos primeiros automóveis.  
...between the completion of the bridge and passage of the first vehicles.

Obviously, the occurrence of more than one of these heads in a sequence is limited by e.g. (i) the specific properties of the connectives, which prevents, for example, in normal circumstances, the sequences *antes de depois de* COMPL / *before after* COMPL, or *dentro de há* X-TIME / *in* X-TIME *ago*, or (ii) the simplicity of the discourse (some theoretically possible forms being avoided, especially whenever an easier expression is available).

Note still that, given the appropriate conditions, these rather complex expressions may occur as the complement of a temporal locating operator, thus generating a particularly complex locating expression:

- (350) A: Vou deixar de fumar  $\emptyset_{em}$  [daqui a duas semanas]<sub>t</sub>.  
B: Não acredito. Vais continuar a fumar *até muito depois de* { [isso]<sub>t</sub> / ??daqui a duas semanas }.  
A: I will give up smoking  $\emptyset_{in}$  [two weeks from now]<sub>t</sub>.  
B: I don't believe you. You will go on smoking *until long after* { [that]<sub>t</sub> / ??two weeks from now }.

## 6.4. Conclusions

By analysing all the phrases discussed in this chapter as mere time-denoting expressions, I depart from the usual picture of time adverbials in the literature. The dividing line between temporal locating adverbials and time-denoting expressions I have proposed is drawn according to their heading expression, I and II below, respectively<sup>188</sup>:

### I. TEMPORAL LOCATING OPERATORS (cf. Table 4, in page 91)

- They define the location time **t** out of the interval represented in their complement **t<sub>c</sub>**. According to this property they may be subdivided into direct operators ([t = t<sub>c</sub>]), single boundary operators ([beg (t) ⊆ t<sub>c</sub>] or [end (t) ⊆ t<sub>c</sub>]) and double boundary operators [beg (t) ⊆ t<sub>c1</sub>] ∧ [end (t) ⊆ t<sub>c2</sub>]).

<sup>188</sup> A similar partition seems also pertinent within the domain of spatial adverbials. Jim Higginbotham pointed out to me (in the Bergamo Conference mentioned in footnote 138) that the arguments I use to advocate a time-denoting status for *before*-phrases might also be used to claim a comparable (space-denoting) status for expressions like *under the table*, which in some languages occur with an explicit spatial locating preposition – “AT under the table” (Chinese). Spatial homonyms of temporal locating prepositions – e.g. English *in*, *on*, *at*, *through(out)*, *from...to*, Portuguese *em*, *através*, *desde*, *a partir de*, *até*, *de...a* – clearly qualify as *spatial locating operators*. Spatial prepositions like, for example, English *between*, *behind*, *near* and their Portuguese counterparts *entre*, *trás*, *perto* possibly qualify as *heads of structurally complex space-denoting expressions* – cf. their occurrence in argumental position in:

- (i) O Paulo deslocou o sofá para {entre as duas portas / trás da porta / perto da janela}.  
“Paulo moved the sofa to {between the two doors / behind the door / near the window}”

■ They define (or at least affect) the relationship between the location time  $t$  and the entity  $\pi$  represented in the structure to which they apply (i.e. the location relation). According to this, they (and the adverbials they head) may be subdivided, for instance, into inclusive locators [ $\pi \subseteq t$ ], durative locators [ $t \subseteq \pi$ ], neutral durative/non-durative locators [ $\pi \circ t$ ], etc. (cf. Part III).

■ Other syntactic or semantic restrictions may correspond to further subdivisions in these subgroups. For instance: some “direct operators”, like *while / enquanto* (conjunctions), combine only with clausal complements, others, like *in / em*, only with non-clausal complements; some English operators, like *in*, combine with names of years, others, like *on*, with names of days of the week.

## II. HEADS OF (STRUCTURALLY COMPLEX) TIME-DENOTING EXPRESSIONS

■ They define an interval ( $t_c$ ), which may (though need not) be used to define a location time  $t$  in combination with one of the operators of the Table 4 (in page 91), out of the interval represented in their complement ( $t_{cc}$ ). They may be subdivided into groups according to the way the interval  $t_c$  is defined out of  $t_{cc}$ ; for instance, (i) by defining a (minimal) anteriority or posteriority relation, i.e. a single boundary, as *antes / before* and *depois / after*, (ii) by defining two boundaries, as *entre / between*, (iii) by referring to an eventuality that characterises this interval, as *quando / when*, (iv) by measuring (or counting) backwards or forwards in time from anchor points.

**Table 10. Subtypes of structurally complex (basic) time-denoting expressions**

type of operation involved in the interval definition	heads of the (structurally complex) time-denoting expressions	
	Portuguese	English
setting of a single boundary	<i>antes</i> <i>depois</i>	<i>before</i> <i>after</i>
setting of two boundaries	<i>entre</i>	<i>between</i>
relation with an eventuality	<i>quando</i>	<i>when</i>
time measurement (or counting) from anchor points	<i>haver</i> (X-TIME) <i>de... a</i> (X-TIME) <i>? dentro de</i> (X-TIME) X-TIME <i>antes</i> X-TIME <i>depois</i>	(X-TIME) <i>ago</i> (X-TIME) <i>from</i> <i>? in</i> (X-TIME) X-TIME <i>before</i> X-TIME <i>after</i>

(cf. Table 8, on page 163,  
and Figure 5, on page 362)

## Chapter 7

### Measuring and counting from anchor points: observations on a subclass of time-denoting expressions

This chapter deals with a subclass of time-denoting expressions characterised by the general property of defining intervals via an operation of **measuring or counting from a given point of the time axis**, that I will term “anchor point”. This subclass has been partially analysed in the previous two chapters, either because its elements occur within so-called ambivalent locating / measure adverbials, which were the subject of chapter 5 (e.g. *os últimos três meses / the last three months*), or because they exhibit the ambivalent locating / time-denoting behaviour discussed in chapter 6 (e.g. *há três meses / three months ago*, *três meses antes das eleições / three months before the elections*). Given that the intervals represented by these expressions may (though need not) be used to define location times, they illustrate a curious **interaction between the subsystems of temporal quantification and temporal location** that I will try to explore here, up to a certain extent.

The main goal of this chapter is: (i) to describe the diversity of the subclass in question, considering several subcategorising parameters; (ii) to present (with some simplifications) the DRS-construction rules needed to process the several (sub)subclasses considered. Many issues raised by these expressions, specially those concerning the anaphoric or deictic dependencies they are involved in, will be very superficially dealt with.

Let us start by considering some examples, involving the Portuguese operators *há* (*haver*), *de* (*aqui*) *a*, “modified *antes*” and “modified *depois*” and their English counterparts *ago*, *from* (*now*), “modified *before*” and “modified *after*”<sup>189</sup>:

- (351) a. O Paulo chegou *há três horas*.  
Paulo arrived *three hours ago*.
- b. O Paulo vai casar *daqui a três semanas*.  
Paulo will get married *three weeks from now*.
- c. Esta ponte ruiu *três semanas antes/depois da guerra*.  
This bridge collapsed *three weeks before/after the war*.

According to what was advocated in the previous chapter, I assume that any of the italicised sequences in (351) can be considered a time-denoting expression that, in these adverbial contexts, is preceded by a null locating operator (with a value close to that of

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<sup>189</sup> As said in 6.2.5, I distinguish two uses of the prepositions *before* and *after* (and their Portuguese counterparts). One is illustrated in (351c), the other in (352c). To facilitate reference, I will designate the former as “modified *before/after*”, and refer to it as part of a complex operator “X-TIME *before/after*” (although, as said, I do not wish to commit to a syntactic analysis of these expressions as forming a single constituent); the latter will be sometimes designated, by contrast, as “non-modified *before/after*”.

Portuguese *em*, or English *in/at*). The intervals represented by these expressions are (roughly) defined as those that lie at a given distance – in the cases under scrutiny, three hours or three weeks – from a given anchor point: in (351a-b), the anchor point is the utterance time, i.e. the TPpt of the sentence; in (351a), the TPpt is not lexically marked, whereas in (351b) it is identified by the complements *aqui / now*; in (351c), the anchor point is a time set by the complement *a guerra / the war* (namely, the beginning or end of the war).

The temporal expressions in (351) can be compared with those that contain: (i) deictically or anaphorically dependent adjectives like Portuguese *último*, *anterior*, *próximo* and *seguinte*, or their English counterparts *last*, *previous*, *next* and *following*, as in (352a-a’); (ii) relative clauses with Portuguese verbs like *preceder* and *seguir*, or their English counterparts *precede* and *follow*, as in (352b); (iii) “non-modified” *antes / before* or *depois / after*, as in (352c):

- (352) a. Poucos eleitores votaram *nas últimas três horas*.  
 Few electors voted in *the last three hours*.  
 a’. O Paulo estará no escritório durante *as próximas três horas*.  
 Paulo will be in the office for *the next three hours*.  
 b. Vários candidatos desistiram *nas três semanas que precederam as eleições*.  
 Several candidates gave up in *the three weeks that preceded the elections*.  
 c. *As três semanas antes das eleições* foram especialmente agitadas.  
*The three weeks before the elections* were particularly hectic.

What these time-denoting expressions have in common with those of (351) is that the interval they represent is defined via an operation (time measurement) which involves an anchor point: the utterance time in (352a-a’), and the time of the elections in (352b-c). The main difference between the temporal phrases in (351) and (352) concerns the type of interval represented: in (351), it is an interval that (roughly) lies at a distance of three hours/weeks from the anchor point<sup>190</sup>, while in (352) it is the interval that stretches between the anchor point and the interval that lies at a distance of three hours/weeks from it. Given this difference, I will designate the expressions of the former type as **uncontiguously anchored time-denoting expressions**, and those of the latter type as **contiguously anchored time-denoting expressions**. Schematically, for some examples given above:

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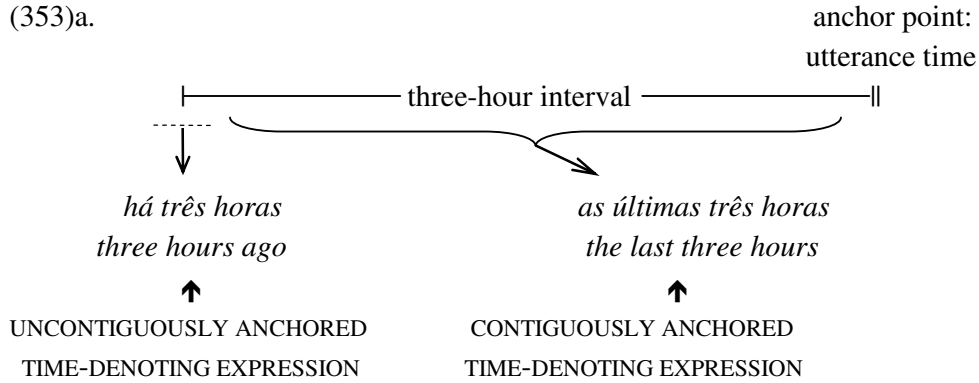
<sup>190</sup> As noted already (in footnote 179), and will be seen in more detail later on, these expressions do not seem to behave as punctual adverbials, but rather as a kind of frame adverbials, namely they can represent an interval *within which* an extended eventuality may occur:

- (i) [o Paulo esteve no hospital *durante dois dias*] há três meses (atrás)  
 [Paulo was in the hospital *for two days*] three months ago

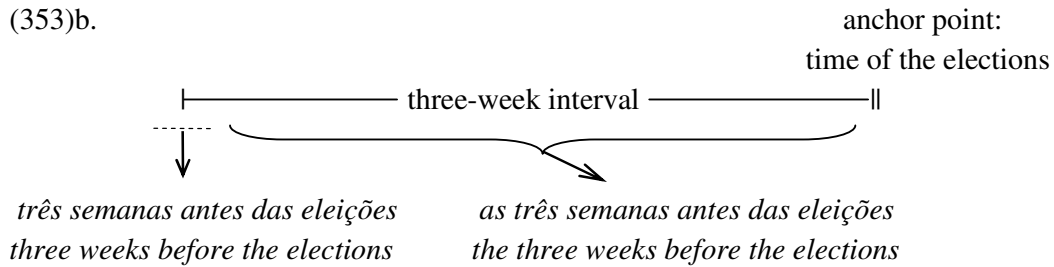
One way of accounting for this possibility is to consider that these expressions do not represent the *punctual* interval lying at the stated distance from the anchor point, but rather a possibly *extended* interval surrounding it (whence the discontinuous line in schemata (353)), the limits of which have to be determined contextually (cf. section 7.2.1.1 for discussion).



(353)a.



(353)b.

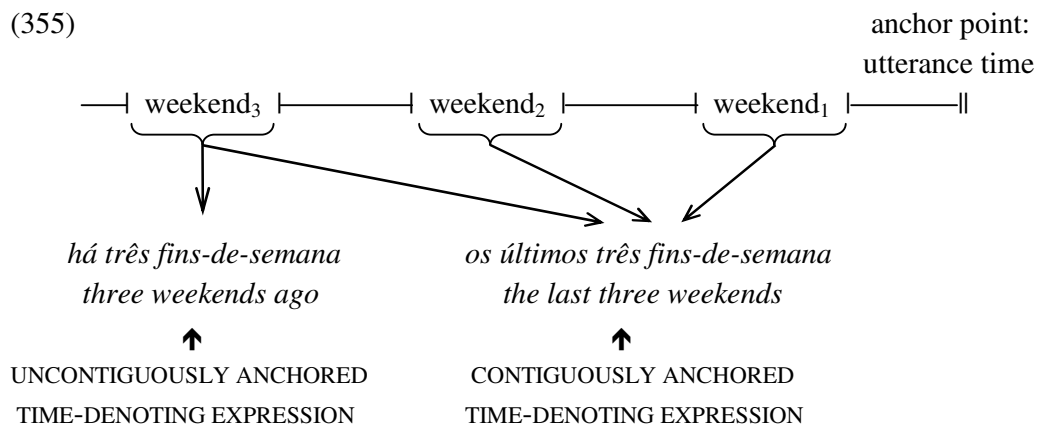


A very interesting fact about the temporal operators that occur in these phrases – e.g. *há* / *ago* or *último* / *last* – is that they can combine with expressions other than predicates of amounts of time. Observe the following sequences:

- (354) a. O Paulo esteve nos Alpes *há três fins-de-semana (atrás)*.  
Paulo was in the Alps *three weekends ago*.
- b. O Paulo esteve nos Alpes *nos últimos três fins-de-semana*.  
Paulo was in the Alps in *the last three weekends*.

The main difference between the italic expressions in (354) and those illustrated in (351)-(352) is that they involve the definition of intervals not via temporal measurement, but rather via **counting temporally ordered entities** (in these cases, weekends). Schematically:

(355)



Note that I use here the term “contiguously anchored” for expressions like *os últimos três fins-de-semana / the last three weekends*, in parallel with *as últimas três horas / the last three hours*, although, as we can see in the schema above, the relevant (sums of) intervals do not necessarily abut the anchor point.

To my knowledge, the possibility illustrated in (354) has not been discussed in the literature in connection with operators of the type of *ago*. Bras (1990: 199, my italics), for instance, considers a class of “adverbiaux qui désignent la zone temporelle en opérant *un report de mesure*”; Asher *et al.* (1995), who refer back to Molinès (1989) and Bras and Molinès (1993), state that

“the LTAs [locating time adverbials] (...) fall into (...) classes, depending on (...) whether or not the identification of the referent depends on **the projection of a length of time** on the temporal axis (from some given point). For example, for the adverbials *il y a 3 jours, 3 jours avant Noël, depuis 3 jours* (3 days ago, 3 days after Christmas, for the last 3 days) the measure “3 days” is projected on the temporal axis” (p. 109, my bold).

It is worth noticing that **different sorts of entities** – viz. intervals, eventualities and “ordinary” individuals/objects – may be involved in the counting operation associated with these time-denoting expressions. As a matter of fact, at least the following three types of expressions may occur, in the relevant position, in combination with the temporal operators under analysis: (common) predicates of times, situational predicates, and object-individual-denoting predicates. Let us consider each in turn.

#### A. (common) predicates of times

in particular, expressions including “calendar nouns”, which represent recursive intervals of the time axis, as, for instance, parts of the day (afternoons, evenings, nights), days of the week, weekends, months or seasons of the year – cf. examples (354) above, and still:

- (356) a. *os últimos três domingos*  
the last three Sundays  
b. [o Paulo foi à igreja] há três domingos (atrás)  
[Paulo went to church] three Sundays ago

Note that common nouns like *semana / week, mês / month* or *ano / year*, when used as calendar terms, are of this type as well. The difference is that the counted intervals are adjacent to each other, contrary to what happens with nouns like *domingo / Sunday* or *fim-de-semana / weekend*. Thus, time-denoting expressions like *os últimos três anos / the last three years*, or *há três anos / three years ago* are ambiguous: they may involve time measurement, like in schema (353b), or counting of calendar years, like in schema (355) (with adjacent units):

- (357) a. *os últimos três anos / the last three years*  
*Time measurement* – “the period of (approximately) 1095 days preceding the utterance time” – vs. *counting* – “the three calendar years that precede the one in which the utterance takes place”. Clearly, the intervals at stake may not be the same.

- b. há três anos / three years ago

*Time measurement* – “a moment surrounding the 1095<sup>th</sup> day (approximately) in the past of the utterance time” – vs. *counting* – “the third calendar year in the past of the utterance time”. The latter use is illustrated in (358):

- (358) No ano passado, foram construídos 250 km de novas estradas, em contraste com 110 km há dois anos e 95 km *há três anos*.  
Last year, 250 km of new roads were built, in contrast with 110 km two years ago, and 95 km *three years ago*.

### B. situational predicates

in particular those referring to recurrent eventualities. These eventualities may occur with a regular cycle – more or less fixed – or not (cf. the differences between, for instance, *Jogos Olímpicos* / *Olympic Games*, *refeições* / *meals*, *eleições* / *elections*, *aulas* / *classes* or *viagens* / *trips*, all of which may occur in the relevant environment):

- (359) a. as últimas três aulas  
the last three classes  
b. [o professor começou a analisar a obra de Goethe] há três aulas (atrás)  
[the teacher started to analyse Goethe’s work] three classes ago

The use of this type of complements in uncontiguously anchored time-denoting expressions seems to be strongly restricted, although possible if an adequate context is supplied<sup>191</sup>.

### C. object/individual-denoting predicates

The designated objects are associated with given intervals of the time axis (in the cases below, cigarettes are associated with the moment they are smoked) and, by way of this association, ordered in time:

- (360) a. os últimos três cigarros (que o Paulo fumou)  
the last three cigarettes (that Paulo smoked)  
b. há três cigarros (atrás)  
three cigarettes ago  
cf. O Paulo está a fumar cigarros uns atrás dos outros.  
*Há três cigarros (atrás) começou a tossir.*  
Paulo is smoking cigarettes one after the other.  
*Three cigarettes ago he started to cough.*

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<sup>191</sup> Some speakers consider sentences like the following somewhat odd:

- (i) Este atleta ganhou uma medalha de ouro há três Jogos Olímpicos (atrás).  
This athlete won a gold medal three Olympic Games ago.  
(ii) Este partido teve 10% dos votos há cinco eleições (atrás).  
This party scored 10% five elections ago.

The use of this type of complements in uncontiguously anchored time-denoting expressions seems even more restricted than that of situational predicates, though also possible, given an appropriate context.

I believe that an integrated analysis of all the expressions presented so far, which fit into the general description **time-denoting expressions that define intervals by measuring or counting from an anchor point**, is quite revealing, and, to my knowledge, has not been systematically pursued in the literature. The main purpose of the present chapter is to make a contribution to such an integrated analysis.

As can be perceived from the examples presented so far, the subclass of time-denoting expressions in question is quite varied, several (sub)subclasses being definable according to different parameters. I think that at least the **four parameters** below are relevant to fully grasp the semantic properties and diversity of these expressions. Note that, contrary to parameters II, III and IV, the first one is expressed by a difference in the expressions the operator combines with, and not by a difference in the operator itself.

#### **I.** type of operation

##### (a) temporal measurement

e.g. *há três horas / three hours ago*

##### (b) counting of temporally ordered entities (intervals, eventualities, objects)

e.g. *há três fins-de-semana / three weekends ago, há três aulas / three classes ago*

#### **II.** direction of the operation

##### (a) backward in time

e.g. *há três horas / three hours ago, três horas antes do concerto / three hours before the concert*

##### (b) forward in time

e.g. *daqui a três horas / three hours from now, três horas depois do concerto / three hours after the concert*

#### **III.** type of anchor point

##### (a) non lexically marked TPpt<sup>192</sup>

e.g. *há três horas / three hours ago*

##### (b) time explicitly marked by a complement (which can be null)

e.g. *três horas antes do concerto / three hours before the concert, três horas antes {Ø / disso} / three hours before {Ø / that}*

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<sup>192</sup> I will not try to assess here whether anchor points not explicitly marked by a complement (i.e. those involved in the interpretation of expressions with *há / ago, dentro de / in*, or similar) may be distinguished Rpts, not coincident with a TPpt (cf. distinction of these two concepts in Kamp and Reyle 1993: 594-595, mentioned in chapter 3).

#### IV. type of interval being designated

- (a) contiguous to (though not necessarily abutting – cf. (355) above) the anchor point
  - (a<sub>1</sub>) for the expressions involving time measurement: interval stretching between the anchor point and the interval that lies at the stated distance from it – cf. schema (353)  
e.g. *as últimas três horas* / *the last three hours*, *as três horas antes do início do julgamento* / *the three hours before the beginning of the trial*
  - (a<sub>2</sub>) for the expressions involving counting of ordered entities: sum of stated number of intervals (corresponding to the given description) that lie right before or after the anchor point – cf. schema (355)  
e.g. *os últimos três fins-de-semana* / *the last three weekends*, *os três fins-de-semana antes das eleições* / *the three weekends before the elections*
- (b) non-contiguous to the anchor point
  - (b<sub>1</sub>) for the expressions involving time measurement: interval (roughly) lying at the stated distance from the anchor point – cf. schema (353)  
e.g. *há três horas* / *three hours ago*, *três horas antes do início do julgamento* / *three hours before the beginning of the trial*
  - (b<sub>2</sub>) for the expressions involving counting of ordered entities: the  $n^{\text{th}}$  interval (corresponding to the given description) counting from the anchor point in the relevant direction (where  $n$  is the stated number of ordered entities) – cf. schema (355) and justification in 7.2.2.  
e.g. *há três fins-de-semana* / *three weekends ago*, *três fins-de-semana antes das eleições* / *three weekends before the elections*

The combination of these four two-valued attributes results in different forms of expressions, whose formal DRT-analysis I will now attempt to – partially – provide. The exposition will be organised as follows: I will first consider (in 7.1) the expressions representing intervals contiguous to the anchor point; these will be analysed in a relatively superficial way, considering mainly simple examples like those mentioned above; I will point out to more complex examples – involving the same type of operators – but will not explore them. In 7.2, I will consider the expressions representing intervals non-contiguous to the anchor point. Within each of the two subchapters 7.1 and 7.2, I will first address the structures involving time measurement and then proceed with those involving counting of ordered entities; as will be observed, and can already be perceived from the schemata above, the latter involve quite different DRS-conditions, being considerably more complex than the former.

It must be stressed that the analysis I will provide is in many aspects simplified, some important issues related with these expressions being ignored or only superficially dealt with. Among these insufficiently treated issues, I underline the following:

(i) (a)symmetry of operators

In the treatment I propose, I do not attempt to describe possible asymmetries between the operators that measure or count backwards in time and those that measure or count forwards in time. A special case that certainly deserves more attention is that of English *ago* vs. *from* and *in*, the latter exhibiting specific distributional constraints (cf. 6.3) that I will as a rule ignore here. Portuguese “forward-measuring operators”, like *dentro de*, *de (aqui/aí) a*, will also be analysed with comparably less detail than “backward-measuring” *há*.

(ii) variety of operators (and their idiosyncrasies, within and across languages)

I will focus on a subgroup of illustrative expressions, namely those with Portuguese *há*, *de...a*, modified and non-modified *antes* and *depois*, *último* and *próximo*, and their English counterparts *ago*, *from*, modified and non-modified *before* and *after*, *last* and *next*. However, as I will observe (mainly in footnotes) in the following text, there are many other expressions that exhibit a comparable behaviour and need be taken into account in a more comprehensive study. These include Portuguese expressions with e.g. X-TIME *mais tarde*, *passado* X-TIME or *a* X-TIME *de* and English expressions with e.g. X-TIME *earlier* / *later*.

(iii) anaphoric or deictic dependencies, in particular: diversity of anchor points and the mechanisms ruling their selection, and the different linguistic forms of marking anchor points

Among the questions that I will not address here are, for instance, the possibility of having distinguished anchor points besides the TPpt (as e.g. the Rpt in the sense of Kamp and Reyle 1993: 594-595), or the shifting of anchor points (cf. footnotes 208 and 210).

## 7.1. Defining intervals contiguous to an anchor point

### 7.1.1. Defining intervals contiguous to an anchor point by measuring

As was already said, intervals can be defined via an operation of temporal measurement from an anchor point, being characterised as having a given amount of time and lying in the (immediate) past or future of the anchor point. The following time-denoting expressions represent this kind of intervals:

- (361) a. as {últimas / próximas} três horas  
the {last / next} three hours  
b. os três meses {antes / depois} das eleições  
the three months {before / after} the elections

It must be noted that all the relevant structures to be considered in this subsection contain predicates of amounts of time. The structures containing predicates of times (which involve counting or ordered entities) will be analysed in 7.1.2. Therefore, in the structures with ambiguous measure/calendar nouns, such as *ano* / *year*, only the interpretation involving the measure noun is relevant here:

- (362) os últimos dois anos / the last two years  
 relevant interpretation:  
 “the 730-day period that precedes the utterance time”<sup>193</sup>

At first sight, the DRS-construction rules needed to account for time-denoting expressions like (361) seem quite simple (as we will see later on, matters are actually sometimes more complicated than they appear to be). What has to be considered is that, as was noted in chapter 5, whenever a predicate of amounts of time occurs in the nominal nuclear position of a definite NP with the structure [*the* X-TIME MOD] (MOD being an expression, like *last*, that links these amounts of time to a given part of the time axis), it seems to denote a particular interval of the time axis ( $t_c$ ) – having the described size – rather than simply an amount of time. Therefore, (361a) appear to be associated with the following conditions:

- (363) a. [o último X-TIME ( $t_c$ )]  
 [the last X-TIME ( $t_c$ )]  
 ↓  
 [X-TIME ( $mt$ )], [dur ( $t_c$ ) =  $mt$ ], [ $t_c \supset \subset$  TPpt]
- b. [o próximo X-TIME ( $t_c$ )]  
 [the next X-TIME ( $t_c$ )]  
 ↓  
 [X-TIME ( $mt$ )], [dur ( $t_c$ ) =  $mt$ ], [TPpt  $\supset \subset$   $t_c$ ]

where the first condition is the normal contribution of a predicate of amounts of time, the second results from its occurrence in the nominal nuclear position of a definite NP, and the third condition is the specific contribution of the deictic/anaphoric adjectives (which anchor the described interval  $t_c$  to the TPpt).

The following rule (where I ignore the contribution of the definite article) seems to be required to handle simple cases like those in (361a), which contain only two elements: a predicate of amounts of time and an adjective like *último* / *last*, or *próximo* / *next*:

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<sup>193</sup> Note that, in Portuguese singular constructions, a different “retrospective” deictical adjective is normally used for measure-nouns (*último*) and calendar nouns (*passado*). Therefore, the expression *o último ano* is preferably interpreted as the 365-day period that precedes the utterance time, while *o ano passado* is preferably interpreted as the calendar year that preceded the one in which the utterance takes place. The English expression (*the*) *last year* can have both interpretations, while *the past year* seems to have only the first. In plural constructions, the Portuguese adjective *último* is used for both measure and calendar nouns (*passado* is normally not used in these constructions). Therefore, the Portuguese expression *os últimos dois anos*, like the English *the last two years*, can either mean “the 730-day period preceding the utterance time” (which is the relevant interpretation here) or “the two calendar years preceding the one in which the utterance takes place”. Portuguese “prospective” adjective *próximo* and its English counterpart *next* systematically combine with measure and calendar nouns both in singular and in plural constructions.

**DRS-CR 5'. NPs with a predicate of amounts of time and a last/next-type adjective**

CR.NP	
<p>Triggering configurations:  <math>\gamma \subseteq \gamma' \in \text{Con}_K</math></p>	
Introduce in $U_K$ :	new discourse referent <b>mt</b>
Introduce in $\text{Con}_K$ :	<p>new conditions:</p> <ul style="list-style-type: none"> <li>– [X-TIME (mt)]</li> <li>– [dur (<math>t_c</math>) = mt]</li> <li>– [<math>\alpha \supset \beta</math>] (<math>\alpha</math> and <math>\beta</math> being <math>t_c</math> or <b>TPpt</b> as in (363))</li> </ul>

It must be noted that this rule does not cover (as it stands) some relatively more complex cases involving *último / last* or *próximo / next*, where other elements (e.g. modifying PPs or relative clauses) are combined with the predicates of amounts of time<sup>194</sup>. I will return to these cases at the end of section 7.1.2. However, I leave their study, which raises some complex issues, and the formulation of a more general rule for *last*, *next* and similar operators for further research<sup>195</sup>.

<sup>194</sup> Observe the following examples (where, apart from the example (iii) with *próximo / next*, no anchor-point seems to exist):

- (i) os {últimos / \*próximos / primeiros} cinco minutos de 2010  
the {last / \*next / first} five minutes of 2010
- (ii) os {últimos / \*próximos / primeiros} dois meses em que o Paulo esteve no Brasil  
the {last / \*next / first} two months Paulo was in Brazil
- (iii) os {últimos / próximos / primeiros} dois meses em que o Paulo estiver no Brasil  
“the {last / next / first} two months Paulo WILL BE (“future subjunctive”) in Brazil”

I thank Michael Schiehlen for calling my attention to structures with *last* like (ii), and the inadequacy of DRS-CR 5' to handle them.

<sup>195</sup> The hypothesis that seems more appealing to me, to handle the case of *último / last*, is the one suggested in Kamp and Reyle (1993):

“As a superlative, **last** has the fairly unusual property that it involves a hidden parameter which can be made explicit by adding a Prepositional Phrase **before...** (...). In the case of **last Sunday**, this parameter is precisely what we have been calling the



The time-denoting expressions (361b), with *before* and *after*, appear to be associated with the following conditions, in case we *do not* postulate the presence of a null locating preposition preceding *before* or *after*:

- (364) a. [o X-TIME antes COMPL ( $t_c$ )]  
           [the X-TIME before COMPL ( $t_c$ )]  
           ↓  
           [X-TIME ( $mt$ )], [dur ( $t_c$ ) =  $mt$ ], [ $t_c \supset \subset t_{cc}$ ], [COMPL ( $t_{cc}$ )]
- b. [o X-TIME depois COMPL ( $t_c$ )]  
      [the X-TIME after COMPL ( $t_c$ )]  
      ↓  
      *idem*, except third condition: [ $t_{cc} \supset \subset t_c$ ]

The source of these conditions is as described for (363) above. Under this analysis, *before* and *after* phrases are taken here as genuine predicates of times applying directly to X-TIME.

As said in 6.2.5.2, the structures with *before* and *after* at stake can be analysed in a slightly different way, which – in the end – yields exactly the same results. This different analysis consists in postulating a null locating preposition preceding *before* or *after*, in order to achieve uniformity of treatment with structures as different as *John got married*  $\emptyset_{in}$  *before 1980*, *a weekend*  $\emptyset_{in}$  *before 1980*, or *the three weekends*  $\emptyset_{in}$  *before the elections*. If this null element is incorporated in the structure, the set of conditions will be as below, where the third and fourth conditions are the contribution of the postulated null operator<sup>196</sup>.

---

origin of computation, which (...) must always be **n**: treating **last Sunday** as the last Sunday before **n**" (p.624, fn.60).

The consideration of this hidden parameter would permit a unified treatment of *último* / *last* in (361a) and in (i)-(iii) of the previous footnote; in this treatment, *último* / *last* always relate two intervals, viz. [last ( $t_c$ ,  $t'$ )] (interpreted as [end ( $t_c$ ) = end ( $t'$ )],  $t'$  being the whole past of **n** in (361a)). The cases with relative clauses are particularly complex because the intervals of the stated size can be discontinuous: for instance, the relevant two months in (ii) of the previous footnote can involve several short stays in Brazil; these cases obviously cannot be tackled with a simple condition [end ( $t_c$ ) = end ( $t'$ )] (where  $t'$  represents the time Paulo spent in Brazil).

The differences between (superlative) *último* / *last* and *primeiro* / *first*, on the one hand, and simple anchor-dependent expressions like *anterior* / *previous*, *próximo* / *next* and *seguinte* / *following*, on the other hand, obviously also require further investigation – cf. contrasts in (i)-(iii) of the previous footnote.

<sup>196</sup> (i) [ $t_c \subseteq t_l$ ] is the inclusive location condition (where  $t_c$ , the interval of size X-TIME described by the whole expression, is the located entity, and  $t_l$  is the location time); (ii) [ $t_l = t_{lc}$ ] is the condition equating the location time  $t_l$  with the time of the complement. Note that  $t_c$  can in turn be equated with the location time  $t$  for a main clause, in structures where the time-denoting expressions under analysis are preceded by a locating preposition like *em* / *in* or *durante* / *during*, as in:

- (i) [muitos candidatos desistiram] *durante* as duas semanas  $\emptyset_{em}$  antes das eleições  
      [many candidates gave up] *during* the two weeks  $\emptyset_{in}$  before the elections

- (365) a. [o X-TIME  $\emptyset_{em}$  antes COMPL ( $t_c$ )]  
 [the X-TIME  $\emptyset_{in}$  before COMPL ( $t_c$ )]  
 $\downarrow$   
 [X-TIME ( $mt$ )], [dur ( $t_c$ ) =  $mt$ ], [ $t_c \subseteq t_1$ ], [ $t_1 = t_{1c}$ ], [ $t_{1c} \supset \subset t_{1cc}$ ], [COMPL ( $t_{1cc}$ )]
- b. [o X-TIME  $\emptyset_{em}$  depois COMPL ( $t_c$ )]  
 [the X-TIME  $\emptyset_{in}$  after COMPL ( $t_c$ )]  
 $\downarrow$   
*idem*, except fifth condition: [ $t_{1c} \supset \subset t_{1cc}$ ]

Now, the set of conditions in (365) is equivalent to the relatively simpler one in (364), if some assumptions with respect to the contribution of the definite quantifier are accepted. In particular, as was already observed in 6.2.5, the use of definite quantifiers in these structures seems to involve the presupposition that the interval of X-TIME we are talking about ( $t_c$ ) is the only one that, in the context of utterance, has the property expressed by the modifier  $\emptyset_{in}$  *before/after* COMPL. For instance, the expression *the two hours before the elections* seems to presuppose that there is only one two-hour period before the elections, in the same way as *the blue shirt* presupposes that there is only one shirt that is blue (in the context of utterance). Given the specific properties of time, namely its density, the uniqueness of the two-hour interval is achieved iff

- (366) a. [dur ( $t_1$ ) = dur ( $t_c$ )]

If  $t_1$  was larger in size, it would contain infinitely many two-hour intervals. This entails that, in this case, the location condition associated with [*in*] is not merely inclusion ( $[t_c \subseteq t_1]$ ), as normally, but rather equality:

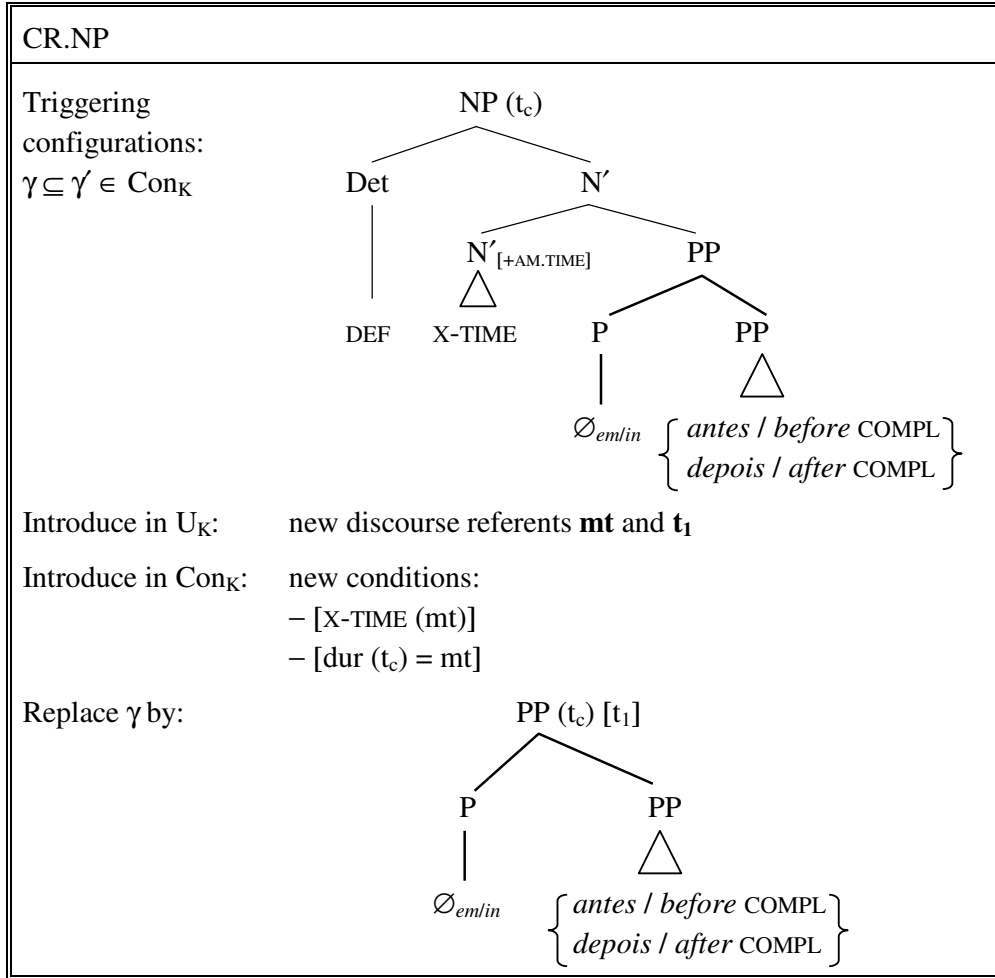
- (366) b. [ $t_c = t_1$ ]

Taking this equation into account, the set of conditions in (365) is obviously equivalent to that of (364).

The DRS-construction rule required to associate the time-denoting expressions in (361b) with the conditions in (365) is parallel to DRS-CR5' above. The main difference is that the modifier position is now occupied by an  $\emptyset_{in}$  *before/after*-PP (rather than by a *last/next*-AP).

With respect to this rule, presented below, it must be noted that: (i) the structures in question are taken to involve temporal location of intervals,  $t_c$  being the located entity (and therefore the referential argument of  $\emptyset_{in}$ ) and  $t_1$  being the location time – cf. **PP** ( $t_c$ ) [ $t_1$ ]; (ii) the autonomous rules for  $\emptyset_{in}$  and *before/after* presented in the previous chapters (namely on pages 108 and 178) yield the desired final result, as expressed in (365).

**DRS-CR 5''. NPs with a predicate of amounts of time and a before/after-phrase**



As said, the postulation of  $\emptyset_{in}$  in these structures was motivated essentially by reasons of uniformity of analysis with other structures. If we dispose of this null operator, the *before* and *after* phrases can be taken here as true predicates of times applying directly to X-TIME, and yielding directly the conditions in (364). Formally, this would be expressed by a rule like DRS-CR 5'', eliminating the operator  $\emptyset_{emlin}$  and passing down the discourse referent  $t_c$  directly to the *before/after*-PP node (as referential argument).

Finally, let us consider the following sentence, which illustrates a curious interaction between *último* / *last* and *before* / *antes* (a similar interaction arising between *primeiro* / *first* and *depois* / *after*):

- (367)    as últimas três horas antes das eleições  
           the last three hours before the elections

What is interesting to notice is that this sentence means exactly the same if *último* / *last* is eliminated (the contribution of this adjective being therefore apparently redundant):

- (368)    as três horas antes das eleições  
           the three hours before the elections

In the analysis I presented above, the interval represented by the *before*-clause in (368) is contextually “lower-bounded” as a result of its combination with the definite quantifier. The comparison with (367) might suggest a different analysis, one that leaves the *before*-clause unbounded and derives the required lower boundary in (368) from the presence of a covert *último* / *last* adjective. In fact, the contribution of *último* / *last* in (367) seems exactly to be the selection, from the (unbounded) interval  $t'$  denoted by *antes das eleições* / *before the elections*, of its final (“last”) subinterval  $t''$  of duration three hours – [end ( $t''$ ) = end ( $t'$ )] (where [dur ( $t''$ ) =  $mt$ ] and [3 hours ( $mt$ )] – cf. footnote 195). I will not try to assess here the (dis)advantages of this “null-*last* analysis”<sup>197</sup>.

### 7.1.2. Defining intervals contiguous to an anchor point by counting

As we saw above, the operators analysed in the previous section may combine with basic predicates of times, as in (369), or expressions that basically denote eventualities or objects, as in (370) and (371), respectively (in the last two cases, only the occurrence within time adverbials being relevant):

- (369) a. os {últimos / próximos} três fins-de-semana  
the {last / next} three weekends  
b. os três fins-de-semana {antes / depois} das eleições  
the three weekends {before / after} the elections
- (370) as últimas três aulas  
the last three classes
- (371) os últimos três cigarros (que o Paulo fumou)  
the last three cigarettes (that Paulo smoked)

These time-denoting expressions are relatively more complex than those considered in the previous section, given that they normally involve plural entities (except for the singular constructions “*o último/próximo*  $N_{[+SING]}$ ” / “*the last/next*  $N_{[+SING]}$ ”, or similar, which I will ignore here). Their peculiar characteristic is that they represent **sums of (possibly discontinuous) intervals**<sup>198</sup>. In the cases involving predicates of times (like *fim-de-semana* / *weekend*), on which I will concentrate, they represent these sums of intervals directly. In

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<sup>197</sup> It is a curious fact that *before* and *after* phrases do not seem to behave exactly in the same way as (anaphorically dependent) expressions like *anterior* / *previous*, or “*que precederam* NP” / “*that preceded* NP”:

- (i) as (\*últimas) três horas anteriores  
the (\*last) previous three hours  
(ii) as (??últimas) três horas que precederam as eleições  
the (??last) three hours that preceded the elections

I leave the analysis of these contrasts for further research.

<sup>198</sup> This (dis)continuity depends on the noun: the sequence *os últimos três fins-de-semana* / *the last three weekends* represents a sum of discontinuous intervals, whereas *os últimos três anos* (*do calendário*) / *the last three* (*calendar*) *years* represents a sum of continuous intervals.

the other cases, they represent them indirectly (e.g. via the **loc** of the referred classes, as in (370), or in some other, possibly more complex, way). I will ignore these cases henceforth, for the sake of simplicity.

Sums of intervals will be represented with non-atomic time discourse referents, marked by a capital letter – **T**. I will keep lower case time discourse referents – **t** – to represent continuous intervals, as in Kamp and Reyle (1993)<sup>199</sup>. Of course, the definition of a **plural model-theoretic semantics for intervals**, which accounts for expressions like *three weekends*, is no trivial task. Although I will refer to some aspects that I think such semantics should take into account (cf. in particular observations about (372) below), I will not attempt to provide it here. Another relevant issue that I will avoid, but which will have to be taken into account in a more thorough analysis of these structures, is the (long-debated) issue of whether sequences like *the three* are single complex operators, a combination of two distinct operators, or can have both analyses (cf. Peres 1987: 33 ff.). I will adopt the second view, basically for simplicity reasons (though I make no strong commitment to it).

Before going into the analysis of the definite expressions presented in (369) above, we must recall that, as was noted in 6.2.5.1, the plural (non-quantified) structures  $[N_{[+PLURAL]} \text{ MOD}]$  (where MOD is a temporal locating expression) seem normally to involve reference to the supremum of the set of entities described by N that obey the restriction imposed by MOD. For instance, the expression *fins-de-semana antes de 1980 / weekends before 1980* may be taken to denote the set of all entities that are at the same time a weekend and precede 1980. The same applies, with the relevant adaptations, to expressions like *fins-de-semana em/de 1980 / weekends in/of 1980*, *fins-de-semana desde o início do ano / weekends since the beginning of the year*, *feriados desde há dois anos / holidays since two years ago*, etc. Formally, the plural expressions in (372) below can be associated with the sum (**T**) in (372’):

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<sup>199</sup> Kamp and Reyle (1993) only take continuous intervals into account. The type of intervals they use in their work (always represented by lower case letters) is defined as follows:

“intervals are readily defined from instants, viz. as the *convex* subsets of instants, i.e. as those instant sets X such that if  $i_1, i_2 \in X$  and  $i_1 < i_3 < i_2$ , then  $i_3 \in X$ ” (p. 668).

Of course, there is a sense in which an extended interval, like a weekend, is non-atomic. For instance, it is formed by two days, which in turn, just like any other day, are formed by a morning, an afternoon and an evening. More generally, every extended interval is non-atomic in the sense that it is formed by an infinite number of instants; cf.:

“Instants will be those times that are, in the appropriate sense, “atomic” and intervals will be the non-atomic times, much as individuals were the atomic and pluralities the non-atomic elements in the Linkian models defined in Section 4.3” (*ibid.*: 506).

However, there is also a sense in which an extended (continuous) interval is atomic. A weekend, for instance, can be conceived as an atom (a complex one if we take into account its internal composition), much like a book can be conceived as an atom, although it can be formed by several chapters, subchapters, pages, and, ultimately, letters and blank spaces. This is the approach I will take here – cf. discussion below.

- (372) fins-de-semana {em / antes de / desde} 1980  
weekends {in / before / since} 1980

(372)'  $T = \Sigma t'$ :

$t'$ weekend ( $t'$ ) $t' \subseteq t$
--

where (i) the inclusive location condition [ $t' \subseteq t$ ] is the contribution of the locating preposition (*em / in*,  $\emptyset_{em} / \emptyset_{in}$ , *desde / since*), and (ii) the discourse referent for the location time  $t$  and the conditions that define it, given below (which are the contribution of these locating prepositions and their complements) are introduced in the main DRS, given the definite character of  $t$ :

- (372)'a. [ $t = t_c$ ], [1980 ( $t_c$ )]  $\rightarrow em / in$  1980  
b. [ $t = t_c$ ], [ $t_c \supset \supset t_{cc}$ ], [1980 ( $t_c$ )]  $\rightarrow \emptyset_{em} antes de / \emptyset_{in} before$  1980  
c. [beg ( $t$ )  $\subseteq t_c$ ], [end ( $t$ ) = TPpt], [1980 ( $t_c$ )]  $\rightarrow desde / since$  1980

In the terms I will repeatedly use in chapter 9, the interval  $t$  is “fully-scanned” in order to “gather” all the relevant entities (weekends, here) included in it.

Throughout the present work, I will use plural time discourse referents ( $T$ ) in abstractions like (372'), or in simpler conditions like

(373) [weekend\* ( $T$ )]

to signify that  $T$  is a non-atomic entity composed by weekends. Furthermore, I will want to use the following type of conditions (in association with these non-atomic entities):

- (374) a. [ $|T| = n$ ] to signify that  $T$  is formed by exactly  $n$  weekends  
b. [ $t \in T$ ] to signify that  $t$ , an element of  $T$ , represents a weekend  
c. [ $T \subseteq t$ ] to signify that all elements composing  $T$  (i.e. weekends) are included in  $t$

In order for a cardinality condition like (374a) to have the desired meaning, the summation of intervals has to be formulated in such a way as to have weekends as its (complex) atoms. In other words, weekends – or, for that matter, any interval designated by a common noun, like *Inverno / winter*, *domingo / Sunday* or *manhã / morning* – should be included as an atom in the model. This is what, for simplicity, I will assume<sup>200</sup>. With this assumption, the definition of cardinality of Kamp and Reyle (1993: 426) can apply:

(375)  $M \models_f |x| = v$  iff  $|\{b \in U_M : b \text{ is an atom of } M \text{ and } b \subset_M f(x)\}| = v$

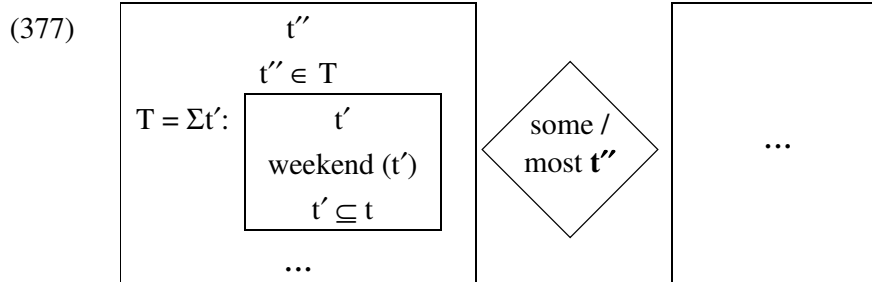
<sup>200</sup> Alternatively, the cardinality function could be relativised as to count only the stretches of the interval corresponding to the descriptive content of *weekend*. On this type of “relativised cardinality”, cf. Nakayama (1998: 4): “it is important to relativize the notion of cardinality by a sortal predicate”.

Furthermore, with this assumption, the condition  $[t \in T]$  will also have the desired meaning that **t** represents a weekend. The condition  $[T \subseteq t]$  will be used with the meaning  $[\forall t' [[t' \in T] \rightarrow [t' \subseteq t]]]$ .

Let us also recall that the plural expressions under analysis may occur with different types of quantifiers:

- (376) a. alguns (dos) fins-de-semana antes das eleições [foram especialmente agitados]  
           some (of the) weekends before the elections [were particularly hectic]<sup>201</sup>  
       b. a maioria dos fins-de-semana antes das eleições  
           most weekends before the elections  
       c. todos os fins-de-semana antes das eleições  
           all (of the) weekends before the elections  
       d. os três fins-de-semana antes das eleições  
           the three weekends before the elections

The peculiar characteristic of the definitely quantified expressions is that they seem to refer directly to the supremum **T**, whereas expressions like *some/most weekends before the elections* seem to quantify over subparts of **T**. In DRT-terms, they would be associated with a duplex condition like:



The expressions on which I focus here are those of type (376d) above. Their contribution can be (tentatively) represented with the conditions below (where the subscript **c** in **T<sub>c</sub>** is the mnemonic index already used before)<sup>202</sup>:

<sup>201</sup> Note the ambiguity of time-denoting expressions like {alguns / três} *fins-de-semana antes das eleições* / {some / three} *weekends before the elections*:

- (i) {alguns / três} fins-de-semana antes das eleições [foram especialmente agitados]  
       {some / three} weekends before the elections [were particularly hectic]  
       Σ use under discussion  
       (ii) {alguns / três} fins-de-semana antes das eleições [a Ana decidiu não votar]  
           {some / three} weekends before the elections [Mary decided not to vote]  
           Σ use to be discussed in 7.2.2

<sup>202</sup> I will not try to assess here whether a similar analysis could be adopted for singular (definite) expressions like *o último fim-de-semana / last weekend*, which could, at least in principle, be associated with parallel conditions, with  $[|T_c| = 1]$ .

- (378) a. [os últimos Q PERIODS ( $T_c$ )]  
 [the last Q PERIODS ( $T_c$ )]  
 $\downarrow$   
 $[|T_c| = Q], [T_c = \sum t' [[\text{PERIOD}(t')] \wedge [t' \subseteq t_1]]_{K1}]^{203}, [t_1 \supset \supset \text{TPpt}]$
- b. [os próximos Q PERIODS ( $T_c$ )]  
 [the next Q PERIODS ( $T_c$ )]  
 $\downarrow$   
*idem*, except third condition:  $[\text{TPpt} \supset \supset t_1]$
- c. [os Q PERIODS  $\emptyset_{em}$  antes de COMPL ( $T_c$ )] /  
 [the Q PERIODS  $\emptyset_{in}$  before COMPL ( $T_c$ )]  
 $\downarrow$   
 $[|T_c| = Q], [T_c = \sum t' [[\text{PERIOD}(t')] \wedge [t' \subseteq t_1]]_{K1}], [t_1 = t_{1c}], [t_{1c} \supset \supset t_{1cc}],$   
 $[\text{COMPL}(t_{1cc})]$   
 In accordance with what was said above,  $[t' \subseteq t_1]$ , in the sub-DRS  $K_1$ ,  
 and  $[t_1 = t_{1c}]$ , outside the sub-DRS, are the contribution of  $\emptyset_{em/in}$ ;  
 $[t_{1c} \supset \supset t_{1cc}]$  is the contribution of *antes/before*.
- d. [os Q PERIODS  $\emptyset_{em}$  depois de COMPL ( $T_c$ )] /  
 [the Q PERIODS  $\emptyset_{in}$  after COMPL ( $T_c$ )]  
 $\downarrow$   
*idem*, except for the fourth condition:  $[t_{1cc} \supset \supset t_{1c}]$

Note that by stating that the supremum  $T_c$  of intervals characterised by PERIOD(S) – e.g. weekends – that are included in  $t_1$  (an interval tied to the anchor point) has cardinality Q, we assure that  $T_c$  is the set of Q instances of PERIOD(S) preceding or following the anchor point. Note that in every case a restriction on the non-explicitly defined bound of  $t_1$  is induced –  $t_1$  has to begin or end in a such a way as to contain no more than Q instances of PERIOD(S)<sup>204</sup>.

The DRS-construction rule that yields the conditions in (378) can be formulated, tentatively and in a simplified manner, as in DRS-CR 6 below. In this rule, I resort to an almost unstructured syntactic configuration, in order to avoid issues that cannot be tackled here, as the already mentioned question of whether *the three* is a unique compound quantifier or not. Therefore, the whole NP is processed in a single step, except for the *before* and *after*-phrase. I also do not take a stand on the exact contribution of the definite.

<sup>203</sup> This condition is a simplified one-lined representation of the condition (372').

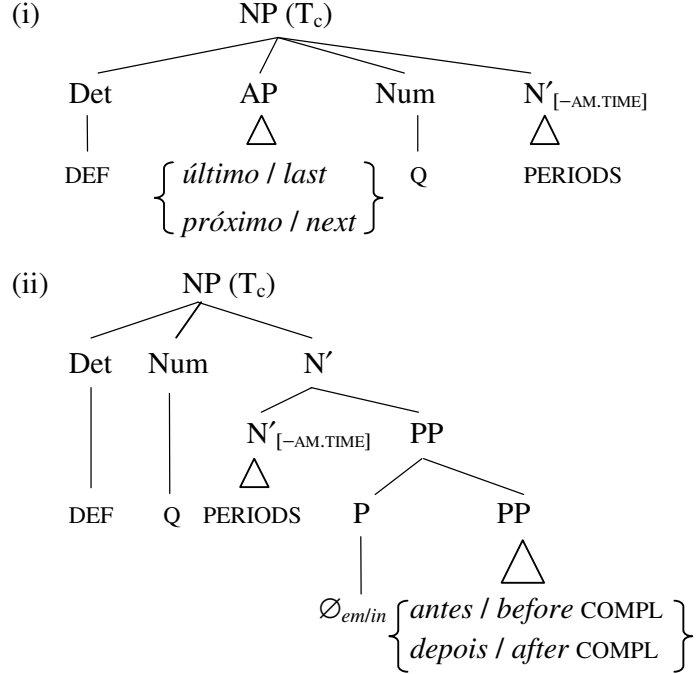
<sup>204</sup> Cf. observations, made in the previous subsection and in 6.2.5.1, about the effect of the definite on imposing a limit on “open intervals”. The relevant aspect to note here is that expressions like *the Q weekends* can combine with open intervals, like the one represented by *before the elections* (irrespective of the value of the cardinal Q), but not with closed intervals, like the one represented by *(in) 1980*, unless that interval contains exactly Q weekends – cf. <sup>OK</sup>*the 52 weekends in 1980* vs. *\*the 15 weekends in 1980*. This seems to indicate that, in the contexts at stake, a limit is “forced upon” the open interval, bounding it in such a way that the cardinality restriction of the definite is satisfied.



**DRS-CR 6. NPs with a predicate of times,  
and a last/next-type adjective or a before/after-phrase**

CR.NP

Triggering  
configurations:  
 $\gamma \subseteq \gamma' \in \text{Con}_K$



Introduce in  $U_K$ : new discourse referent  $t_1$

Introduce in  $\text{Con}_K$ : new conditions:  
 –  $[[T_c] = Q]$   
 –  $[T_c = \Sigma t' \mathbf{K}_1]$

Introduce in  $U_{K1}$ : new discourse referent  $t'$

Introduce in  $\text{Con}_{K1}$ : new condition:  $[\text{PERIOD}(t')]$

**For triggering configuration (i):**

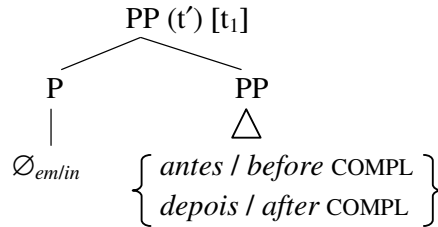
Introduce in  $\text{Con}_{K1}$ : new condition:  $[t' \subseteq t_1]$

Introduce in  $\text{Con}_K$ : new condition:  $[\alpha \supset \beta]$   
 (where  $\alpha$  and  $\beta$  are  $t_1$  or **TPpt** as in (378a-b))

**For triggering configuration (ii):**

Replace (in  $\text{Con}_{K1}$ )

$\gamma$  by :



With respect to DRS-CR 6, the following must be noted:

(i) The NPs at stake may occur in temporal adverbials phrases – e.g. *{em / durante} os últimos três fins-de-semana / {in / during} the last three weekends* – giving rise to constructions that are not strictly locating (in the sense of involving a single location time for e.g. a main clause eventuality), but akin to constructions of “temporal quantification”, or “frequency”, like *every weekend* – cf. Table 1’ on page 14. As I said, I will not tackle here this type of temporal adverbials.

(ii) As with DRS-CR 5”, the autonomous rules for  $\emptyset_{in}$ , and *before* and *after* (cf. pp. 108 and 178) yield the desired final result for structures with *before* and *after*, as expressed in (378c-d). Note that the  $\emptyset_{in}$ -modifier, the *before/after*-phrase, and the complement of the *before/after*-phrase are processed within the sub-DRS created by abstraction, but the conditions they introduce and which pertain to the characterisation of the (definite) location time  $t_1$  are introduced outside the sub-DRS:  $[COMPL(t_{1cc})]$  (definite complement of *before/after*),  $[t_{1c} \supset t_{1cc}]$  (*before/after*-phrase with definite complement; cf. observations at the end of 6.2.2),  $[t_1 = t_{1c}]$  ( $\emptyset_{em/in}$ ); the location inclusive condition  $[t' \subseteq t_1]$  (contributed by  $\emptyset_{em/in}$ ) remains in the sub-DRS. Note still that the structures with *before* and *after* are taken to involve temporal location of intervals, where  $t'$  is the located entity, and therefore the referential argument of  $\emptyset_{in}$ , and  $t_1$  is the location time.

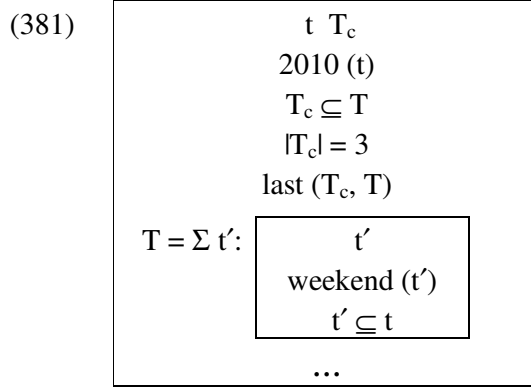
In the previous subsection, I mentioned (cf. footnote 194) a group of constructions involving predicates of amounts of time (in combination with modifying PPs or relative clauses) that posed problems for the rules therein presented (DRS-CR 5’ and DRS-CR 5”). Parallel structures with predicates of times exist, and pose comparable problems for the rule presented here (DRS-CR 6):

- (379)a. os últimos três fins-de-semana de 2010  
the last three weekends of 2010
- b. os últimos três fins-de-semana em que o Paulo esteve no Brasil  
the last three weekends Paulo was in Brazil
- (380) os últimos três fins-de-semana antes das eleições  
the last three weekends before the elections

With respect to these expressions, I will only make two brief observations (parallel to those already made in the previous subsection), leaving a more thorough analysis for further research.

1. In (379)-(380) – like in (i)-(iii) of footnote 194 and in (367) (previous section), and unlike in *os últimos três fins-de-semana / the last three weekends* – the operator *último / last* is not “anchor-dependent”: it merely identifies the most recent intervals of a set, within a given time frame (1999, the period Paulo was in Brazil, the period before the elections). To handle these cases, it seems that a relational analysis of *último / last*, along the lines described in footnote 195, is required, involving two sets of intervals here:  $[last(T_c, T)]$ ,

where  $\mathbf{T}$  is the set of all intervals described by the predicate of times that obey the restriction imposed by the modifier (e.g. weekends of 2010, weekends Paulo was in Brazil, weekends before the elections) and  $\mathbf{T}_c$  is the subset formed its most recent  $Q$  instances (as defined by the quantifier)<sup>205</sup>. The sequence (379a), for instance, would therefore be associated with the following DRS-conditions



As before, uniformity of analysis with the “unmodified” sequences like *os últimos três fins-de-semana* / *the last three weekends* can be achieved if a covert modifier with the meaning of “in the past” is associated with these sequences (cf. footnote 195, on pages 228-229):  $\mathbf{T}$  would pick-up all the past weekends and the expression *último* / *last* could be assigned the same interpretation.

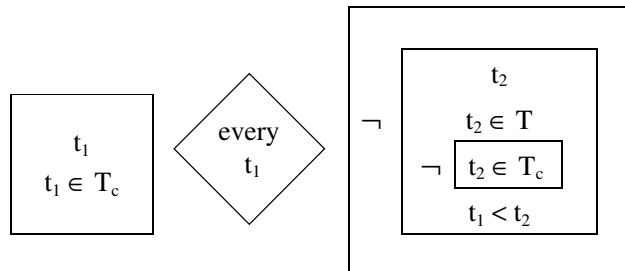
2. Sentence (380), with *último* / *last*, means the same as the sentence without it:

(382)    os três fins-de-semana antes das eleições  
              the three weekends before the elections

As mentioned in relation with (367), an analysis of (382) can be hypothesised, where the adjective *último* / *last* appears covertly. This obviates the need to assume that the interval associated with *antes* / *before* is “contextually lower-bounded” as a result of the presence of the definite quantifier. In this case, DRS-CR 6 would not apply, as it stands, to these structures.

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<sup>205</sup> The condition [last ( $T_c, T$ )] is to be interpreted as:



## 7.2. Defining intervals non-contiguous to an anchor point

### 7.2.1. Defining intervals non-contiguous to an anchor point by measuring

As I said at the beginning of this chapter, some time-denoting expressions define, via an operation of (temporal) measurement, intervals that lie (roughly) a stated amount of time in the past or future of an anchor point:

- (383) a. há duas horas  
          two hours ago  
      b. duas horas antes do concerto  
          two hours before the concert

These uncontiguously anchored time-denoting expressions are quite varied in their form. Even though, as said before, I do not intend to explore in this chapter the diversity of the subclasses considered, I will make a brief description of these expressions (specially of the forms on which I will focus), before proceeding to their formal analysis.

Backward measurement from TPpt is often marked in Portuguese by expressions with *haver*, as (352a) above. *Haver* is morphologically a verb<sup>206</sup> (meaning “there to be”), and generally occurs with the morphologically present form *há*, even in contexts that do not involve overlapping with the utterance time:

- (384) O Paulo tinha casado *há* quinze dias.  
      “Paulo had married THERE-IS fifteen days”  
      Paulo had married fifteen days before.

However, morphologically past or future forms such as *havia* (“pretérito imperfeito”) or *haverá* (“futuro imperfeito”) are also possible. See the following example from Cunha and Cintra (1984: 534) (and more examples in e.g. Viegas 1996: 48):

- (385) Tinha adoecido, *havia* quinze dias.  
      (Miguel Torga, *Novos Contos da Montanha*)  
      “He had fallen ill, THERE-WAS fifteen days”

Expressions with *haver* may occur, in certain contexts, with a (postponed) element *atrás* (literally: “behind”), which does not alter the interpretation<sup>207</sup>:

- (386) O Paulo casou *há* quinze dias *atrás*.  
      “Paulo got married THERE-IS fifteen days BEHIND”  
      Paulo got married fifteen days ago.

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<sup>206</sup> Parallel constructions in other Romance languages are also built with verbal operators; e.g. French *y avoir* (e.g. *il y a deux heures*), or Spanish *hacer* (e.g. *hace dos horas*). Brazilian Portuguese normally uses the verb *ter* instead of *haver* (e.g. *tem duas horas*).

<sup>207</sup> Some (prescriptionist) grammarians disapprove of this construction with *haver...atrás*, considering *atrás* a redundant element. Nevertheless, it is commonly used.

Sometimes, in structures with *atrás*, the verb *haver* does not occur:

- (387) o trabalho feito *sete meses atrás* (= o trabalho feito *há sete meses atrás*)  
“the work done seven months BEHIND”  
the work (that was) done seven months before

This construction with simple *atrás* (structurally closer to the English construction with *ago*) is widely used in Brazilian Portuguese.

While Portuguese can use the same linguistic form – an *há*-phrase – to measure from past, present and future TPpts, English normally resorts to a different operator for the backward measurement from the utterance time (*ago*) and from other TPpts (*before*)<sup>208</sup>:

- (388) a. Paulo left two hours {*\*before* / *ago*}.  
vs. b. Ana arrived at six. Paulo had left two hours {*before* / *\*ago*}.  
c. Ana will arrive at six. Paulo will have left two hours {*before* / *\*ago*}.

Note, however, that Portuguese also uses *antes* in the contexts where English uses *before*. Therefore, the feature that sets Portuguese apart is the possibility of *haver* applying to non-present TPpts:

- (388)'a. O Paulo saiu {*\*duas horas antes* / *há duas horas*}.  
[first alternative ungrammatical with the intended present-TPpt meaning]  
vs. b. A Ana chegou às seis. O Paulo tinha saído {*duas horas antes* /  
*há duas horas*}.  
c. A Ana chega às seis. O Paulo terá saído {*duas horas antes* / *há duas horas*}.

Possibly, the expressions with *antes* and *before* in (388) contain a null (anaphoric) complement referring to the TPpt<sup>209</sup> (“X-TIME *antes* / *before*  $\emptyset$ ”), an analysis which seems to be favoured by the possibility of the complement of these prepositions being a pronoun:

- (389) O Paulo tinha saído duas horas antes *disso*.  
Paulo had left two hours before *that*.

or an explicit lexical complement (setting a non-deictic or anaphoric anchor point):

- (390) O Paulo saiu duas horas antes de {a Ana chegar / do fim do espectáculo}.  
Paulo left two hours before {Ana arrived / the end of the show}.

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<sup>208</sup> I do not consider here cases of so-called “shifted deixis”, as those mentioned in Smith (1991: 143), like *Jane had lost her watch a week ago*, where, according to the author, “the adverbial *a week ago* is anchored to a tacit Reference Time which is understood to involve Jane’s consciousness”. I will also not consider cases with a “shifted anchor point” as *we went to the cinema a week ago yesterday*, mentioned in Harkness (1987: 87), who discusses Bäuerle (1979); Portuguese *haver* does not occur in this construction: *\*fomos ao cinema há uma semana ontem*; this English sequence is translated as *fomos ao cinema fez ontem uma semana* (literally: “we went to the cinema it made yesterday one week”).

<sup>209</sup> On the anaphoric behaviour of this type of adverbials, see e.g. Kamp and Rohrer (1983: 263): “adverbs such as *deux jours après*, *un an plus tard* (...) are anaphoric expressions par excellence”.

Forward measurement from TPpt is often marked by *dentro de*, in Portuguese, and *in* in English. The time-denoting status of the phrases headed by these operators is disputable, as observed in 6.3. Anyway, they appear to be mirror images of *há* and *ago*, respectively, in what concerns the location of an eventuality in an interval defined by measurement from the utterance time<sup>210</sup> – sentences *a*:

- (391) a. O Paulo chega *dentro de* duas horas.  
 b. A Ana saiu às seis. O Paulo chegou { \**dentro de* duas horas / duas horas *depois* }.
- (392) a. Paulo will arrive *in* two hours.  
 b. Ana left at six. Paulo arrived { \**in* two hours / two hours *after* that }.

Forward measurement is also often expressed by means of the operators *de...a* in Portuguese and *from* in English. These operators can take (with restrictions that I ignore here) a referentially dependent complement, deictically associated with the utterance time (*aqui / now*) or anaphorically dependent on a TPpt (*aí / then, that time*), or a referentially autonomous complement:

- (393) O Paulo chega de { *aqui / domingo* } a duas semanas.  
 Paulo will arrive two weeks from { *now / next Sunday* }.
- (394) A Ana saiu às seis. O Paulo chegou daí a duas horas.  
 ?Ana left at six. Paulo arrived two hours from then.

A third type of operators commonly used to express forward measurement includes *depois / after*. What was said above about backward-measuring *antes / before* (e.g. concerning the possibility of null, pronominal and lexical complements) applies, with the relevant adaptations, to forward-measuring *depois / after*. There are still several other expressions used in Portuguese and English for similar (forward or backward) measuring purposes, but I will ignore them here<sup>211</sup>.

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<sup>210</sup> In some cases, *dentro de* and *in* do not measure from the utterance time – cf. sentences like *Mary said last Sunday that she was leaving in three days*, where the anchor point (the time of saying) is established by a subordinating clause, and which Smith (1991: 142) considers a case of “shifted deixis”, or like *Kissinger arriva au Caire le 6 Juillet. Il {partait / partirait / allait} pour Jérusalem dans deux jours*, analysed Kamp and Rohrer (1983). In the counterparts of these sentences, Portuguese *dentro de* can also be used, although the perspective point is not the utterance time.

<sup>211</sup> Just a few examples:

- A. Expressions with a comparative element: “X-TIME *mais tarde / later*”, “X-TIME *earlier*” (the Portuguese direct counterpart “X-TIME *mais cedo*” is not normally used) – on the relationship between *after* and *later*, and *before* and *earlier*, cf. e.g. Heinämäki 1974: 39 ff.).
- B. Portuguese expression “a X-TIME (de) COMPL” (where COMPL is obligatorily non-null):
- (i) *A dois meses das eleições*, houve uma crise governamental.  
 “at two months from the elections, there was a governmental crisis”  
 Two months before the elections, there was a crisis in the government.
- C. English expression “*after* X-TIME”, an expression involving anaphoric dependencies:
- (ii) The meeting started at ten; *after some minutes* it had to be interrupted.

Let us now consider the general contribution of a sample of representative expressions considered above:

- (395) a. [há X-TIME ( $t_c$ )]  
[X-TIME ago ( $t_c$ )]  
↓  
[X-TIME ( $mt$ )], [dur ( $t'$ ) =  $mt$ ], [beg ( $t'$ ) =  $t_c$ ] (provisional), [end ( $t'$ ) = TPpt]
- b. [daqui a X-TIME ( $t_c$ )] / ?[dentro de X-TIME ( $t_c$ )]  
[X-TIME from now ( $t_c$ )] / ?[in X-TIME ( $t_c$ )]  
↓  
idem, except for the last two conditions: [end ( $t'$ ) =  $t_c$ ] (provisional), [beg ( $t'$ ) = TPpt]<sup>212</sup>
- c. [X-TIME antes COMPL ( $t_c$ )]  
[X-TIME before COMPL ( $t_c$ )]  
↓  
as (395a), except for the last condition: [end ( $t'$ ) = beg ( $t_{cc}$ )], plus [COMPL( $t_{cc}$ )]
- d. [X-TIME depois COMPL ( $t_c$ )]  
[X-TIME after COMPL ( $t_c$ )]  
↓  
as (395b), except for the last condition: [beg ( $t'$ ) = end ( $t_{cc}$ )], plus [COMPL( $t_{cc}$ )]

The condition [X-TIME ( $mt$ )] is the normal contribution of a predicate of amounts of time X-TIME. The conditions involving **dur ( $t'$ )**, **beg ( $t'$ )** and **end ( $t'$ )** result from the combination of this predicate with the temporal operators *há / ago*, *de...a / from*, *antes / before* or *depois / after*. Note that  $t'$  is merely an “instrumental” interval that is introduced in the representation in order to define the relevant interval ( $t_c$ ) denoted by the temporal expression as a whole – e.g. for *há / ago*:  $t_c$  is an interval that (roughly) lies at the beginning of an interval  $t'$  of size **mt** that ends at TPpt. The conditions that define  $t_c$ , marked with “provisional”, need be revised, since this interval seems not to be conceived of as punctual (cf. section 7.2.1.1). The conditions stating that the anchor point marks either the end or the beginning or the measured interval  $t'$  are the formal expression of the

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D. Portuguese expression “*passado* X-TIME”, a participial clause; it normally contains a null anaphoric complement, as in (iii), in which case it corresponds closely to the English expression “*after* X-TIME” in C above, but it may also have an explicit complement, as in (iv):

(iii) A reunião começou às 10 horas; *passados poucos minutos* foi interrompida.

“the meeting started at ten; some minutes (having) passed it had to be interrupted”

The meeting started at ten; *after some minutes* it had to be interrupted.

(iv) A guerra acabou em 1945; *passados cinquenta anos sobre esse acontecimento*, a Europa celebra a Paz.

“the war ended in 1945; fifty years (having) passed over that event, Europe celebrates Peace”

The war ended in 1945; fifty years after that event, Europe celebrates Peace.

<sup>212</sup> In fact, “*daqui a* X-TIME” / “X-TIME *from now*” is interpreted as “X-TIME *depois / after* COMPL” in (395d) (with [ $t_{cc}$  = TPpt]).

direction of the time measurement operation (backwards or forwards in time) expressed by the temporal operators under analysis. The DRS-construction rules that yield the interpretive conditions in (395) can be formulated, with some simplifications, as follows:

**DRS-CR 7. Phrases with a predicate of amounts of time and  
a backward or forward temporal measuring operator**

CR.XP	
<p>Triggering configuration:  <math>\gamma \subseteq \gamma' \in \text{Con}_K</math></p>	<p>(i)</p> <p>(ii)</p>
Introduce in $U_K$ :	new discourse referents <b>t'</b> and <b>mt</b>
Introduce in $\text{Con}_K$ :	<p>new conditions:</p> <ul style="list-style-type: none"> <li>– [X-TIME (mt)]</li> <li>– [dur (t') = mt]</li> <li>– [<math>\alpha</math> (t') = <math>\delta</math>]</li> <li>– [<math>\beta</math> (t') = <math>t_c</math>] (provisional)</li> </ul> <p>(<math>\alpha</math> and <math>\beta</math> are <b>beg</b> or <b>end</b>, <math>\delta</math> is TPpt, <b>beg</b> (<math>t_{cc}</math>) or <b>end</b> (<math>t_{cc}</math>), as in (395) above)</p>
For triggering configuration (ii), still:	
Introduce in $U_K$ :	new discourse referents <b>t<sub>cc</sub></b>
Replace $\gamma$ by:	<p>NP / S' (<math>t_{cc}</math>)</p> <p>COMPL</p>

With respect to this rule, it must be noted that I made some simplifications in the syntax. In the first triggering configuration: (i) X can also be a morpho-syntactically complex expression, like *dentro de* (in Portuguese); (ii) Portuguese structures with *haver* possibly



involve an IP (=S), but I ignore the possible contribution of (or restrictions associated with) the inflectional part of these structures (and the possible expletive Subject); (iii) the fact that the temporal operator *ago* follows rather than precedes the NP is not represented. In the second triggering configuration, I represent the expressions “X-TIME *before / after* COMPL” with a non-structured tripartite configuration, thereby avoiding taking a stand on the exact constituent combination; besides this tripartite structure, two options would have to be considered: (i) a structure where [X-TIME *before/after*] is considered a complex operator – [[X-TIME *before/after*] COMPL] – and (ii) a structure where [*before/after* COMPL] forms a constituent – [X-TIME [*before / after* COMPL]].

Finally, note also that:

- (i) I present a rule for *dentro de* and *in* as time-denoting expressions. Were these expressions not to be considered as such, but rather as full temporal locating adverbials, they would obviously require a different rule, adapted accordingly.
- (ii) The operators *de...a* and *from* are interpreted as *depois / after* (syntactic differences apart); the expressions *daqui a / from now*, and *daí a / from then* include these operators and a referentially dependent complement.
- (iii) From a structural viewpoint, the group of expressions with *before* and *after* analysed in section 7.1 (e.g. *as duas horas antes do espectáculo / the two hours before the show* – cf. DRS-CR 6) differs significantly from the one analysed here (e.g. *duas horas antes do espectáculo / two hours before the show*). While the expressions in the former group are headed by a predicate of amounts of time X-TIME, those in the latter group have a predicate of amounts of time in a subordinate position. The semantic correlate of this distinction is that: in the former group, the stated amount of time characterises the described interval ( $t_c$ ) itself (formally: [X-TIME (mt)]  $\wedge$  [dur ( $t_c$ ) = mt]); in the latter group, it characterises a “instrumental” interval  $t'$ , through which  $t_c$ , the interval designated by the expression as a whole, is defined.

### 7.2.1.1. On the punctuality of the expressions that define intervals non-contiguous to an anchor point by measuring

The conditions [beg ( $t'$ ) =  $t_c$ ] and [end ( $t'$ ) =  $t_c$ ] in (395) above were formulated as provisional. According to these conditions,  $t_c$ , the interval represented by the temporal expressions at stake as a whole, is conceived as **punctual**, coinciding with the beginning or end of a given “instrumental” interval  $t'$ . This is however not indisputable. I will consider this question here, though in a superficial way, given some complexities that will be mentioned below (which require deeper research).

At first glance, the interval denoted by *há / ago* phrases, and similar ones, may appear to be conceived of as punctual. Note that it can coincide with the interval associated with a typically punctual expression: for instance, [*a*] *as duas horas (de hoje) / [at] 2 p.m. (today)* seems to refer to the same interval than *há (exactamente) dez minutos / (exactly) ten minutes ago*, if the utterance takes place at 2.10 p.m. However, the occurrence of expressions like “*há* X-TIME” / “X-TIME *ago*” in contexts as those illustrated below seems to

suggest the **non-punctual** character of these expressions. The following sentences involve structures where extended eventualities are located – (arguably) inclusively – with resort to the temporal expressions at stake:

- (396) a. O Paulo leu este livro há dois dias.  
Paulo read this book two days ago.
- b. O Paulo esteve no hospital (durante) uma semana há seis meses (atrás).  
Paulo was in hospital for a week six months ago.
- c. O Paulo esteve no hospital (durante) uma semana dois meses antes/depois de regressar da Índia.  
Paulo was in hospital for a week two months before/after he returned from India.

The assessment of the issue under consideration is complicated by the existence, for (at least some) sentences involving this type of adverbials, of two interpretive possibilities with respect to temporal location: (i) one where the *whole accomplishment* is located by the time adverbial (which functions as a kind of frame adverbial) – I will designate it as “frame interpretation”; (ii) another where only its *culmination point* is being located, the adverbial setting the time where this point is reached – I will designate it “endpoint interpretation”<sup>213</sup>. Note that the endpoint interpretation is compatible with a punctual analysis of the adverbials at stake, while the frame interpretation obviously is not. So, what is relevant, for the purposes of the present discussion, is to show that these adverbials can be involved in a frame interpretation (regardless of whether they can also sometimes involve an endpoint interpretation). The two interpretations at stake would correspond, for the sentence (396a), to: (i) the reading was completely done (more or less) two days before the utterance time, and (ii) the reading was merely finished in that period, with the possibility that it started much earlier (e.g. two weeks before that); for the sentence (396b), it would correspond to: (i) the stay in the hospital occurred in a period (more or less) six months in the past of the utterance time, and (ii) the stay in the hospital reached the duration of one week six months before the utterance time. With the Portuguese *haver*-expressions the endpoint interpretation is very odd for any of the sentences (396), whereas the frame interpretation is clearly salient. According to my English informants, the endpoint interpretation is also hard to get, or odd, with *ago*-expressions (particularly in simple decontextualised sentences like *Paulo read this book two days ago*). This difficulty of getting the endpoint interpretation can be easily verified in a sequence where, for pragmatic reasons, the frame interpretation is excluded. Observe the following sentence, and assume the implausibility of reading the mentioned book in a matter of minutes:

- (397) ?O Paulo leu este livro há dois minutos.  
?Paulo read this book two minutes ago.

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<sup>213</sup> The dividing line between these two interpretations is not always clear-cut, given the vagueness that very often is associated with predicates of amounts of time (X-TIME frequently meaning *approximately* X-TIME in many contexts of utterance); cf. the subtlety of the distinction in (396b) and the more clear distinction in (396a).

Now let us compare *há / ago* phrases with some typically punctual adverbials:

- (398) a. ?O Paulo leu este livro {às 14.00 h. (desse dia) / nesse momento}.  
           ?Paulo read this book {at 2 p.m. (that day) / at that moment}.
- b. \*O Paulo esteve no hospital (durante) uma semana {às 14.00 h. (desse dia) / nesse momento}.
- ??Paulo was in hospital for a week {at 2 p.m. (that day) / at that moment}.

A frame interpretation is obviously excluded here. The difficulty in getting the endpoint interpretation accounts for the oddity of these sentences.

Once we assume that a frame interpretation for sentences (396) is either necessarily or possibly obtained, that is, in other words, that they may involve an inclusive location condition [ $t_e \subseteq t$ ], we have to consider that the time-denoting expressions under analysis denote non-punctual intervals. More specifically, the interval ( $t_e$ ) they define is not necessarily the punctual interval that lies (exactly) the stated amount of time in the past or future of the TPpt – i.e. **beg** ( $t'$ ) or **end** ( $t'$ ) – but rather an interval that surrounds **beg** ( $t'$ ) or **end** ( $t'$ ) (up to a certain limit, as we will see). The conditions [ $\text{beg} / \text{end} (t') = t_e$ ] in (395) should, accordingly, be replaced by the less restrictive condition:

- (399) [ $\text{beg} / \text{end} (t') \subseteq t_e$ ]

( $t_e$ , the interval represented by the time-denoting expressions under analysis as a whole, is *an interval that surrounds* the beginning or end of an interval  $t'$ , of extent **mt**, expressed by X-TIME, which has the anchor point as the other extremity).

Condition (399a) proves to be very weak, however, given that it does not impose a limit on the temporal extent of  $t_e$ . The relevance of imposing this limit is shown by the following examples (where a possible endpoint interpretation must be ignored):

- (400) a. O Paulo leu este livro há {dois meses / dois dias / ??dois minutos}.
- Paulo read this book {two months / two days / ??two minutes} ago.
- b. O Paulo esteve no hospital durante {dois dias / ?três meses / \*um ano}
- há seis meses (atrás).
- Paulo was in hospital for {two days / a week / ?three months / \*one year}
- six months ago.

The value of the limit at stake seems to be only contextually determined (and may even be null, which is tantamount to saying that the interval  $t_e$  may be conceived of as punctual). Thus, (399a) has to be complemented with a condition like (399b) (where **mt'**, the value of the mentioned limit, is fixed contextually):

- (399) b. [ $\text{dur} (t_e) \leq \text{mt}'$ ]<sup>214</sup>

<sup>214</sup> Actually, as pointed out to me by Hans Kamp (p.c.), an analysis along the same lines is possibly also adequate for the typically punctual adverbials like *agora / now* or [*a*] *as duas horas* / [*at*] *2 p.m.*, given that, as is known, they allow for a certain temporal extendedness – cf. footnote 44 (on page 60) and the following example:

- (i) O Paulo susteve a respiração *durante alguns segundos* {nesse momento / às duas horas}.
- Paulo held his breath *for a few seconds* {at that moment / at 2 p.m.}.

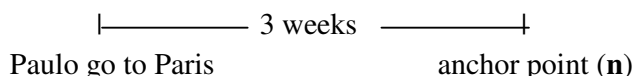
### 7.2.2. Defining intervals non-contiguous to an anchor point by counting

As was noted at the beginning of this chapter, operators like *há / ago* and similar ones can combine (with some restrictions that I will not try to describe here) with expressions that basically represent intervals, eventualities and objects. This entails that the expressions headed by these operators can define intervals via an operation of **counting temporally ordered entities** (backwards or forwards in time), as shown again in the following sentences:

- (401) a. O Paulo esteve nos Alpes {há três fins-de-semana / três fins-de-semana antes de viajar para a Índia}.  
Paulo was in the Alps {three weekends ago / three weekends before he travelled to India}.
- b. O professor começou a analisar a obra de Goethe há três aulas.  
The teacher started to analyse Goethe's work three classes ago.

Counting ordered entities and measuring time are obviously relatable operations. In particular, (some) information provided via the latter may be inferentially extracted from the former. Note that, in structures like (402), predicates of amounts of time supply information about the distance between the anchor point and the eventuality described in the matrix structure:

- (402) O Paulo foi a Paris há *três semanas*.  
Paulo went to Paris *three weeks* ago.



In some (though not all) structures involving counting of entities, namely in those that refer to intervals or eventualities with a regular cycle, this information is also obtained. The main difference is that it is not directly supplied by a predicate of amounts of time, but rather it is inferred from the cycle of repetition of the relevant entity. So, for instance, given the cycle of repetition of Sundays and Olympic Games, the following deductions may be made<sup>215</sup>:

- (403) a. O Paulo foi a Paris há *três fins-de-semana* (atrás).  
Paulo went to Paris *three weekends* ago.  
→  
O Paulo foi a Paris há *entre duas e três semanas*.  
Paulo went to Paris *between two and three weeks* ago.
- b. Este atleta ganhou uma medalha de ouro há *três Jogos Olímpicos* (atrás).  
This athlete won a gold medal *three Olympic Games* ago.  
→  
Este atleta ganhou uma medalha de ouro há *entre oito e doze anos*.  
This athlete won a gold medal *between eight and twelve years* ago.

<sup>215</sup> The exact amount obviously depends on where the utterance time falls.

In sentences where the time-denoting expression refers to eventualities with possibly an irregular cycle, like (401b), extra-information is needed, namely the time between each relevant eventuality (classes, here), in order to estimate the distance between the anchor point and the eventuality described in the main clause. If this extra-information lacks, the interval represented by the time-denoting expression as a whole ( $t_c$ ) and the location time of the sentence ( $t$ ), which is defined through it, are defined only with respect to the counted eventualities; they are not associated, in such case, with any fixed amount of time determined with respect to the anchor point.

Let us now consider the formal analysis of the time-denoting expressions at stake in structures involving counting of temporally ordered entities. For simplicity, I will focus only on expressions with common predicates of times (e.g. *fins-de-semana* / *weekends*). Although I will ignore all particular aspects concerning the other subtypes of complements (namely situational and object-denoting), I believe that the essence of what will be said also applies to them, with the relevant adaptations.

I take expressions like “há Q PERIODS” / “Q PERIODS ago”, or “Q PERIODS *depois das eleições*” / “Q PERIODS *after the elections*” to denote, as a whole, the *entire*  $Q^{th}$  instance of PERIOD counting from the anchor point in the relevant direction – e.g. the (whole) third weekend in the past of the utterance time for *há três fins-de-semana* / *three weekends ago*, and the whole third weekend in the future of the elections for *três fins-de-semana depois das eleições* / *three weekends after the elections*. This is motivated by the possibility of having sentences (involving counting of eventualities) like the following<sup>216</sup>:

- (404) a. O número de bilhetes (para este museu) vendidos ao fim-de-semana é o seguinte: 1200 no fim-de-semana passado, 1100 há dois fins-de-semana, 800 há três fins-de-semana.  
The number of tickets (for this museum) sold on weekends is as follows:  
1200 last weekend, 1100 two weekends ago, 800 three weekends ago.
- b. 115 aviões aterraram neste aeroporto há três fins-de-semana, o que constituiu um novo recorde.  
115 planes landed at this airport three weekends ago, which sets a new record.

The processing of these sentences requires consideration of all the relevant events (ticket-sales or landings) occurred within a given stretch of time (cf. “full-scanning inclusive reading”, in chapter 9). In these cases, this stretch is obviously a whole weekend (no part of it being irrelevant).

Furthermore, the analysis of *há três fins-de-semana* / *three weekends ago* as denoting a whole weekend is compatible with the interpretation of sentences describing simple events:

<sup>216</sup> Note the logical equivalence of *no domingo passado* and *há um domingo (atrás)*, in Portuguese, and of *last Sunday* and *one Sunday ago*, in English. The second forms are normally not used. In many languages, there are also alternative (more common) forms for expressions involving cardinality two (e.g. Portuguese *o penúltimo fim-de-semana*, English *the weekend before last*) or three (e.g. Portuguese *o antepenúltimo fim-de-semana*).

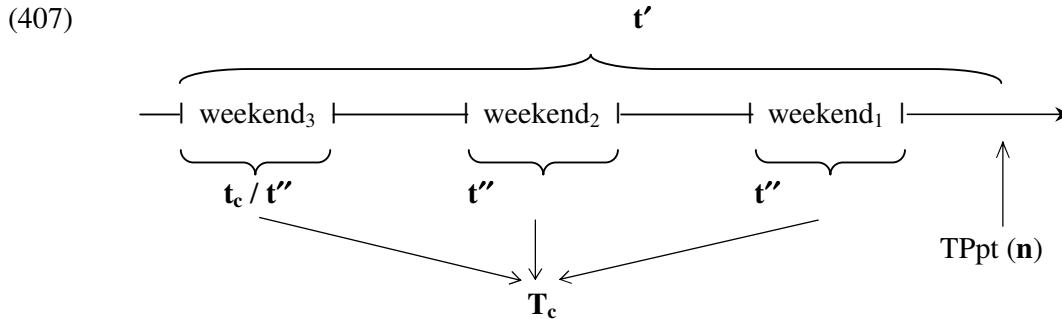
- (405) Paulo got married three weekends ago.  
 O Paulo casou há três fins-de-semana (atrás).

These sentences assert that Paulo got married on a weekend. Under the proposed interpretation of *há três fins-de-semana / three weekends ago*, a normal inclusive condition ( $[ev \subseteq t]$ , where  $[t = t_c]$  and  $t_c$  is defined as suggested above) may represent the temporal location of the sentences.

Let us now look at the DRS-conditions associated with time-denoting expressions of the subclass under consideration:

- (406) a. [há Q PERIODS ( $t_c$ )]  
 [Q PERIODS ago ( $t_c$ )]  
 $\downarrow$   
 $[|T| = Q]$ ,  $[T = \Sigma t'' [[\text{PERIOD}(t'')] \wedge [t'' \subseteq t'] ]_{\mathbf{K1}}]$ ,  $[t_c \in T]$ ,  $[\text{beg}(t') = \text{beg}(t_c)]$ ,  
 $[\text{end}(t') = \text{TPpt}]$
- b. [daqui Q PERIODS ( $t_c$ )] / ?[dentro de Q PERIODS ( $t_c$ )]  
 [Q PERIODS from now ( $t_c$ )] / ?[in Q PERIODS ( $t_c$ )]  
 $\downarrow$   
 idem, except the last two conditions:  $[\text{end}(t') = \text{end}(t_c)]$ ,  $[\text{beg}(t') = \text{TPpt}]$ <sup>217</sup>
- c. [Q PERIODS antes COMPL ( $t_c$ )]  
 [Q PERIODS before COMPL ( $t_c$ )]  
 $\downarrow$   
 as (406a), except for the last condition:  $[\text{end}(t') = \text{beg}(t_{cc})]$ , plus  $[\text{COMPL}(t_{cc})]$
- d. [Q PERIODS depois COMPL ( $t_c$ )]  
 [Q PERIODS after COMPL ( $t_c$ )]  
 $\downarrow$   
 as (406b), except for the last condition:  $[\text{beg}(t') = \text{end}(t_{cc})]$ , plus  $[\text{COMPL}(t_{cc})]$

Schematically, for *há três fins-de-semana / three weekends ago*:



<sup>217</sup> In fact, “*daqui a Q PERIODS*” / “*Q PERIODS from now*” is interpreted as “*Q PERIODS depois / after COMPL*” in (406d) (with  $[t_{cc} = \text{TPpt}]$ ).

Note that  $\mathbf{t}'$  is an “instrumental” interval that serves merely to define a frame for the summation operation  $[T = \Sigma \mathbf{t}'' \text{ } [[\text{PERIOD}(\mathbf{t}'')] \wedge [\mathbf{t}'' \subseteq \mathbf{t}']]\mathbf{k}_1]$  (cf. parallel use of an “instrumental” interval  $\mathbf{t}'$  in structures with predicates of amounts of time in (395) above).  $\mathbf{t}'$  is a continuous interval (cf. representation by an atomic discourse referent) tied to the anchor point (cf. conditions in (406)). Therefore, by stating that the supremum  $\mathbf{T}$  of intervals characterised by PERIOD (e.g. weekends) that are included in it has cardinality  $Q$ , we assure that  $\mathbf{T}$  is the set of  $Q$  instances of PERIOD immediately preceding or following the anchor point. Now, as said before, I take the expression as a whole to denote the  $Q^{\text{th}}$  instance of PERIOD (in the relevant direction) – e.g. the third Sunday in the past of the utterance time for *há três fins-de-semana / three weekends ago*. This is achieved by postulating that  $\mathbf{t}_c$ , the interval denoted by the expression as a whole:

- (i) is a member of  $\mathbf{T}$ , i.e. one of the  $Q$  PERIODS summed up –  $[\mathbf{t}_c \in \mathbf{T}]$ , and
- (ii) is at the relevant extremity of the “instrumental” interval  $\mathbf{t}'$  –  $[\text{beg}(\mathbf{t}') = \text{beg}(\mathbf{t}_c)]$  or  $[\text{end}(\mathbf{t}') = \text{end}(\mathbf{t}_c)]$  (depending on the temporal operator)<sup>218</sup>.

Before turning to the DRS-construction rules, I will make an observation that is particularly relevant for the discussion to be made in the next subsection. For simplicity, I will focus on the sequence *há três fins-de-semana / three weekends ago*, but the observation applies, with the necessary adaptations, to any other relevant sequence.

Assuming that the counting of intervals associated with these sequences is done according to a schema like (407), there is a limit-case which may pose some problems, to wit: the case in which the utterance time (anchor point) occurs within a weekend. The question is: is this “weekend of utterance” relevant for the counting operation through which the interval defined by the expression as a whole is determined? In simpler words: does this weekend count as the first of the three mentioned? Judgements are subtle in this particular respect, but the general consensus among speakers seems to be that it doesn’t. This is taken into account in the conditions presented in (406): the “weekend of utterance” is not an element of  $\mathbf{T}$ , since it is not included in  $\mathbf{t}'$ , but merely overlaps it.

The DRS-construction rule that yields the conditions in (406) can be formulated as follows (with simplifications parallel to those mentioned with respect to DRS-CR 7):

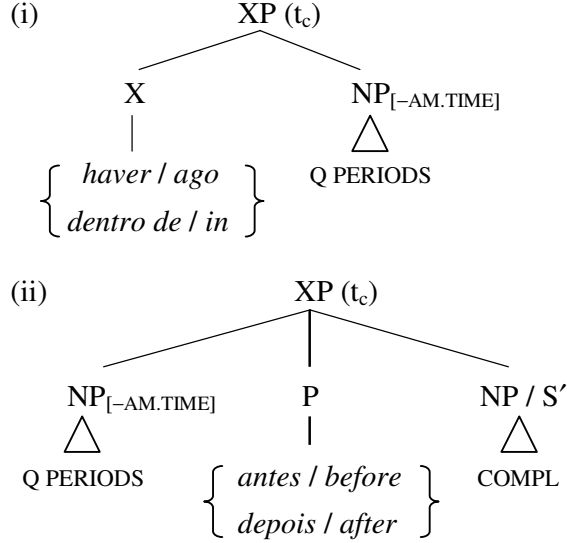
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<sup>218</sup> The same results would be obtained with the conditions  $[\text{beg/end}(\mathbf{t}') \supset \subset \mathbf{t}_c]$ , or  $[\text{beg/end}(\mathbf{t}') \subseteq \mathbf{t}_c]$ .

**DRS-CR 8. Phrases with a predicate of times  
and a backward or forward temporal measuring operator**

**CR.XP**

Triggering  
configuration:  
 $\gamma \subseteq \gamma' \in \text{Con}_K$



Introduce in  $U_K$ : new discourse referents  $\mathbf{t}'$  and  $\mathbf{T}$

Introduce in  $\text{Con}_K$ : new conditions:

- $[|T| = Q]$
- $[T = \Sigma t'' \mathbf{K}_1]$
- $[t_c \in T]$
- $[\beta(t') = \beta(t_c)]$
- $[\alpha(t') = \delta]$

( $\alpha$  and  $\beta$  are **beg** or **end**,  $\delta$  is TPpt, **beg** ( $t_{cc}$ ) or **end** ( $t_{cc}$ ), as in (406) above)

Introduce in  $U_{K1}$ : new discourse referent  $\mathbf{t}''$

Introduce in  $\text{Con}_{K1}$ : new conditions:

- $[\text{PERIOD}(t'')]$
- $[t'' \subseteq t']$

For triggering configuration (ii), still:

Introduce in  $U_K$ : new discourse referent  $\mathbf{t}_{cc}$

Replace  $\gamma$  by:

```

      graph TD
      NP_S_prime["NP / S' (tcc)"] --> Delta["△"]
      Delta --> Compl["COMPL"]
  
```



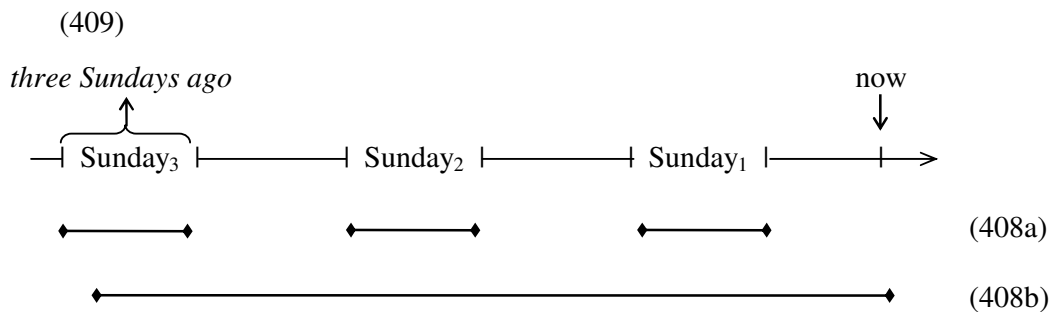
### 7.3. On the ambiguity of Portuguese *haver*-expressions

As we saw in the previous sections of this chapter, Portuguese expressions with *haver* (like English expressions with *ago* or *before*) are used to define intervals via an operation of time measurement, or counting of temporally ordered entities, from an anchor point. In this subchapter, I will show that these Portuguese expressions are ambiguous, and may have a different interpretation, where they are closer to English expressions with *for*. To my knowledge, this ambiguity has not been noted in the literature.

Let us start by observing the following two Portuguese sentences, which include an *haver*-expression:

- (408) a. O Paulo não vai à igreja *há* três domingos.  
 “Paulo DOES NOT GO to the church THERE-IS three Sundays”  
 [Paulo hasn’t been to the church *for* three Sundays (now)]
- b. O Paulo não vai à igreja *desde há* três domingos.  
 “Paulo DOES NOT GO to the church SINCE THERE-IS three Sundays”  
 [Paulo hasn’t been to the church *since* three Sundays *ago*]

These sentences, which describe a negative (habitual) state, are not equivalent<sup>219</sup>. In a scenario where Paulo went to the church on a Wednesday the week before the utterance time, for instance, the first sentence would not necessarily be false, whereas the second would. This is because the assertion in (408a), without *desde*, involves merely the three Sundays that precede the utterance time, while the assertion in (408b) involves the whole interval between the utterance time and the third Sunday in its past, including all weekdays. In the following schema, the relevant intervals for the location of the described negative (habitual) state, discontinuous for (408a), are represented by the thicker lines below the time axis:



<sup>219</sup> Negation is not a crucial factor here. The relevant differences between these two sentences (that I will describe below) also exist between sentences describing positive (habitual) states, like:

- (i) Um avião etíope aterra neste aeroporto {há vs. desde há} três domingos.  
 “an Ethiopian airplane LANDS at this airport {THERE-IS vs. SINCE THERE-IS} three Sundays”

This sentence is similar to one I read in a newspaper which drew my attention to the ambiguity at stake.

There may be some differences with respect to where the utterance time falls with respect to “Sunday<sub>1</sub>”, but I ignore them in this schema (cf. observations at the end of this section).

The described differences between the Portuguese sentences (408a) and (408b), both including an *haver*-expression, seem to be the same as those between the English sentences given as a translation above (and repeated below), which exhibit different temporal operators:

- (410) a. Paulo hasn’t been to the church *for* three Sundays (now).  
 b. Paulo hasn’t been to the church *since* three Sundays *ago*<sup>220</sup>.

What this data seems to indicate is that Portuguese *haver*-expressions are ambiguous:

(i) In sentences like (408a), *haver*-expressions are associated with the *sum of Q PERIODS of the stated type in the past of the utterance time*, that is, they involve a set of location times, rather than a single location time. In this respect, they are akin to adverbials like *todos os domingos* (*every Sunday*), *em três domingos* (*on three Sundays*), and *nos últimos três domingos* (*on the last three Sundays*), and express directly, i.e. without preceding locating prepositions, “location relative to a set of intervals” (cf. Table 1’, on page 14). In the use at stake, Portuguese *haver*-expressions seem to be a counterpart of English *for*-expressions<sup>221</sup>. Their interpretation differs from that presented in the previous section (DRS-CR 8) and poses some complex questions, which I will only briefly discuss, below.

(ii) In sentences like (408b), *haver*-expressions represent the *Q<sup>th</sup> PERIOD in the past of the utterance time*. They are time-denoting expressions, which, when combined with a locating preposition ( $\emptyset_{em}$ , *desde* or *até*), form a strict temporal locating adverbial (involving a single location time). In the use at stake, they are a counterpart of English *ago*-expressions (or *before*- $\emptyset$ -expressions), and have the semantic interpretation described in DRS-CR 8.

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<sup>220</sup> The combination *since...ago* is strongly restricted in English, but seems accepted in cases like this, with the intended interpretation (according to my informants). I will return to this issue later on.

<sup>221</sup> I leave for further research the question of assessing up to which extent the relevant *for* and *haver* constructions can really be considered counterparts of each other, given the differences between them (e.g. in the tenses they combine with). For simplicity, I will refer to them as counterparts, in this subchapter.

An interesting issue for further research is the proximity between English *for*-adverbials that have (indefinite) predicates of times or situational predicates as complements – *for three Sundays*, *for three meals* – and those that have predicates of amounts of time as complements – *for three hours* (in Portuguese, the expressions to be compared with these are *há três domingos*, *há três refeições*, and *há três horas*, respectively); the former, expressing “location relative to set of intervals”, seem to behave as a kind of temporal measure phrases, in which the unit of measurement is an interval or an eventuality, rather than an amount of time. In this respect, note that the German operator *lang*, which only seems to combine with indefinite predicates of amounts of time in strict temporal measure phrases (*drei Stunden lang* vs. \**die letzten drei Stunden lang*; cf. chapter 5), can also combine with predicates of times, if they are indefinite (*drei Sonntage lang* vs. \**die letzten drei Sonntage lang*).

Note that, in (408b), the  $Q^{\text{th}}$  interval –  $t_c$  – marks the lower bound of the location time –  $t$  – of the whole sentence, given the presence of *desde* (*since*): [ $\text{beg}(t) \subseteq t_c$ ]. In the following sentence without *desde* (which describes an episodic, rather than an habitual, state-of-affairs), the *haver*-expression has the same interpretation, but identifies the whole location time (the third Sunday in the past of the utterance time):

- (411) O Paulo não foi à igreja *há* três domingos.  
 “Paulo DID NOT GO to the church THERE-IS three Sundays”  
 [Paulo did not go to the church three Sundays *ago*]

Note that I assume here a null locating operator  $\emptyset_{em}$ , which states [ $t = t_c$ ].

Apparently, (411) differs from (408a) merely in the tense of the verb. However, I consider that the *haver*-adverbials contained in these two sentences are semantically different: in (408a), it is a “locating (relative to a set of intervals) adverbial”; in (411), as in (408b), it is a time-denoting expression. This can be easily perceived in the different English counterparts: a *for*-expression for (408a), an *ago*-expression for (411). Interestingly, it can also be perceived, in Portuguese, by the (im)possibility of combination with the redundant element “atrás” (literally “behind”), which, as was said at the beginning of 7.2.1, may co-occur with *haver*-expressions, in certain contexts. Now, this combination is possible in (408a) but not in (408b) and (411), which seems to indicate that *atrás* can only combine with time-denoting *haver*-expressions:

- (408) a’. O Paulo não vai à igreja *há* três domingos (\*atrás).  
 (408) b’. O Paulo não vai à igreja *desde* *há* três domingos (atrás).  
 (411)’ O Paulo não foi à igreja *há* três domingos (atrás).

In order that a more comprehensive view of the constructions under analysis is reached, the following related ones, which seem to involve the same interval as (408a), need to be taken into account:

- (412) O Paulo não {foi / \*vai} à igreja *nos últimos três domingos*.  
 [Paulo {did not go / \*does not go} to the church *on the last three Sundays*]

Portuguese sentences (408a), *o Paulo não vai à igreja há três domingos*, and (412), *o Paulo não foi à igreja nos últimos três domingos*, although involving the same discontinuous period of three Sundays, are clearly different with respect to temporal information. The difference is reflected in the tense of the verb.

Sentence (408a) has a simple present tense (*vai*), although the relevant three-Sunday period does not necessarily abut (or overlap with) the utterance time. In fact, this sentence may be uttered on a Tuesday, for instance (as, for that matter, the English sentences *Paulo hasn’t been to the church for three Sundays now*, or *Paulo hasn’t been to the church for the last three Sundays*). (408a) asserts that the situation of Paulo’s not going to the church on the mentioned Sundays holds at the utterance time (which may not be a Sunday!), and is therefore closer in meaning to the two English sentences given in parentheses in the

previous period, which are built with the perfect<sup>222</sup>. Furthermore, the use of the “presente” clearly bestows a habitual character on sentence (408a).

Conversely, sentence (412), with “pretérito perfeito simples” (*foi*), has no underlying habitual character. This sentence is understood as a mere assertion about the (episodic) absence of Paulo from the church on the relevant three Sundays, and is therefore possibly closer in meaning to the English sentence *Paulo did not go to the church on the last three Sundays*.

In the rest of this subchapter, I will focus on some semantic and pragmatic differences between the constructions with simple *haver* and with *desde haver*, as those in (408). I will also take into account their (at least approximate) English counterparts: constructions with *for*, and with *since...ago*, respectively, as in (410). Two questions in particular will be addressed:

- (i) the neutralisation of the difference between these constructions in structures with predicates of amounts of time (in connection with this issue, the relatively restricted use of English *since...ago* constructions will be discussed);
- (ii) some pragmatic restrictions affecting the use of these constructions.

As was said above, the difference between sentences with “*há* Q PERIODS” and “*desde há* Q PERIODS” of type (408), as well as that between sentences with “*for* Q PERIODS” and “*since* Q PERIODS *ago*” of type (410), lies essentially in the relevance of the intervals in-between the described periods (e.g. Sundays). This difference is not observable in structures with predicates of amounts of time (which are associated with continuous intervals, in these contexts). Thus, the constructions at issue are equivalent, when X-TIME occurs in the context of Q PERIODS:

- (413) a. O Paulo está no hospital *há* dois meses.
- b. O Paulo está no hospital *desde* [*há* dois meses].
- (414) a. Paulo has been in the hospital *for* two months (now).
- b. ?Paulo has been in the hospital *since* [two months ago].

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<sup>222</sup> The contrast between *Paulo hasn't been to the church for three Sundays (now)* and *Paulo hasn't been to the church for the last three Sundays* is similar to the one discussed in chapter 5, apropos parallel structures with predicates of amounts of time (instead of predicates of times, like *Sundays*). As was said then, the sentences in this type of pairs can be equivalent, given that “*for* X-TIME” may be associated with an interval tied to the anchor point (an interpretation that can be made explicit by adding *now*), and therefore convey the same temporal information than “*for the last* X-TIME” – cf. *Paulo hasn't been to the church for three months (now)* / *Paulo hasn't been to the church for the last three months*. The same holds, with the relevant adaptations to pairs of sentences with “*for* Q PERIODS *now*” and “*for the last* Q PERIODS”. A difference to be noticed between structures with X-TIME and Q PERIODS is that, in the latter type (contrary to the former), the relevant interval, represented in schema (409), does not necessarily abut the utterance time (as was said above). For instance, a sentence like *Paulo hasn't been to the church for three Sundays now* may be uttered on a Tuesday, for instance. Nevertheless, this sentence is an assertion about a situation that holds at the utterance time, an effect that seems due to the use of the perfect (cf. Kamp and Reyle's 1993 analysis of the perfect, involving a consequent state that overlaps with the TPpt).

Sentences (413a) and (413b) are equivalent and equally grammatical in Portuguese. The second contains a counterpart of *since* (*desde*) and a counterpart of *ago* (*há*). The first is, with respect to its surface form, identical to the second with omission of the preposition *desde*<sup>223</sup>; on the whole, the first Portuguese sentence has the same meaning as the English sentence (414a), which contains a *for*-construction.

Sentences (414) illustrate a curious fact about English, viz. that the logically admissible combination of *since* and an *ago*-expression with predicates of amounts of time is normally not used and/or accepted. In fact, sentence (414b) is considered odd by most speakers. In order to express the temporal relations at stake, English resorts to a *for*-construction, as in (414a), which, though formally involving a temporal measure phrase, conveys the same information<sup>224</sup>. The oddity of the combination *since...ago* in (414b) is somehow unexpected, given that, once we assume a time-denoting analysis for *ago*-expressions, they are expected to freely combine with temporal locating operators, such as *since* or *until*. And, in fact, the combination *until...ago* is unproblematic in English, as well as in Portuguese for the counterparts of these operators:

- (415) a. Paulo was in the hospital *until* [two months *ago*].
- b. O Paulo esteve no hospital *até* [há dois meses].

The oddity of the combination *since...ago* at stake seems, nevertheless, more a question of use than of strict grammaticality. Searching the British National Corpus, I found the following four records of the combination *since...ago* (and only these, which indicates the rarity of the combination). The first two involve predicates of amounts of time, the third

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<sup>223</sup> I will not discuss here whether sentences like (413a) should be analysed as involving a simple ellipsis of the preposition *desde*, thus being a mere formal variant of (413b). However, two facts at least seem to indicate that this would be an *inadequate analysis*: (a) the above-mentioned non-equivalence of *desde há* and simple *há* constructions when predicates of time (rather than predicates of amounts of time) are present – cf. (408); (b) the fact that the *desde há*, but not the simple *há*, construction can combine with the element *atrás* – cf. (413a'-b') on page 253, repeated below with a predicate of amounts of time instead of *três domingos* (*three Sundays*):

- (i) O Paulo está no hospital *desde há* dois meses (*atrás*).  
“Paulo is in the hospital SINCE THERE-IS two months BEHIND”
- (ii) O Paulo está no hospital *há* dois meses (\**atrás*).  
“Paulo is in the hospital THERE-IS two months BEHIND”

A possible explanation for the contrast above is that the *haver*-expression occurring in these two constructions is different: a time-denoting expression (along the lines described in this chapter), compatible with *atrás*, in (i); a temporal measure-like expression (similar to *durante*-measure adverbials, but deictically/anaphorically dependent), incompatible with *atrás*, in (ii).

<sup>224</sup> As has been abundantly mentioned in the literature, English adverbials of the type *for* X-TIME may (though need not) represent an amount of time characterising an interval connected to the TPpt, that is, they may (though need not) be equivalent to *for the last* X-TIME. One of the interpretations of the sentence *Mary has lived in Amsterdam for three years*, for instance, is that Mary still lives in Amsterdam and this state-of-affairs has been going over the past three years (cf. discussion on the ambiguity of *for*-adverbials in Dowty 1979, Richards 1982, Mittwoch 1988, Abusch 1990, or Kamp and Reyle 1993).

involves a conjunction of a predicate of amounts of time and an object-denoting NP, and the fourth involves a predicate of times (on this last example, cf. footnote 230):

- (416) a. «(...) they've probably been isolated since fourteen thousands years ago (...)»  
 (<bcnDoc id=BDF8H n=081201>)
- b. «With exasperation, he said, 'Since when? Since Christmas?' Doone said stolidly, 'Since ten days ago.'» (<bcnDoc id=BDADY n=Longsh>)
- c. «There had been no boys left to help Jimmy because since five minutes and three hundred pounds ago, three of them had started working for us and a fourth was lying in the toilet presently not working for anybody.»  
 (<bcnDoc id=BDH80 n=Carter>)
- d. «I've been coming to the Manor since I was 10... (...) since three seasons ago I haven't missed a match – I've been to them all.»  
 (<bcnDoc id=BDECN n=Disord>)

There are however, cases where the *since...ago* construction appears to be generally accepted (according to my informants). This is the case of (410b), for instance. As far as I can judge from the information I gathered, the accepted cases seem to require the concurrence of two facts:

- (i) the involvement of discontinuous intervals – e.g. Sundays – and the relevance of the periods in-between those intervals (as was said, structures with predicates of amounts of time normally don't occur with *since...ago*);
- (ii) the pertinence of referring to the starting point of the location time via a relatively complex expression “Q PERIODS *ago*”. This fact is quite important (and applies also to the corresponding Portuguese expressions): the use of expressions involving counting of ordered entities, like *three Sundays ago*, seems normally quite restricted, and requires a specific context where the relevant PERIOD is for some reason salient; otherwise a simpler expression involving time measurement, like *three weeks ago*, is clearly preferred.

When these two facts concur, there seems to be no alternative construction to “*since* Q PERIODS *ago*”, which is formed by a single temporal preposition and a time-denoting complement, of the type “P *the last* X-TIME” or “P X-TIME”. The non-existence of such an alternative seems closely connected with the acceptance of the combination *since...ago*<sup>225</sup>.

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<sup>225</sup> In German, the combination of the counterparts of *until* (*bis*) or *since* (*seit*) and *ago* (*vor*) is also possible. However, the combination involving *seit* normally requires the omission of *vor* (a similar construction being used in French – *depuis deux mois*):

- (i) Paulo war *bis* [*vor* zwei Monaten] im Krankenhaus.
- (ii) Paulo ist *seit* [Ø<sub>vor</sub> zwei Monaten] im Krankenhaus.

This fact is not surprising, given that there is a certain redundancy between the two temporal operators: *seit*-adverbials (like their Portuguese and English counterparts) normally represent an interval stretching up the TPpt; *vor* (again, like its Portuguese and English counterparts) indicates that the stated amount of time characterises an interval stretching up to the TPpt (speech time); therefore, if just a predicate of amounts of time is specified as the complement of *seit*, this has to characterise the period immediately preceding the TPpt, thus making the *vor* operator redundant. This seems to be why it can be suppressed in German or French without affecting the interpretation.

Let us look at some illustrative examples, with different aktionsart types:

### I. ATELIC EVENTUALITIES

Observe the following sentence, which describes a simple (continuous) state:

- (417) Paulo has been in Lisbon since three Sundays ago.  
(He arrived from Brazil that day, and initially planned to stay just a couple of hours here.)

The construction with *for* and predicates of amounts of time (or expressions containing them) – (418) – is semantically very close (a possible difference of a few days, depending on when the utterance takes place, being disregarded<sup>226</sup>), but differs in that it does not make the Sunday of arrival salient:

- (418) Paulo has been in Lisbon for (the last) three weeks.

There are of course several alternatives to (417), involving different linguistic strategies.<sup>227</sup> The important fact, however, is that (417) seems to be accepted in the discourse context at stake.

The construction with *for* and predicates of times – (419) – commits the speaker to the presence of Paulo in Lisbon on just the three mentioned Sundays (and may suggest his absence in the intermediate periods), while (417) refers to a continuous stay in Lisbon ever since the mentioned Sunday (i.e. also during the weekdays in-between). The two sentences are thus semantically different:

- (419) Paulo has been in Lisbon for (the last) three Sundays.

The difference between the English sentences (417) and (419) is parallel to that between their Portuguese equivalents:

- (420) a. O Paulo está em Lisboa *desde há* três domingos.  
“Paulo is in Lisbon SINCE THERE-IS three Sundays”  
b. O Paulo está em Lisboa *há* três domingos.  
“Paulo is in Lisbon THERE-IS three Sundays”

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<sup>226</sup> *Paulo has been in Lisbon since three Sundays ago* entails a duration of around two weeks if uttered right after the latest relevant Sunday (i.e. at the beginning of the following Monday), and a duration of around three weeks if uttered on the Sunday following the latest relevant one. Intermediate durations will be involved, if the utterance takes place on any day in-between. For simplicity, I will henceforth ignore these differences and present as equivalent, for all practical purposes, the intervals associated with *since three Sundays ago* and *the last three weeks* (or similar expressions).

<sup>227</sup> For instance:

- (i) Paulo has been in Lisbon for more than three weeks now.  
He arrived from Brazil three Sundays ago...
- (ii) Paulo arrived from Brazil three Sundays ago, and has been here (in Lisbon) since then.
- (iii) Paulo has been in Lisbon since January 15. He arrived from Brazil that day...  
[assuming that January 15 is the third Sunday in the past of the utterance time]

Obviously, the designation of the relevant Sunday with a calendar term, as in (iii), is the simplest strategy.

Sentences describing habitual-like states were already discussed:

- (421) Paulo hasn't been to the church since three Sundays ago.  
(This was the last time the priest saw him.)
- (422) An Ethiopian airplane has been landing in Lisbon since three Sundays ago.  
(This was when the first landing of an airplane from Ethiopia took place in Portugal.)

These cases are very similar to (417), except that the eventualities described are composed by several instances of events (of Paulo not going to the church, or of an Ethiopian airplane landing in Lisbon). The construction with *for* and predicates of amounts of time (or expressions containing them) – (423a) and (424a) – does not make the Sunday when the priest saw Paulo for the last time, or when the airplane first landed in Lisbon, salient; the construction with *for* and predicates of time – (423b) and (424b) – has different truth conditions (as we saw above, with respect to (410)) since it does not involve the periods in-between Sundays:

- (423) a. Paulo hasn't been to the church for (the last) three weeks.  
b. Paulo hasn't been to the church for (the last) three Sundays.
- (424) a. An Ethiopian airplane has been landing in Lisbon for (the last) three weeks.  
b. An Ethiopian airplane has been landing in Lisbon for (the last) three Sundays.

## II. TELIC EVENTUALITIES

Observe the following sentences, which describe either a simple event – (425) – or a sum of events – (426):

- (425) Paulo has got married since three Sundays ago.  
(This was the last time I had news from him, and he was still single then.)
- (426) Thirty weddings have been celebrated in this church since three Sundays ago.  
(This was the day weddings restarted to be celebrated here, after a break of nearly three years.)

So far, I have not mentioned structures with *since...ago* and descriptions of telic eventualities. First, note that the sequence “*since X-TIME ago*” (where X-TIME is a predicate of amounts of time) is odd or disused in combination with descriptions of events, just as it is in combination with descriptions of atelic eventualities. The difference is that, with descriptions of events, the alternative (equivalent) constructions involve prepositions other than *for* (e.g. *within*, *in*, *on* or *during*):

- (427) a. ?Paulo has got married since three weeks ago.  
b. Paulo got married {within / in / during} the last three weeks.
- (428) a. ?Thirty weddings were celebrated in this church since three weeks ago.  
b. Thirty weddings were celebrated in this church {within / in / during} the last three weeks.



With respect to the structures involving predicates of time (“*since* Q PERIODS *ago*”), facts are similar to those observed above in connection with atelic descriptions, namely: constructions (425) and (426) are accepted inasmuch as there is no alternative equivalent strategy which merely resorts to a temporal preposition and a time-denoting expression. In fact: (i) the construction with *within / in / during* and (expressions containing) predicates of amounts of time does not make the mentioned Sunday salient:

- (429) a. Paulo got married {within / in / during} the last three weeks.
- b. Thirty weddings were celebrated in this church {within / in / during} the last three weeks.

(ii) the construction with *within / on / during* and predicates of time has different truth conditions, since it only involves the mentioned three Sundays and not the intervening periods:

- (430) a. Paulo has got married within the last three Sundays.
- b. Thirty weddings have been celebrated in this church {within / on / during} the last three Sundays.

Sentence (430b), for instance, counts only the weddings taking place on the relevant Sundays, while (426) also counts the weddings taking place between these Sundays (furthermore, (426) strongly suggests that weddings could have been celebrated in-between Sundays; if not, (430b) would be a preferable description of the situation).

Sentence (426) has a Portuguese counterpart with *desde há* – (431b). Sentence (425) doesn’t, because *desde* is not used to locate inclusively simple events (a property that will be described in detail in chapter 9) – cf. ungrammaticality of (431a):

- (431) a. \*O Paulo casou desde há três domingos (atrás).
- b. Celebraram-se trinta casamentos nesta igreja desde há três domingos (atrás).

The English sentences with predicates of amounts of time (427)-(428) all have grammatical Portuguese counterparts, with the exception of (427a) ((432a) being ungrammatical for the same reasons as (431a)):

- (432) a. \*O Paulo casou desde há três semanas (atrás).
- b. O Paulo casou nas últimas três semanas.
- (433) a. Celebraram-se trinta casamentos nesta igreja desde há três semanas (atrás).
- b. Celebraram-se trinta casamentos nesta igreja {em / durante} as últimas três semanas.

In sum, we can conclude that the combination *since...ago* in English appears to be accepted in contexts where there is no simple alternative construction (with resort to a single temporal preposition and a time-denoting expression) to express the same temporal relations. As for Portuguese, the *desde...há* construction is used more freely than *since...ago* in English. In particular, it is used with predicates of amounts of time – cf. (413b) (vs. (414b)), and (433a) (vs. (428a)). Apart from this difference in distribution,

Portuguese *desde...há* and English *since...ago* constructions behave similarly in that: (i) when discontinuous intervals are involved, the intermediate periods are in principle relevant (if not, alternative constructions are preferred – e.g. for atelics, construction with simple *há* in Portuguese, and *for* in English); (ii) there must be a reason for choosing the relatively more complex time-denoting expression with Q PERIODS, rather than a simpler one with X-TIME (this reason having to do with the discourse salience of the relevant Q<sup>th</sup> PERIOD).

The observation made above that, in structures with *desde há* and *since...ago*, the intermediate periods between discontinuous intervals are in principle relevant, or else alternative constructions are preferred, brings about the issue of the pragmatic restrictions affecting the use of these constructions. I will focus on cases involving atelic eventualities.

In combination with descriptions of this type of eventualities, we observe that: (i) as said, if the intermediate periods are irrelevant, English uses *for*-constructions, and Portuguese simple *há* constructions, where the *haver*-phrase is a “locating (relative to a set of intervals) adverbial”<sup>228</sup>; (ii) if the intermediate periods are relevant, English uses *since...ago*-constructions, and Portuguese *desde...há*-constructions, where the *haver*-expression is a time-denoting expression.

This difference can be observed in combination with “adverbials of temporal quantification”:

- (434) a. Um avião etíope aterra em Lisboa *todos os dias* desde há três domingos (atrás).
- b. \*Um avião etíope aterra em Lisboa *todos os dias* há três domingos.
- (435) a. An Ethiopian airplane has been landing in Lisbon *everyday* since three Sundays ago.
- b. \*An Ethiopian airplane has been landing in Lisbon *everyday* for (the last) three Sundays.

It can also be observed in combination with descriptions of eventualities that normally only take place in the type of periods described (via temporal or situational complements) in the complement of *há* / *ago*:

- (436) a. O Paulo não come peixe { ?desde há / há } cinco refeições.
- b. Paulo hasn’t eaten fish { ?since five meals ago / for five meals }.
- vs. (437) a. O Paulo não come pão { desde há / há } cinco refeições.
- b. Paulo hasn’t eaten bread { since five meals ago / for five meals }.

Normally, people only eat fish at meals, but they can eat bread during meals or in-between meals. Therefore, in (436), the constructions with simple *há* and *for*, which pick up just meals, seem preferred to the constructions with *desde há* and *since...ago*. This is obviously a pragmatic restriction: were the assumptions about eating fish different, so would the

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<sup>228</sup> The use of *desde...há* in structures where the intermediate periods are irrelevant does not seem to be completely rejected. The form with simple *há* is, however, clearly preferred in these contexts.

acceptability of the sentences. In accordance with what has been said up to now, the two possibilities in (437) are not equivalent: the constructions with simple *há* and *for* only involve bread-eating during the mentioned meals (nothing being asserted with respect to what happened in-between those meals); conversely, the constructions with *desde...há* and *since...ago* make an assertion about the whole interval covering the relevant meals and the intermediate periods<sup>229</sup>. Observe also the following examples:

- (438) a. Este partido anda a eger apenas dois deputados {?desde há / há} cinco eleições.
- b. This party has been electing only two MPs {?since five election ago / for five elections}.
- (439) a. A posição dos advérbios temporais é o tema favorito do Paulo.  
           {?Desde há / há} não sei quantos artigos que não escreve sobre outra coisa.
- b. The position of time adverbs is Paulo's favourite subject. He hasn't written about anything else {?since I don't know how many papers ago / for I don't know how many papers}.

Once we assume the normal irrelevance of the periods between elections, or between papers, in the sentences above, the oddity of *since...ago* and *desde...há* is predicted<sup>230</sup>.

The main motivation for this subsection was to isolate the case where Portuguese *haver*-expressions do not behave as time-denoting expressions (as opposed to those analysed in subsections 7.1 and 7.2). In brief terms, this occurs essentially in structures (i) with a description of habitual-like states (with tense forms expressing overlapping with the TPpt, as “presente” or “pretérito imperfeito”<sup>231</sup>), whose composing sub-eventualities occur typically in the periods described in the complement of *haver*, and (ii) without an explicit preposition (like *desde*) – e.g. (408a), (420b), and (436)-(439) without *desde*. It also occurs in structures with predicates of amounts of time and atelic eventualities, like (413a), if we assume that these constructions do not involve ellipsis of *desde* (cf. fn. 223).

Note, finally, that no formal analysis of the structures with locating (relative to set of intervals) *haver*-phrases was provided. In fact, these structures (with habitual-like states) pose specific problems, whose study is beyond the scope of the present dissertation. I will, however, briefly mention an interesting fact, to be taken into account in the formal analysis. Let us consider the following sentences:

<sup>229</sup> Some difficulty in coming up with a context where the sentence (437) with *five meals ago* sounds completely natural arises from the fact that this expression is normally not used as a meal-description, other simpler forms, like *Friday's lunch*, being much easier to process.

<sup>230</sup> This seems more a question of use than of strict grammaticality. Sentence (416d), of the BCN, illustrates a context where a *for* – rather than a *since...ago* – construction would be expected.

<sup>231</sup> The difference between *o Paulo não vai à igreja HÁ três domingos* and *o Paulo não vai à igreja DESDE HÁ três domingos* (with “presente”, *vai*) is the same as between *o Paulo não ia à igreja HÁ três domingos* and *o Paulo não ia à igreja DESDE HÁ três domingos* (with “pretérito imperfeito”, *ia*).

- (440) a. Um avião etíope aterra neste aeroporto *há* três domingos.  
 [An Ethiopian airplane has been landing at this airport *for* three Sundays (now)]
- b. Um avião etíope aterra neste aeroporto *desde* *há* três domingos.  
 [An Ethiopian airplane has been landing at this airport *since* three Sundays *ago*]

Let us assume that the utterance takes place on a Sunday. For sentence (440a), if a landing (i.e. an instance of the eventualities composing the habit) has taken place on that Sunday, it counts as one of the three mentioned; if no landing has taken place, it does not count. The following sequences (for which an utterance on a Sunday shall be considered) illustrate this fact:

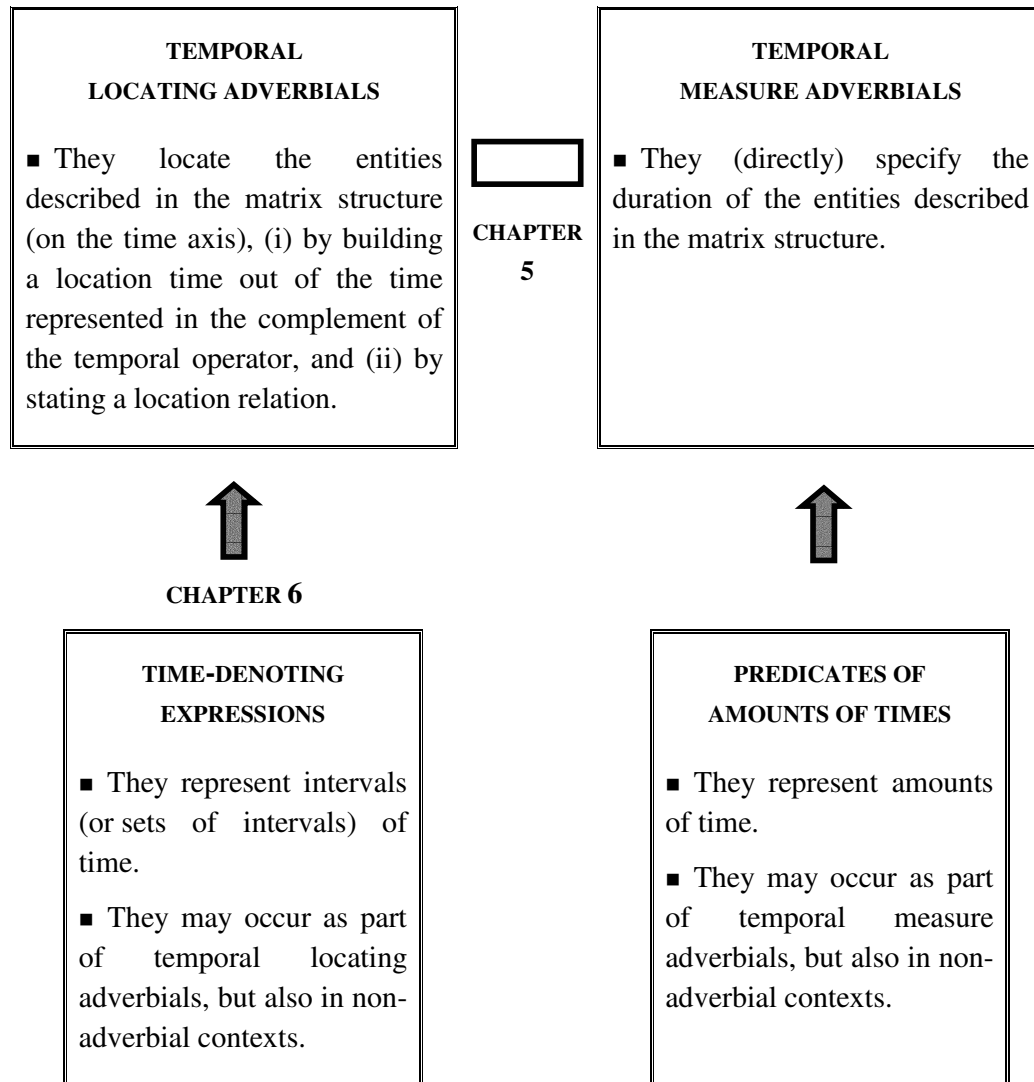
- (441) Um avião etíope aterra neste aeroporto *há* três domingos.  
 [An Ethiopian airplane has been landing at this airport *for* three Sundays (now)]
- a. ...Vamos ver se hoje também aterra e no mesmo sítio das outras três vezes.  
 [...Let us see if it also lands today, and at the same place as the other three times]
- b. ...Hoje chegou mais cedo que das outras duas vezes.  
 [...Today it arrived sooner than the other two times]

In this aspect, sentence (440a) differs from (440b), where the general consensus among speakers (despite some hesitations) seems to be that, irrespective of whether any landing occurred on the Sunday of utterance or not, it does not count as one of the three mentioned ones (cf. formalisation in DRS-CR 8, in the previous section, and the observations made before the presentation of that rule).

This chapter, whose content is relatively marginal within Part II, ends the part of the dissertation where I tried to clarify the concept of temporal locating adverbial, distinguishing it from other closely related classes of temporal expressions. Let us now briefly state some conclusions.

## Conclusions to Part II

In this part of the dissertation, four types of temporal expressions were specially considered. The relations between them are expressed in the following schema:



*Figure 4. Boundaries between temporal location, temporal measurement and temporal reference*

I concentrated on the issues concerning temporal location adverbials, that is, the dividing line (i) between temporal locating adverbials and temporal measure adverbials, on one hand, and (ii) between temporal locating adverbials and time-denoting expressions, on the other hand<sup>232</sup>.

Two disputable cases involving the first dividing line were discussed (in chapter 5), taking into account their analysis in the literature: (i) adverbials containing bare predicates of amounts of time – *durante três horas / for three hours* – or combinations of predicates of amounts of time with other expressions – *durante as últimas três horas / for the last three years*; (ii) adverbials that do not contain predicates of amounts of time, but state that a given situation occurs all through a given stretch of the time axis – *das duas às três / from 2 to 3 p.m., até segunda-feira / until Monday*. The conclusion was that except for adverbials formed exclusively by a combination of a preposition and a bare predicate of amounts of time, as {*durante / em*} *três horas* / {*for / in*} *three hours*, all the other phrases analysed in chapter 5 are better categorised as temporal locating adverbials. I advocated that the information about the duration of the located eventuality that (in some cases) these phrases also convey should be taken as an inference, derived from the mode of location involved. The inferential pattern associated with the durative location (of atelic eventualities) is particularly important for the cases considered in the literature as “ambivalent adverbials”:

$$(442) \quad [t \subseteq \text{ev}] \quad \rightarrow \quad [\text{dur}(\text{ev}) \geq \text{dur}(t)]$$

(durative location)                      (inference about the duration of **ev**)

I assumed that, in the structures analysed, predicates of amounts of time (except the bare ones) were part of a complex expression qualifying (as a whole) as a time denoting expression – e.g. *the last three hours, the three years Paulo stayed at the airport, those three hours*, etc. Consequently, the dividing line between temporal locating adverbials and temporal measure adverbials appears to parallel the one that separates time-denoting expressions from predicate of amounts of time, which means that a combination of a

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<sup>232</sup> With respect to the boundary between predicates of amounts of time and temporal measure phrases, notice the possible use of the former (contrary to the latter) as:

- A. arguments of temporal predicates that refer to amounts of times, such as *muito tempo / a long time, uma eternidade / an eternity*, etc.
  - (i) *Uma hora é muito tempo (para ficar aqui à tua espera)!*  
*One hour is a long time (to stay here waiting for you)!*
- B. arguments of the verb *ser / to be*, in equative constructions where the other member of the equation is a predicate of amounts of time:
  - (ii) *24 horas é o tempo que a Terra leva a dar uma volta completa em torno do Sol.*  
*24 hours is the time the Earth takes to complete a circle around the Sun.*
- C. complements of verbal predicates like *passar / pass*, or *decorrer / elapse*:
  - (iii) *Três horas passam depressa.*  
*Three hours pass quickly.*
  - (iv) *Decorreram três horas e nada aconteceu.*  
*Three hours elapsed and nothing happened.*

temporal (locating) operator – *durante / for, em / in, até / until*, etc. – with a time-denoting expression forms a temporal locating adverbial, whereas a combination of a temporal (measuring) operator – *durante / for, em / in* – with a predicate of amounts of time forms a temporal measure adverbial.

The second dividing line was discussed, in chapter 6, in connection with a set of expressions that apparently have a double categorial status, namely: expressions that may occur with exactly the same superficial form both in adverbial contexts typical of temporal locating adverbials, and in argumental positions characteristic of time-denoting expressions. These include simple forms like *agora / now, então / then* or *amanhã / tomorrow*, as well as relatively more complex phrases containing a temporal operator like *antes / before, depois / after, entre / between, quando / when, há / ago*, or *de...a / from*. I concluded that the most economic and perspicuous classification of these phrases is the one that puts them (in all cases) in the category of (complex) time-denoting expressions. This categorisation involves postulating a null temporal locating operator with a value close to that of *em / {in / on / at}* for the contexts in which such phrases occur in adverbial position. As a consequence of this analysis, the set of truly temporal locating operators ends up strongly reduced.





## Part III

### Modes of temporal location

It has become clear that adverbial temporal location constitutes a structured conceptual domain. In this last part of the dissertation, I will try to characterise the relevant structure in terms of the notion **mode of temporal location**. The main focus will be on the location of eventualities, which involves a wider variety of relations than the location of intervals, although the latter will also be taken into consideration.

In chapter 8, I will try to show that a more fine-grained typology of temporal (location) relations than the one normally used in the literature is required in order to characterise the semantic contribution of temporal locating adverbials. I will identify different location modes (and submodes) associated with temporal adverbials, propose a taxonomy for them, and try to highlight the main factors responsible for variation in this area. In particular, I will consider the essential role of *aktionsart*, but also that of causality, quantification and, at a different level, (in)exactness. I must stress that this chapter has a relatively subsidiary status, inasmuch as many issues raised here are not treated in a sufficiently elaborate and deep manner. As a matter of fact, the chapter is mainly aimed at providing a general schematic overview of temporal location relations, as it emerges from the relatively minute analysis of temporal adverbials in previous chapters.

The main contribution of this third part will be that of chapter 9. This chapter focuses on some distinguished cases of adverbial temporal location of events (accomplishments and achievements), which demonstrate the importance of **event summation** in the semantic interpretation – and also in the distribution – of temporal adverbials. These distinguished cases are illustrated by sentences like

- (443) a. O Paulo casou *três vezes* desde 1980.  
Paulo has got married *three times* since 1980.  
b. O Paulo escreveu *três livros* em 1980.  
Paulo wrote *three books* in 1980.

where the event described in the main clause may be conceived of as a complex event composed of three (summed) subevents of Paulo getting married, or of Paulo writing a book, respectively. I will show that the role of the adverbials in these sentences appears not to be of the same nature as in simpler cases like:

- (444) O Paulo casou em 1980  
Paulo got married in 1980.

In (443), their role is to provide a temporal frame for the above-mentioned summation operation, assuring that the non-atomic event described in the main clause is the

**supremum** of the set of relevant sub-events that occur within the frame. Metaphorically speaking, the location time associated with these adverbials has to be “fully scanned” in order to gather all the relevant sub-events happening within it, whence the proposed designation of **full-scanning inclusive location**.

The relevance of distinguishing between the two modes of event location exemplified in (443) and (444) becomes evident once we realise that it is reflected in the distribution of time adverbials, some being compatible with one type of location, but not with the other. The case I will explore in more detail is that of Portuguese *desde*, which behaves like its Romance counterparts, and unlike English *since*, in that it seems only compatible with the full-scanning location. The main goal of chapter 9 will be to compute the semantics of this subclass of temporal locating adverbials, by resorting to a Boolean summation operation over event discourse referents, and to identify the triggers that allow the application of such operation.

## Chapter 8

### Modes of temporal location: general overview

Eventualities – or located entities, in general – and location times may be related in different ways. The following assertion by Kamp and Reyle (1993), formulated about the possible relations between intervals of time, applies in like manner to the diversity of temporal location relations: “precisely how many relations (...) one wants to distinguish depends on the purpose to which one wants to put these relations” (p. 668, fn. 76). Given that my focus is the semantic contribution of temporal locating adverbials, I will concentrate on establishing only the distinctions that seem relevant to tackle the temporal adverbial data. In general, I will try to show that a relatively **more fine-grained typology of temporal relations** than the one usually considered in the literature seems required, as soon as the contribution of the different types of time adverbials is seriously taken into account.

In this dissertation, I dedicate special attention to two modes of temporal location, i.e. two types of relation between located entities and location times. One of these modes, and a subform of the other, have not been, to my knowledge, described or elaborated upon in the literature. A first mode, that I will term **full-scanning inclusive location**, will only briefly be presented here, since it will make the topic of the next chapter. As said in the introduction to Part III, it involves the location of non-atomic entities – sums of events (**E**) or intervals (**T**) – with a maximality requirement with respect to the location time **t** (that is, that the located entities – **E** or **T** – are the supremum of the relevant events/times included in the location time):

- (445) a. O Paulo escreveu três livros desde 1980.  
Paulo has written three books since 1980.
- b. (todos os) fins-de-semana desde o início do ano  
(all the) weekends since the beginning of the year

I will particularly insist on the need to distinguish this location mode from the **simple inclusive location**, occurring in sentences like (446), which merely asserts the inclusion of an event (somewhere) within a time frame:

- (446) O Paulo escreveu este livro em 1980.  
Paulo wrote this book in 1980.

Another form of location to which I will pay some attention – though I will only partially explore it (in sections 8.1.2 and 8.2), leaving a more extensive analysis for further research – is what I term **derived durative location**. It involves expressions that are basic descriptions of achievements, but which, (arguably) by mere virtue of the presence of a temporal adverbial, are associated with a consequent state and are hence interpreted as extended eventualities. In other words, in the contexts at stake, temporal adverbials seem to function as aktionsart triggers, locating not only the achievement, which is directly

described in the matrix structure, but also its consequent state. With respect to this location mode, I will concentrate essentially on a subform which involves causal relations, and focus on Portuguese (given that, in the relevant English contexts, the specific contribution of the time adverbial is not so easily perceived, due to the occurrence of the perfect, and its normal association with consequent states):

- (447) O Paulo perdeu o medo de andar de avião desde que atravessou  
o Atlântico sem problemas.<sup>233</sup>  
[Paulo has lost his fear of flying since he crossed the Atlantic  
without problems]

Losing one's fear of flying may be conceived of as a punctual eventuality. In the sentence above, the consequent state of such an achievement, involving Paulo (i.e. his no longer having the fear of flying) is assumed to hold at the utterance time. Now, this Portuguese sentence has a "pretérito perfeito simples", a simple tense form which, contrary to the compound ones (having *ter* as an auxiliary), is normally assumed not to involve reference to a consequent state. If we take this analysis of the Portuguese simple tense, then the association of the basic achievement (described in the matrix structure) with a consequent state seems due merely to the *desde*-adverbial, which introduces an extended location time (as we will see later on, simple inclusion of an achievement in an extended interval is incompatible with Portuguese *desde*). Consequently, the temporal adverbial appears to play two distinct roles in sentence (447): on the one hand, it triggers a kind of aktionsart shift, by associating the described punctual eventuality with a consequent state, and, on the other hand, it locates this consequent state in a durative-like way.

An important issue that will pervade this chapter is the interaction between the domain of **temporal location**, as expressed by time adverbials, and other linguistic domains that, more or less directly, affect temporal location conditions. Among them, **quantification** (particularly emphasised in chapter 9) and **causality**, besides the all but ubiquitous **aktionsart**, stand out as the most important in the phenomena to be explored here.

Before enumerating and briefly describing the different relations that seem relevant to account for the semantic contribution of temporal locating adverbials, let us briefly recall what was said in section 4.2.2 with respect to the sources of the temporal location information.

Kamp and Reyle (1993) distinguish essentially between two modes of temporal location:  $[e \subseteq t]$  (for events) and  $[s \circ t]$  (for states). Since these conditions can be determined merely by the aktionsart of the matrix structure, no great disadvantages seem to result from dissociating them (or rather, their insertion in the DRS) from the time adverbial node, as is done by Kamp and Reyle (cf. pp. 543 and 554). In this dissertation, more temporal relations will be taken into consideration, some of which are subtypes of the two mentioned above. The choice of these relations is closely dependent not only on the aktionsart of the matrix structure, but also on the temporal preposition. Consequently, it

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<sup>233</sup> This is a case of *derived semi-durative location* (rather of *derived strict durative location*), as we will see in section 8.2 (cf. tables 11 and 11' below).

seems simpler to introduce the location condition in the DRS *only* when processing the temporal operator node (with sensitivity to the aktionsart of the sister node, as in the rule proposed in 4.2.2.5). In general then, as said in Part II, I take the semantic contribution of temporal locating operators to be twofold: (i) they “build” the location time  $t$  out of the information conveyed by their complements –  $R(t, t_c)$  – and, furthermore, (ii) they determine the relation between this interval and the entity  $\pi$  (an eventuality, or an interval) described in the matrix structure –  $R(\pi, t)$ .

### 8.1. Sketch of a typology of temporal location relations

In order to account for the temporal adverbial data to be presented, it seems necessary to distinguish the location relations in Tables 11 and 11' below. These relations vary crucially with the aktionsart of the located eventuality ( $ev$ ), three types of eventualities appearing to be relevant: (i) atelic, including both (basic and derived) states and activities; (ii) telic, i.e. accomplishments and achievements (for which I will often use the cover term “events”); (iii) a subtype of achievements (to be identified) which are associated with a consequent state merely as a result of their combination with the temporal locating adverbial. Intervals, as bounded entities, are temporally located like telic eventualities. I will henceforth, as a rule, ignore them.

*Table 11. Modes of temporal location of eventualities*

aktionsart of $ev$	modes of temporal location	
	DRS-conditions	designation
atelic	$[t \circ ev]$	<i>neutral durative / non-durative location</i>
	$[t \subseteq ev]$	<i>(strict) durative location</i>
telic $\rightarrow$ atelic	$[\text{beg}(t) = \text{loc}(ev)] \wedge [\text{end}(t) \circ s]$ (where $[ev \supset \subset s]$ ) therefore: $[t \subseteq ev \oplus s]$	<i>derived (strict) durative location</i>
telic	$[ev \subseteq t]$	<i>simple inclusive location</i>
	$[ev = \Sigma ev' [\dots [ev' \subseteq t] \dots]_{K1}]$ therefore: $[ev \subseteq t]$	<i>full-scanning inclusive location</i>

As will be observed in more detail in section 8.2, the existence of causal relations between main and subordinate clauses *may* affect the DRS-conditions applicable, in the cases of the durative and the derived durative location. To account for these cases we need to add the following two (sub)modes of temporal location (applying in contexts where the relation  $[\text{cause}(ev', ev)]$  holds;  $ev'$ , the eventuality represented in the subordinate clause, marks the location time via a condition like  $[t = \text{loc}(ev')]$ , or similar):

**Table 11'. Two submodes of temporal location of eventualities**

aktionsart of <b>ev</b>	(sub)modes of temporal location	
	DRS-conditions	designation
atelic	$[\text{beg}(t) <_{\text{close}} \text{ev}]^{234} \wedge [\text{end}(t) \circ \text{ev}]$	<i>semi-durative location</i>
telic $\rightarrow$ atelic	$[\text{beg}(t) <_{\text{close}} \text{ev}] \wedge [\text{end}(t) \circ s] \text{ (where } [\text{ev} \supset \subset s])$	<i>derived semi-durative location</i>

Of course, the location condition introduced by the time adverbial can be formulated in such a way as to cover the *strict* durative and the *semi*-durative cases in a single formula<sup>235</sup>. This would keep the insertion of location conditions – at the level of the locating PP – independent from causal values, which may stem from different components of the sentence (or be determined only at the discourse level). The underspecified (strict/semi-) durative location condition could then be further specified in the context. For simplicity, I will keep the two conditions apart, and treat the special cases of Table 11' in a separate section (8.2).

### 8.1.1. Temporal location of atelic eventualities

As noted in chapter 4, in what concerns the temporal location of atelic eventualities (states and activities), two distinctions seem crucial:

(448)  $[t \circ \text{ev}]$

***neutral durative / non-durative location (of atelic eventualities)***

The located eventuality overlaps the location time, i.e. at least part of it (but possibly the whole of it) occurs within this interval.

(449)  $[t \subseteq \text{ev}]$

***strict durative location (of atelic eventualities)***

The eventuality occurs all through the location time, i.e. it occurs in every subinterval of it (up to a certain level of granularity, for activities).

(449) is a restricted version of (448). The choice between these two conditions appears to be determined mainly by the temporal operator. For instance, Portuguese *desde* and English *until* “select” (449), whereas, quite interestingly, the English counterpart of the first – *since* – and the Portuguese counterpart of the latter – *até* – seem to “select” (448); Portuguese *em*, *durante* and *enquanto*, and their approximate English counterparts *in/on*, *during* and *while* also “select” (448):

<sup>234</sup> On the definition of close anteriority (“ $<_{\text{close}}$ ”), cf. (474), in section 8.2.

<sup>235</sup> For instance, with a simple disjunction:

(i)  $[[t \subseteq \text{ev}] \vee [[\text{beg}(t) <_{\text{close}} \text{ev}] \wedge [\text{end}(t) \circ \text{ev}]]]$  ***(strict/semi-) durative location***  
 $\Leftrightarrow [[[\text{beg}(t) \circ \text{ev}] \vee [\text{beg}(t) <_{\text{close}} \text{ev}]] \wedge [\text{end}(t) \circ \text{ev}]]$   
(ii)  $[[[\text{beg}(t) = \text{loc}(\text{ev})] \vee [\text{beg}(t) <_{\text{close}} \text{ev}]] \wedge [\text{end}(t) \circ s]]$  ***derived (strict/semi-)durative location***

- (450) a. O Paulo está em Paris desde ontem. [only durative]  
 “Paulo is in Paris since yesterday”  
 Paulo has been in Paris since yesterday. [durative / non-durative]
- b. Os computadores estarão disponíveis *até* ao final da próxima semana.  
 [durative / non-durative<sup>236</sup>]  
 The computers will be available *until* the end of the next week.  
 [only durative]
- (451) a. O Paulo esteve em Paris *em* 1980.  
 Paulo was in Paris *in* 1980. } [durative / non-durative]
- b. O Paulo esteve em Paris *durante* as férias.  
 Paulo was in Paris *during* his holidays. }

Another (theoretically) possible restricted version of (448) is as follows:

- (452)  $[t \circ ev] \wedge [\neg[t \subseteq ev]]$   
***non-durative location (of atelic eventualities)***  
 The eventuality occurs only through part of the location time.

As noted in chapter 4, there seems to be a striking asymmetry in the linguistic marking of the durative – (449) – and the non-durative – (452) – location of atelic eventualities: whereas the first can be imposed by the mere use of some locating prepositions (e.g. Portuguese *desde* or English *until*, as in (450)), no Portuguese or English prepositional operator appears to determine necessarily the second. Quite often, what takes place is a context-selection of the relevant reading, that is, in a sentence with an operator that merely determines the relation (448), the discourse or situational context may impose either a durative or non-durative interpretation – cf. the following examples, already given in 4.2.1.2 (which illustrate a coerced non-durative interpretation resulting from an explicit statement, in (453a), or from pragmatic factors, in (453b)):

- (453) a. O Paulo viveu em Paris na década de 40, mas só depois da guerra.  
 Paulo lived in Paris in the forties, but only after the war.
- b. O faraó Tutankhamon viveu no segundo milénio antes de Cristo.  
 Pharaoh Tutankhamon lived in the second millennium BC.  
 (unfortunately or not, no human life can last that long!)

---

<sup>236</sup> The non-durative reading of this Portuguese sentence involves inclusion of the *beginning of the state* in the location time ( $[beg(ev) \subseteq t]$ ), and has possibly to be treated with resort to a more complex formula than (448), namely by invoking aktionsart shift. The English preposition that more closely translates this value of *até* is *by*:

- (i) The computers will be available *by* the end of next week.

This (sometimes called) “ingressive reading” of *até*-adverbials is much more restricted than the durative one – cf. (ii) below – but I will not try to assess here the linguistic factors that condition it:

- (ii) O Paulo permanecerá em Paris até domingo. [durative / \*non-durative]  
 “Paulo will stay in Paris until/by next Sunday”

The non-durative location (of atelic eventualities) has different subforms, whose distinction may be relevant in certain contexts (for instance, in cases involving inferences about duration based on the temporal location, as those analysed in chapter 5<sup>237</sup>). Again, these subforms apparently can only be made explicit by auxiliary means (and not directly via a locating operator):

(452) a.  $[ev \subset t]$

*properly inclusive location (of atelic eventualities)*

The eventuality is properly included in the location time.

a'. O Paulo viveu em Paris em 1980, mas só no Verão.

Paulo lived in Paris in 1980, but only in the summer.

b.  $[t \circ ev] \wedge [\neg[t \subseteq ev]] \wedge [\neg[ev \subset t]]$

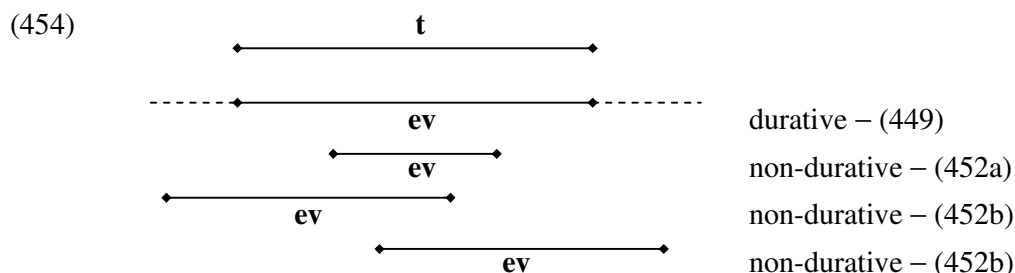
*non-properly inclusive non-durative location (of atelic eventualities)*

The eventuality overlaps just one of the boundaries of the location time, i.e. it either (i) starts before the lower bound (and ends before the upper bound), or (ii) ends after the upper bound (and starts after the lower bound).

b'. O Paulo viveu em Paris em 1980; mudou-se para lá em Fevereiro desse ano e só regressou a Lisboa catorze meses mais tarde.

Paulo lived in Amsterdam in 1980; he moved there in February that year and returned to Lisbon only fourteen months later.

Schematically:



### 8.1.2. Temporal location of telic eventualities associated with consequent states

As said above apropos sentence (447), an achievement can be associated with a consequent state (and both be temporally located) as a result (arguably) of its combination with a locating adverbial. Therefore, a theoretically possible mode of location can be formulated as follows:

<sup>237</sup> Cf. (i) O Paulo esteve em Paris durante os seus dois meses de férias.

Paulo was in Paris during the two months of his holidays.

In the durative reading, it can be inferred that Paulo's stay in Paris was at least two months long; in the properly inclusive (non-durative) reading, it can be inferred that his stay was shorter than two months; otherwise, nothing can be inferred about the extent of that stay.



- (455)  $[\text{beg}(t) = \text{loc}(ev)] \wedge [\text{end}(t) \circ s]$  (where  $[ev \supset \subset s]$ ), whence:  $[t \subseteq ev \oplus s]$   
***derived strict durative location***

An achievement plus an associated consequent state fill the whole location time.

This mode of location has the following description: the eventuality represented in the matrix structure (**ev**) is of the type achievement, and a consequent state (**s**) is associated with it as a direct result of the use of some temporal locating adverbial<sup>238</sup>; in other words, the adverbial is the trigger of an aktionsart shift of the achievement (which occurs with its normal punctual value in sentences without the adverbial); temporal location involves both eventualities, the telic (achievement) and the atelic (consequent state), which is why this location mode is considered in a separate group.

Now, I did not find indisputably grammatical instances of this mode of location, exactly as stated in (455). However, there are at least two “variants” of it which have utterly grammatical instances: one, illustrated in (447) above, involves a causal relation between the located and the locating eventuality and therefore the condition  $[\text{beg}(t) <_{\text{close}} ev]$  instead of  $[\text{beg}(t) = \text{loc}(ev)]$ ; the other, illustrated in (456) below, involves a consequent state that *is intended to hold* (rather than *actually holding*) in the manner described in (455), for which reason conditions (455) can apply only with the necessary adaptations to encode this (possibly intensional) intention component. The former variant will not be treated until we reach section 8.2. The latter one will be considered here, and the structures which instantiate it will, furthermore, be compared with others also involving consequent states of achievements, but a different temporal operation: measurement rather than location.

Consider the following sentences:

- (456) Ele emprestou-me o livro até segunda-feira.  
 He lent me the book until Monday. (Mittwoch 1980: 220)

*Até / until* adverbials define a location time that stretches between the time nailed down by their complement (the mentioned Monday, here) and some contextually determined point in its past. Now, these sentences do not assert that the lending-achievement occurred *anywhere* within that location time, i.e. they do not have a normal inclusive reading:  $[ev \subseteq t]$ <sup>239</sup>. Rather, they mean that the lending took place at a given point before the mentioned Monday (this point marking the beginning of the location time), and its consequent state – the speaker being in possession of the book – *is intended to hold* until that Monday. This intentional component is quite consequential. Notice that, as Mittwoch (1980) stresses (for English), the following sentences are not contradictory:

- (457) He lent me the book until Monday but I gave it back on Sunday.  
 Ele emprestou-me o livro até segunda-feira, mas eu devolvi-lho no domingo.

<sup>238</sup> Only structures where the insertion of a (consequent) state discourse referent is directly associated with the temporal locating adverbial will be regarded as instantiating this mode of location.

<sup>239</sup> In fact, the Portuguese sentence can have this inclusive reading (though it is clearly not prominent), if an appropriate context is given. I will ignore it here.

The interpretation of (456) accords with the conditions (455), though obviously what (455) lacks is the codification of the *intentional* rather than *actual* character of  $s^{240}$ . Note that, under this analysis, the use of English *until*, which is normally incompatible with non-durative readings, is not exceptional in (456).

In general, sentences with *até* (and also with *until*, as I infer from the data commented in the literature) are considered odd (though in varying degrees) in the reading where the “actual consequent state” of an achievement rather than the “intended one” are the object of location. I will return to this issue below.

Sentences (456), including a temporal locating adverbial, are comparable with the following ones, which include a temporal measure phrase<sup>241</sup>:

- (458) a. Ele emprestou-me o livro {por / durante}<sup>242</sup> duas semanas.  
He lent me the book for two weeks. (Mittwoch 1980: 220)  
b. O xerife de Nottingham encarcerou o Robin Hood {por/durante} quatro anos.  
The sheriff of Nottingham jailed Robin Hood for four years. (Binnick 1969)

These sentences may also be interpreted as involving addition of an “intended consequent state” to the described achievement, though the operation affecting this state varies with respect to (456): it is measurement rather than location. In fact, the *for*-phrases of (458) can quantify the time that the consequent state was *intended to last* on the part of some Agent (the lending or jailing ones here), rather than what it *actually lasted*. Observe the following non-contradictory statements:

- (459) O xerife de Nottingham encarcerou o Robin Hood {por / ??durante}  
quatro anos, mas ele só ficou preso três dias.  
The sheriff of Nottingham jailed Robin Hood for four years  
but he stayed in jail only three days. (cf. Hitzeman 1993: 17)

<sup>240</sup> The following two facts would still have to be taken into account in the formal analysis:

1. The *until* / *até* phrase does not seem to occur at the S'-level but rather within the VP (as common locators do):
 

(i) I met Paulo on Friday. He lent me this book until Monday. Encontrei o Paulo na sexta-feira. Ele emprestou-me este livro até segunda. (ii) *I met Paulo on Friday. Until Monday, he lent me this book. *Encontrei o Paulo na sexta-feira. Até segunda, ele emprestou-me este livro [ungrammatical in the relevant reading] (iii) I met Paulo on Friday. Until Monday, we didn't part. Encontrei o Paulo na sexta-feira. Até segunda, não nos separámos.	}	<i>derived</i> durative reading (with intention value)  <i>basic</i> durative reading
--	---	---
2. The sentence as a whole still works as an achievement-description, and can be located with a frame adverbial (extended, or punctual):
 

(iv) {Yesterday / at seven o'clock on Friday}, Paulo lent me this book until Monday.  
 {Ontem / às sete horas de sexta-feira}, o Paulo emprestou-me este livro até segunda-feira.

<sup>241</sup> *For*-structures like (458) have been studied by many authors: Binnick (1969), McCawley (1971, 1974), Dowty (1979), Mittwoch (1980), Moens and Steedman (1988), Parsons (1990) and Hitzeman (1993), just to mention some.

<sup>242</sup> In Portuguese (like, for that matter, in French or German), two different prepositions – *por* and *durante* – may head the measure phrase. These prepositions differ in distribution (the former being often used for the “intentional reading”), but I will not attempt a definition of their differences here. On this issue, cf. e.g. Garrido (1996).

However, intention does not seem to be a necessary component of *for*-constructions. As Hitzeman (1993) notes, there are felicitous uses of this type of *for*-phrases which do not involve any intention or purpose whatsoever, for instance:

- (460) The hiker lost his way for several hours. (Hitzeman 1993: 15)  
 O caminhante perdeu-se {OK/? por / durante} várias horas.

Therefore, an analysis which associates the relevant punctual eventualities with a “normal” (“non-intentional”) result state seems to be required to handle (at least) some sentences with *for*-phrases (like (460)). Moreover, cases like (458) can be taken as ambiguous, allowing both for an intentional and a non-intentional interpretation – cf. Hitzeman (1993: 18): “Although there is a reading [of the sentence *the sheriff of Nottingham jailed Robin Hood for four years*] in which the *for*-phrase describes the intended duration of the result state, it is important to note that there is another reading which does not involve intention”.

Thus, structures with *for* apparently differ from those with *until* in the acceptability of the “non-intentional reading”<sup>243</sup>. Judgements are particularly subtle and varying in this area, though (at least for Portuguese), and I will not try to further elaborate on the possible differences between *até* / *until* and {*por* / *durante*} / *for*. I just note that the Portuguese example parallel to (460) with *até* is in fact very odd:

- (461) ??\*O caminhante perdeu-se até às cinco horas, altura em que foi  
 reencontrado.  
 “the hiker lost his way until 5, when he was found”

However, there are verbs – e.g. *sair* [go out] – whose “actual consequent state” location (generally?) causes no eyebrow-raising (this being the closest example I could find of a real *derived strict durative location*, as expressed in (455)):

- (462) Até que horas saíste ontem à noite?  
 “until what time did you go out last night?”

Another fundamental issue raised by the constructions at stake (with associated consequent states, regardless of their “actual / intended” status) concerns the fact that only some punctual eventualities can be associated with consequent states that are “confinable” by a time adverbial, i.e. which can be located in a closed frame, or temporally measured. Observe the following examples (where, for the Portuguese sentences with *até*, the possible inclusive reading should be ignored):

- (463) a. O xerife de Nottingham encarcerou o Robin Hood {por / durante}  
 quatro anos.  
 The sheriff of Nottingham jailed Robin Hood for four years.

<sup>243</sup> According to Mittwoch (1980), *until*-phrases are hardly compatible (in this type of structures) with eventualities that do not involve some kind of “volition”: “the occurrence of *until*-durational is (...) very restricted. For verbs that do not denote volitional acts they are impossible” (p. 221). The author expresses the following judgements (*ibid.*: 222):

- (i) <sup>OK</sup>Let’s open the window until dinner time!  
 (ii) ?He opened the window until dinner time.

A similar contrast seems to exist in Portuguese between the counterparts of these sentences:  
<sup>OK</sup>*Vamos abrir a janela até à hora do jantar!* vs. ?*Ele abriu a janela até à hora do jantar.*  
 Judgements among speakers are not unanimous (or firm) in this area, though.

- b. A Gwendolyn levantou a mão {por / ?durante} dez minutos.  
Gwendolyn {raised / ?lifted} her hand for 10 minutes. (Hitzeman 1993: 111)
- c. \*O John reconheceu o Bill {por / durante} dez minutos.  
\*John recognized Bill for 10 minutes. (cf. *ibid.*: 110)
- (464) a. Ele emprestou-me o livro até segunda-feira.  
He lent me the book until Monday.
- b. ??/\*O caminhante perdeu-se até às cinco horas.  
“the hiker lost his way until 5”
- c. \*Ele acordou até às cinco horas.  
\*He woke up until 5. (Mittwoch 1980: 221)
- d. \*Ele partiu a perna até Setembro.  
\*He broke his leg until September.

There are certainly many different ways of trying to account for these differences. Mittwoch (1980), for instance, opts for the strategy of considering different lexical entries for verbs that can occur as punctual and (in combination with e.g. *for*-phrases) as extended:

“verbs like *rent* and *hire* (...) in fact fluctuate between being punctual and state verbs. (...) Hence, (...) [they] must (...) be given a disjunctive dictionary entry” (pp. 225-226).

A treatment resorting to the aktionsart shift coercion (à la Moens 1987) [culmination → consequent state] is suggested, though not adopted, by Hitzeman 1993 (who refers back to Hwang 1992):

«Hwang [1992] suggests (...) that a telic can be coerced into its result state in examples such as (2.22) [*John left the room for a few minutes*]. Moens and Steedman could implement this solution via their transition from “culmination” to “consequent state”» (p. 16).

Hitzeman (1993), inspired by Pustejovsky (1991), proposes to deal with contrasts involving the (un)capacity of *for*-phrases to combine with different telic eventualities by resorting to a different (basic) aktionsart classification of the eventuality-descriptions involved:

“To explain the ability of the *for*-phrase to describe the duration of the result state in [*the sheriff of Nottingham jailed Robin Hood for four years*, and not in *\*Smith & Co. built a bridge for 10 weeks*] (...), I propose that these eventualities are members of different aspectual classes” (p. 23); “I propose that eventualities be separated into classes based on the type of interaction they may felicitously have with a *for*- or *until*-phrase” (p. 108).

With respect to the traditional class of achievements, which is the one particularly relevant here, she makes a partition into two new classes (cf. p. 110):

- (465) a. “culmination” e.g. *recognise Bill (\*for 10 minutes)*
- b. “culmination + interval” e.g. *leave (for an hour)*

Event-descriptions which combine with *for*-adverbials, like *leave*, are not classified as basic (shiftable) instantaneous events, but rather as members of the class “culmination + interval”. When they actually combine with a *for*-phrase, their atelic “portion” (i.e. the “interval” part) is selected: «a *for*-phrase may select for the atelic portion of any eventuality when that portion is in some sense “available”» (*ibid.*: 106-107). In fact, this amounts to a [culmination + interval → interval] (i.e. a “drop-the-culmination”) aktionsart shift.

A thorough assessment of the (dis)advantages of these different approaches would take me too far away from my main trend, and I will have to side-step it. However, I will return to this topic in section 8.2, in order to discuss the construction illustrated in (447), with Portuguese *desde*-adverbials and causal relations. There, I will suggest a formal analysis (cf. footnote 252), which encompasses an [achievement → achievement + consequent state] aktionsart shift, triggered by the locating adverbial.

### 8.1.3. Temporal location of telic eventualities

With respect to the temporal location of telic eventualities, I believe that (at least) the following two modes should be taken into account (to my knowledge, the latter has not been distinguished as a special case in the literature):

- (466) [ev ⊆ t]  
*(simple) inclusive location*

The eventuality occurs (anywhere) within the location time.

- (467) [ev = Σev' [ ... [ev' ⊆ t] ... ]<sub>K1</sub> ] (whence: [ev ⊆ t])  
*full-scanning inclusive location*  
 (i.e. inclusive location associated with a “full-scanning” of the location time)

The (non-atomic) eventuality expressed in the matrix structure is the supremum of the set of eventualities of the described type that occur within the location time.

Note that **ev** is always non-atomic, i.e. **E**, in the notational convention concerning the use of capital and lower case letters that I follow here.

The simple inclusive location occurs whenever the time adverbial sets a temporal frame **t** and no constraint is, in principle, imposed as to the specific part of that frame where the located eventuality **ev** is supposed to fall:

- (468) a. O Paulo visitou o irmão em 1990.  
 Paulo visited his brother in 1990.

There are some distinguished forms of simple inclusive location. One is temporal coincidence between the located eventuality and the location time (which may also happen in the durative location of atelic eventualities):

- (466) a. [loc (ev) = t]  
*co-extensive location*

This limit-case of inclusion occurs when both the located eventuality and the location time are punctual – cf. (469) – but it may also happen with accomplishments and temporally extended intervals. In the latter case, however, this “minimal frame case” cannot be inferred from the mere combination of the located eventuality description and the time adverbial; it has to be made explicit by independent means – cf. (470):

(469) A torre da igreja foi atingida por um raio às duas horas (em ponto).  
The church steeple was struck by lightening at 2.00 (sharp).

(470) O Paulo escreveu esta carta entre as 2.00 e as 2.30.  
Levou exactamente trinta minutos a escrevê-la.  
Paulo wrote this letter between 2.00 and 2.30 p.m.  
It took him exactly thirty minutes to do it.

A second distinguished form of simple inclusive location is proper inclusion. It occurs when the located eventuality is punctual and the location time is non-punctual, as in (466b’):

(466) b. [ev  $\subset$  t]  
*properly inclusive location*  
b’. A Madre Teresa de Calcutá morreu em 1997.  
Mother Theresa of Calcutta died in 1997.

In this dissertation, the two forms of inclusive location (466a-b) will not be represented in the DRSs, since they do not seem relevant to account for any of the problems concerning temporal adverbials that will be addressed here.

Now, it is interesting to notice that not all temporal adverbials are compatible with the simple inclusive location. This seems to be the case with the Portuguese *desde*-phrases (and their Romance counterparts), contrary to the English *since*-phrases:

(471) O Paulo comprou este apartamento {em / \*desde} 1980.  
Paulo {bought this apartment in / has bought this apartment since} 1980.

These Portuguese adverbials are, nevertheless, compatible with descriptions of telic eventualities, provided that what I term a “full-scanning inclusive location” operates:

(472) O Paulo comprou três apartamentos desde 1980.  
Paulo has bought three apartments since 1980.

As I already said, for this type of sentences, it will prove necessary to distinguish between the complex event of Paulo buying three apartments (**ev**), which the matrix clause represents and the *desde*-adverbial locates, and each of the three composing (sub)events of Paulo buying an apartment (**ev’**). It should be noted that, in the Portuguese sentence (472), (i) **ev** corresponds necessarily to the summation of *all ev’* occurring between 1980 and the utterance time (i.e. within **t**), and (ii) this requirement seems to be directly connected with the temporal operator *desde* (cf. (471) vs. (472)). Note also that this interpretation seems to be the most natural one for the English sentence in (472) as well.

The questions raised by these structures will be thoroughly explored in chapter 9. At this point, suffice it to say that the distinction between (466) and its more restricted version (467) is needed to account for the distribution of some temporal adverbials, and will therefore be encoded in the DRSs.

## 8.2. Interaction between causality and (adverbial) temporal location

As can be gathered from the examples given so far, location relations are determined mainly by two factors: (i) the aktionsart of the located eventuality, and (ii) the temporal locating operator. However, other linguistic factors may affect these relations. A most prominent among these is the existence of **causal relations** between located and locating eventualities, i.e. between the eventualities represented in the matrix structure and those represented in the time adverbial, respectively.

A previous point to make in this discussion concerns the impact that causal relations are generally assumed to have in the temporal domain (already briefly discussed in 4.2.3.3):

- (473) If  $\alpha$  causes  $\beta$ , then (the beginning of)  $\alpha$  temporally precedes  $\beta$ .  
 $[\text{cause}(\alpha, \beta)] \rightarrow [\alpha < \beta]$  (stronger version)  
 $[\text{cause}(\alpha, \beta)] \rightarrow [\text{beg}(\alpha) < \beta]$  (weaker version)

A mere relation of temporal precedence seems, however, too unrestricted to account for the temporal implications of causality. In fact, the distance separating  $\alpha$  from  $\beta$  is in principle conditioned by the nature of the eventualities involved (pragmatic considerations playing a crucial role): for instance, if the fact that Mary drinks a glass of milk causes her to throw up, both events have to be separated by a maximum of, say, one or two hours, never by some months; obviously, this does not apply to the causal relation between Mary writing an extraordinary novel and getting a literary prize for it. Apparently, what is needed to account for the temporal relation between causally linked events is a (context-sensitive) notion of *temporal closeness* – that is, the two events must be separated by an interval of duration smaller than  $x$ ,  $x$  being a variable whose value is to be set in the context (in many cases, only vaguely or approximately). I will write this relation of temporal closeness with the symbol “ $<_{\text{close}}$ ”, which has the following (DRT-)definition:

- (474)  $[\alpha <_{\text{close}} \beta] \Leftrightarrow [ [\alpha \supset \supset t' \supset \supset \beta] \wedge [\text{dur}(t') \leq \text{mt}] ]^{244}$   
 (the value of **mt** being contextually determined)

In view of what has been said, I will represent (473) rather as:

- (475) If  $\alpha$  causes  $\beta$ , then (the beginning of)  $\alpha$  closely precedes  $\beta$ .  
 $[\text{cause}(\alpha, \beta)] \rightarrow [\alpha <_{\text{close}} \beta]$  (stronger version)  
 $[\text{cause}(\alpha, \beta)] \rightarrow [\text{beg}(\alpha) <_{\text{close}} \beta]$  (weaker version)

<sup>244</sup> Possibly, the limit-case of temporal adjacency between the two causally linked events, i.e.  $[\alpha \supset \supset \beta]$ , should also be taken into account; cf. examples like:

- (i) O Paulo é órfão de pai e mãe desde que o pai morreu.  
 “Paulo is an orphan of mother and father since that the father died”  
 Paulo has been a parentless child since his father died.

Causality has a particularly significant impact on temporal location expressed by means of time adverbials. This is evident, for instance, in structures that in the absence of causal links would involve either a *strict durative* or a *derived strict durative* location (in accordance with definitions (449) and (455)), but which – because of these links – have a slightly different interpretation – (476) and (477) below (cf. Table 11', on page 274):

- (476)  $[\text{beg}(t) <_{\text{close}} \text{ev}] \wedge [\text{end}(t) \circ \text{ev}]$   
***semi-durative location***  
 The located eventuality occurs through *almost all* (but not all) the location time.
- (476)' O Paulo está maldisposto desde que tomou os comprimidos.  
 “Paulo IS sick since he took the pills”  
 Paulo has been sick since he took the pills.

Given that an interval may separate (and naturally does) Paulo taking the pills from his starting to feel sick, it cannot be the case that  $[t \subseteq \text{ev}]$  (*strict durative* location).

- (477)  $[\text{beg}(t) <_{\text{close}} \text{ev}] \wedge [\text{end}(t) \circ s]$  (where  $[\text{ev} \supset \subset s]$ )  
***derived semi-durative location***  
 The eventuality described in the matrix structure (**ev**) plus its result state (**s**) fill *almost all* (but not all) the location time.
- (477)' O Paulo começou a sentir-se maldisposto desde que tomou os comprimidos.  
 “Paulo STARTED to feel sick since he took the pills”  
 Paulo has started to feel sick since he took the pills.

Given that an interval may separate (and naturally does) Paulo taking the pills from his starting to feel sick, it cannot be the case that:  $[t \subseteq \text{ev} \oplus s]$  (*derived strict durative* location).

The relevance of the derived semi-durative location mode is more evident for the Portuguese examples than for the English ones. Note that: (i) the Portuguese sentence (477') includes a *desde*-adverbial, an achievement-description in the main clause, and a simple tense form, “pretérito perfeito simples” (which is normally assumed not to “invoke” a consequent state) in the main clause; (ii) a theoretically possible simple inclusive reading of this sentence –  $[\text{ev} \subseteq t]$  – is excluded (unless some exceptional regulation is postulated), because *desde*-adverbials appear to be systematically incompatible with this form of location (cf. (471) above, and chapter 9 *passim*), this objection not applying to English, given that *since* normally allows simple inclusion; (iii) the mere statement of an inclusive condition –  $[\text{ev} \subseteq t]$  – would not account for a crucial fact in the interpretation of the Portuguese sentence (477'), viz. the “presence” of a consequent state which overlaps with the utterance time, given that the tense form does not introduce a discourse referent for this state, this objection not applying to English, which contains a perfective form. Given the facts just mentioned, I will consider that the *derived semi-durative location* should be considered a (sub)mode of location independent from the simple inclusive one<sup>245</sup>.

<sup>245</sup> Note that, for the English sentence in (477'), a simple inclusive condition  $[e \subseteq t]$  can be adopted because:



The derived semi-durative location of eventualities (expressed in Portuguese sentences like (477'), with *desde*-adverbials) raises some interesting issues. In subsection 8.2.2, I will make a brief digression in order to describe (though partially and superficially) some of these issues. It must be noted, in particular, that these constructions provide an interesting illustration of a fact already mentioned in section 8.1.2, namely that a considerable amount of semantic variation, with respect to temporal properties, exists within the (traditional) class of achievements.

Before that digression, I will mention in the following subsection a noticeable fact about the (basic) semi-durative location, namely that this submode of temporal location appears in connection with “lower-bounded locating adverbials” (like those headed by *desde* [*since*] – cf. (476')), but interestingly – though predictably – not with “upper-bounded locating adverbials” (like those headed by *até* [*until*]).

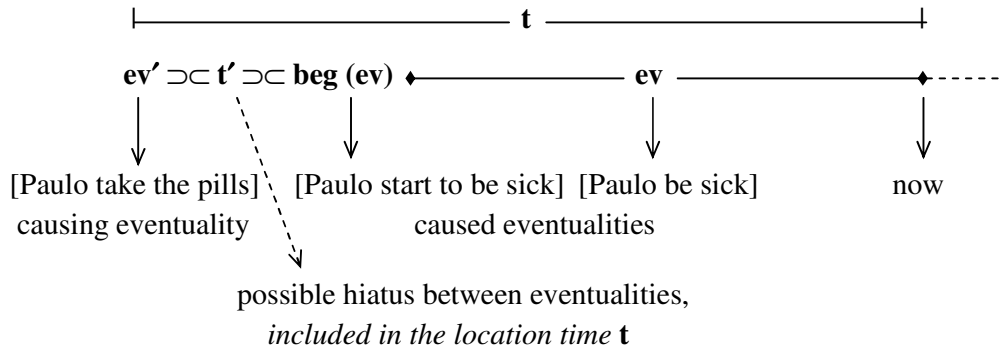
### 8.2.1. Semi-durative location of eventualities

Compare the following sentences, and assume a causal connection between the eventuality of taking the pills and that of starting, or ceasing, to be sick:

- (478) a. O Paulo está doente *desde* que tomou os comprimidos.  
 Paulo has been sick *since* he took the pills.  
 b. O Paulo esteve doente *até* tomar os comprimidos.  
 Paulo was sick *until* he took the pills.

As we saw, in sentences with *desde* / *since*, the possible hiatus between taking the pills and starting to feel sick falls within the location time. This is why the strict durative condition  $[t \subseteq ev]$  is too strong for these cases, a weaker *semi*-durative condition,  $[[beg(t) <_{close} ev] \wedge [end(t) \circ ev]]$ , applying:

- (478)a'. O Paulo está doente *desde* que tomou os comprimidos.  
 Paulo has been sick *since* he took the pills.

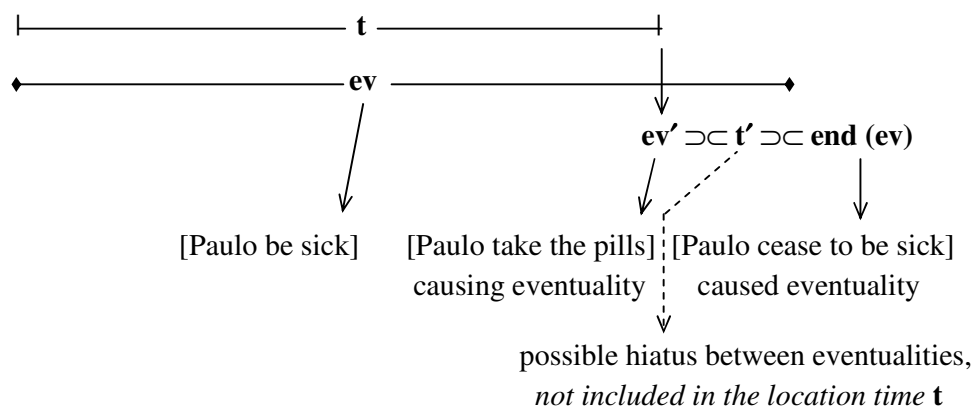


CONSEQUENCE: it is not necessarily the case that  $[t \subseteq ev]$  (strict durative reading).

- 
- (i) the required closeness between **beg**(**t**) and **ev** –  $[beg(t) <_{close} ev]$  – can be inferred from the causal relation  $[cause(ev', ev)]$  (where  $[t_c = loc(ev')]$  and  $[beg(t) = t_c]$ );  
 (ii) the required overlapping of the consequent state with the utterance time –  $[end(t) \circ s]$  (where  $[end(t) = n]$ ) – is explicitly marked by the (present) perfect.

Conversely, in sentences with *até / desde*, the possible hiatus between taking the pills and getting cured falls outside the location time. Therefore, the existence of causal relations in these sentences *does not* directly affect the temporal location expressed by the time adverbial – with or without these causal links, the strict durative location ( $[t \subseteq ev]$ ) always applies:

- (478)b'. O Paulo esteve doente *até* tomar os comprimidos.  
Paulo was sick *until* he took the pills.



Note that in (478a), with *desde / since*, the causal relation is  $[cause(ev', beg(ev))]$ , whereas in (478b), with *até / until*, the relation is “reversed”:  $[cause(ev', end(ev))]$  (although the subordinate clause always expresses the cause). This asymmetry seems naturally due to the different properties of the temporal prepositions at stake, viz. that *desde* and *since* explicitly express a lower bound, while *até* and *until* explicitly express an upper bound.

With respect to asymmetries between these prepositions, a distinguished occurrence of *até / until* should also be mentioned. Some authors, in particular Heinämäki (1974: 85, 116), note that the eventuality described in an *until*-adverbial is sometimes the result of the activity expressed in the main clause. In these cases, involving “result-*until*” (as Heinämäki terms it), the adverbial clause expresses not the causing eventuality but the caused eventuality, a fact that is relatively exceptional among temporal subordinate clauses:

“sentences that have a temporal clause can have an implicature that the temporal clause expresses the cause or reason for the main clause. With some *before*- and *until*-structures the main clause can be taken to express the cause: (...) in the case of *until*, the activity expressed by the main clause can produce the result described by the *until*-clause” (*ibid.*: 116).

Here are some illustrative examples given by Heinämäki, with the Portuguese translations (which show that Portuguese *até* can occur in the same type of environment):

- (479) a. Sam waxed the floor until it was shining. (Heinämäki 1974: 84)  
O Sam encerou o chão até ele estar a brilhar.  
b. Bill kept kicking the door until it opened. (*ibid.*)  
O Bill continuou a dar pontapés na porta até ela se abrir.

- c. Carol kept jumping on the board until it broke. (*ibid.*: 116)  
 A Carol continuou a saltar em cima da tábua até ela se partir.

With regard to the interaction between causality and temporal location, these sentences do not seem to constitute a special or exceptional case. Note that, in fact, the general condition for sentences with *until* – [cause (ev', end (ev))] – also holds here: in (479c), for instance, the board breaking causes Carol to stop jumping on it. The peculiarity of these constructions lies in the existence of another *additional* causal relation, viz. the eventuality described in the main clause causes the one described in the subordinate clause: [cause (ev, ev')]<sup>246</sup>. The two causal relations are obviously not incompatible: Carol jumping on the board causes it to break, which on turn makes her stop jumping on it. With respect to temporal location, the double causality requires no supplementary or distinct conditions.

### 8.2.2. Derived semi-durative location of eventualities (by Portuguese *desde*-adverbials)

The aim of this section is merely to point out some clues for further research, since I cannot engage here in a thorough analysis of all the relevant issues.

Let us start by considering two Portuguese sentences which instantiate the derived semi-durative location<sup>247</sup>:

- (480) a. O Paulo começou a estudar alemão desde que soube que ia para Berlim.  
 [Paulo has started to study German since he learned he was going to Berlin]  
 b. O Paulo deixou de jogar futebol desde que foi operado à perna.  
 [Paulo has quit playing football since he had his leg operation]<sup>248</sup>

As already mentioned, the distinctive features of these constructions are: (i) the main clause represents a punctual eventuality occurring *near* the lower bound of the location time (set by the *desde*-adverbial), whose consequent state extends up to the TPpt (the utterance time, here); (ii) the eventualities expressed in the main and subordinate clauses are causally linked. Hence, sentences (480) are approximately equivalent to the following ones, with atelic descriptions in the main clause (involving *basic* durative location):

- (481)a. O Paulo anda a estudar alemão desde que soube que ia para Berlim.  
 [Paulo has been studying German since he learned he was going to Berlin]

<sup>246</sup> Brée (1985), who also discusses structures with “result-*until*”, notes this fact:

“Note also that when the state given by the sub-proposition is the result or goal of the activity described by the main proposition, then it may also be the cause of the ending of this activity. This main activity is the cause of the result noted in the sub-proposition, which in its turn stops the main activity from holding any longer – an instance of feedback” (p. 23).

<sup>247</sup> Cf. the following Portuguese example from a novel by Camilo Castelo Branco:

«Desde que meus olhos fitaram o seu rosto cândido, a tranquilidade desertou a minh'alma.»  
 (“Since my eyes gazed at her candid face, tranquility has deserted my soul”)  
 (Camilo Castelo Branco, *A Queda de um Anjo*,  
 apud Aurélio Buarque de Holanda Ferreira, *Novo Dicionário da Língua Portuguesa*)

<sup>248</sup> The English sentences in (480) are approximate counterparts of the Portuguese ones, whose interpretation, as noted above, is not necessarily the same.

b. O Paulo não joga futebol desde que foi operado à perna.

[Paulo hasn't been playing football since he had his leg operation]

Now, the interesting fact is that the construction illustrated in (480) occurs only with a *limited set* of predicative expressions (in the main clause) and, as we will see, this set does not coincide with either:

- (i) the set of “culminations” – as distinct from “points” – in the classification of Moens (1987) and Moens and Steedman (1988)<sup>249</sup>, or
- (ii) the set of “culmination + interval” expressions, identified by Hitzeman (1993) in connection with the measurement of consequent states of telic eventualities via *for*-phrases (cf. end of section 8.1.2).

Observe the contrasts in the sets of sentences in (482)-(487) below, where:

- examples *a* involve “consequent state confinement” via a temporal measure or a temporal locating phrase (cf. Hitzeman’s tests to identify “culmination + interval”), i.e. *derived strict durative location* (associated with an intentional value or not) – cf. (455) above;
- examples *b* involve “consequent state extension to the TPpt” in association with a causal connection, i.e. *derived semi-durative location* – cf. (477) above; for English, I will just provide the translations, without trying to determine their grammatical status.

The grammaticality judgements expressed in these sentences concern only the relevant readings, described right above. Note, for instance, that the Portuguese sentences with *até* presented below can have a simple inclusive reading, which is not taken into account here.

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<sup>249</sup> Moens (1987) and Moens and Steedman (1988) divide the traditional class of achievements into two separate aktionsart classes: “culminations” and “points”. They are set apart by the fact that the former can easily be associated with a consequent state, whereas the latter (but for exceptional circumstances) cannot.

“[A culmination is] informally, an event which the speaker views as punctual or instantaneous, and as accompanied by a transition to a new state of the world. This new state we will refer to as the **consequent state** of that event” (Moens and Steedman 1988: 16)

“A point is an event (...) that is viewed as an indivisible whole and whose consequences are not at issue in the discourse – which of course does not mean that *de facto* consequences do not exist” (*ibid.*)

A major linguistic distinction between these two classes is the oddity of the combination (of the latter but not of the former) with the perfect. In Portuguese, I believe that the closest linguistic contrast to the English perfect *vs.* non-perfect one is, in these cases, the presence *vs.* absence of the adverb *já* [= *already*] (although I think it does not perfectly translate the English contrast):

- (i) ?Harry has {hiccuped / accidentally found this coin}.
- ?O Harry já {soluçou / achou acidentalmente esta moeda}.
- (ii) Harry has reached the top of the mountain.
- O Harry já atingiu o topo da montanha.

It must be emphasised that sentences like (i) are not necessarily ungrammatical. As Moens and Steedman (1988) observe, with respect to similar examples, “[sentences like these], to the extent that they are acceptable at all, seem to demand rather special scenarios, in which [the described eventualities] (...) have a momentousness that they usually lack” (p. 17). This would be the case in (i) if, for instance, the speaker and his/her audience were just waiting for Harry to hiccup.

### **I. TYPICAL “POINT”**

*achar acidentalmente uma moeda / accidentally find a coin*

- (482) a. \*O Paulo achou acidentalmente esta moeda {por / durante} dez minutos.  
\*Paulo accidentally found this coin for ten minutes.  
a'. \*O Paulo achou acidentalmente esta moeda até ao meio-dia.  
\*Paulo accidentally found this coin until noon.  
b. \*O Paulo achou acidentalmente esta moeda desde que começou a procurar tesouros escondidos na praia.  
[Paulo has accidentally found this coin since he started to look for hidden treasures on the beach]

### **II. TYPICAL “CULMINATIONS”**

*partir a perna / break one's leg*

*atingir o topo da montanha / reach the top of the mountain*

- (483) a. \*O Paulo partiu a perna {por / durante} dez dias.  
\*Paulo broke his leg for ten days.  
a'. \*O Paulo partiu a perna até à semana passada.  
\*Paulo broke his leg until last week.  
b. \*O Paulo partiu a perna desde que caiu da bicicleta.  
[Paulo has broken his leg since he fell from the bicycle]
- (484) a. \*O Paulo atingiu o topo da montanha {por / durante} duas horas.  
\*Paulo reached the top of the mountain for two hours.  
a'. \*O Paulo atingiu o topo da montanha até ao meio-dia.  
\*Paulo reached the top of the mountain until noon.  
b. \*O Paulo atingiu o topo da montanha desde que conseguiu subir os últimos cem metros.  
[Paulo has reached the top of the mountain since he managed to climb the last 100 metres]

### **III. TYPICAL “CULMINATION + INTERVAL”**

*sair / leave*

- (485) a. O Paulo saiu {por / durante} dez minutos.  
Paulo left for ten minutes.  
a'. OK/?O Paulo saiu até às 5 horas.<sup>250</sup>  
?Paulo left until 5.  
b. \*O Paulo saiu desde que se apercebeu de que não tinha comida no frigorífico.  
[Paulo has left since he realised there was no food left in the fridge]

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<sup>250</sup> As I said before, judgements about this type of sentences are particularly subtle.

#### IV. TYPICAL “CULMINATION” INVOLVED IN THE DERIVED SEMI-DURATIVE LOCATION

*perder o medo de andar de avião / lose one's fear of flying*

*começar a estudar alemão / start to study German*

- (486) a. ?O Paulo perdeu o medo de andar de avião {por / durante} três meses.<sup>251</sup>  
?Paulo lost his fear of flying for three months.  
a' \*O Paulo perdeu o medo de andar de avião até Setembro.  
\*Paulo lost his fear of flying until last September.
- b. O Paulo perdeu o medo de andar de avião desde que atravessou o Atlântico sem problemas.  
[Paulo has lost his fear of flying since he crossed the Atlantic without problems]
- (487) a. \*O Paulo começou a estudar alemão {por / durante} três meses.  
\*Paulo started to study German for three months.  
a' \*O Paulo começou a estudar alemão até Setembro.  
\*Paulo started to study German until last September.
- b. O Paulo começou a estudar alemão desde que soube que ia para Berlim.  
[Paulo has started to study German since he learned he was going to Berlin]

It should be kept in mind that the given sentences are mere illustrations. I do not assume, or even hypothesise, that all achievement-descriptions behave regularly like one of the typical examples above.

Portuguese predicative expressions that can be involved in a derived semi-durative location (i.e. with a *desde*-adverbial expressing some form of causation) include at least the following three types:

- (i) Expressions containing a verb (sometimes called *aspectual*) that marks the beginning or end of a state (which is lexically expressed by the clausal complement of this verb) – e.g. *começar a / passar a* [start], *deixar de / parar de* [stop, cease, quit].
- (ii) Expressions containing a verb (sometimes called *aspectual*) that marks a change of state (the new state being lexically expressed by the adjectival complement of this verb) – e.g. *tornar-se / ficar* [become].
- (iii) Expressions containing a verb that “intrinsically” invokes a change of state (the new state being lexically non-expressed) – e.g. *ganhar* (*juízo, coragem*) [“gain (wisdom, courage)”], *perder* (*o medo, o juízo*) [*lose (one's fear, one's mind)*], *mudar* (*de opinião, de atitude*) [*change (one's opinion, one's attitude)*], *alterar* [alter].

With respect to the combination of these predicative expressions with *desde*-adverbials, I will just add that the existence of a causal relation seems crucial for utter grammaticality.

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<sup>251</sup> I state the judgements in (486a) with reserve. These sentences seems odd to me, but not as bad as the parallel ones with *até / until* – (486a') – or *começar a / start* – (487a).

In fact, if the complement of *desde* is an eventuality that has no causal link with the main clause, sentences tend to be rejected:

- (488) O Paulo deixou de fumar desde que o filho nasceu.  
[Paulo has quit smoking since his son was born]

This Portuguese sentence appears to be felicitous only if a cause-effect relation links the two described eventualities. If an expression like *por coincidência* (*by coincidence*), for instance, is added, it becomes somewhat odd.

The same tendency for rejection occurs when the complement of *desde* is strictly temporal (though, if the mentioned interval is part of an anaphoric chain that associates it with a causing eventuality, grammaticality improves – cf. example *b* below)

- (489) a. ?O Paulo deixou de fumar desde o dia 10 de Janeiro.  
[Paulo has quit smoking since January 10]  
b. OK/?O Paulo deixou de fumar desde o dia 10 de Janeiro,  
o dia em que viu um programa sobre cancro do pulmão na televisão.  
[Paulo has quit smoking since January 10,  
the day he watched a programme about lung cancer on TV]

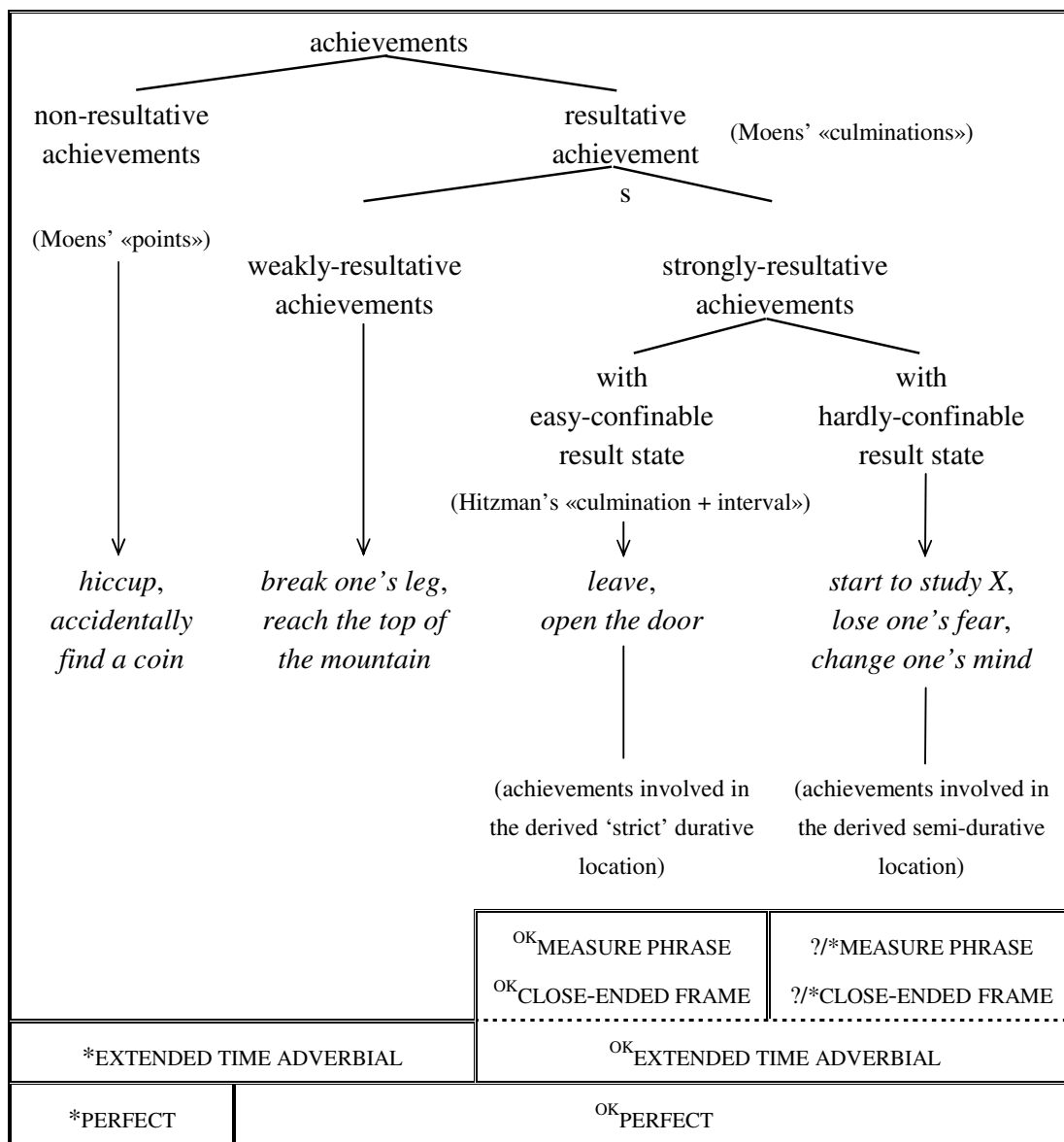
As said in 8.1.2, the contrasts involving different sorts of punctual achievements illustrated here (and in that subsection) can possibly be accounted for in many different ways.<sup>252</sup> Although lacking the research required for taking a grounded stand on the matter, it seems obvious to me that some form of partition of the traditional class of achievements is required. In view of the data available, and with all the above-mentioned provisos, I believe that something along the lines of (490) below could be an interesting working hypothesis, a starting point for research.

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<sup>252</sup> I can hypothesise an analysis of structures with derived semi-durative location using the type of algorithms adopted in this dissertation. Consider the DRS-construction rules presented in section 4.2.2.5; they can be adapted to handle this mode of location roughly as follows (where I ignore the aspects pertaining to the computation of the causal value):

Given a triggering configuration  $[S' \ S_{[+ACHIEVEMENT\pi]} \ [PP \ P_p \ COMPL]]$ , where “achievement <sub>$\pi$</sub> ” and “P<sub>p</sub>” identify the subset of achievements and the subset of prepositions compatible with this location mode, the processing rule would introduce: (i) two (rather than one) eventuality discourse referents in the DRS – **ev** and **s** – and, furthermore, (ii) a condition relating them –  $[ev \supset \subset s]$ . Then, the replacement instruction of the S'-rule would split the configuration in two, with **S (ev) [t]**, on the one hand, and **PP (ev  $\oplus$  s) [t]**, on the other hand. Finally, the temporal locating PP-rule would introduce, whenever this complex eventuality **ev  $\oplus$  s** occurred as its referential argument, the locating rules stated in (477):  $[beg(t) <_{close} ev]$  and  $[end(t) \circ s]$ .

As we can see, this DRT-analysis encodes two strategies: (i) an aktionsart shift, expressed in the addition of the result state **s** (note that I keep the “input” punctual **ev** also as an object of location); (ii) a sub-classification of achievements, expressed in the feature  $[+ACHIEVEMENT\pi]$ .



### 8.3. (In)exactness in temporal location

I will end this chapter with a few cursory lines about (in)exactness in (adverbial) temporal location. I will not develop this issue, since the questions concerning the relation between asserted and non-asserted information it raises go beyond the scope of this dissertation.

Let us consider the durative location of atelic eventualities, the mode for which this issue has greater significance, and particularly structures with “single-boundary temporal locating operators”. In the sentences below, ignore any possible non-durative interpretation.

<sup>253</sup> This is obviously quite preliminary and tentative. Note, for instance, that it is not clear what the relation between “easiness of result state confinement” and (im)possibility of combination with temporal-causal *desde*-phrases could be.



- (491) a. O Paulo vive em Paris *desde* 1980. } lower-bound  
           Paulo has lived in Paris *since* 1980. } temporal locating operator  
       b. O Paulo viveu em Paris *até* 1980. } upper-bound  
           Paulo lived in Paris *until* 1980. } temporal locating operator

The general condition presented for the durative reading,  $[t \subseteq ev]$  (which is used in e.g. Kamp and Reyle 1993, and I adopt here), allows the state of Paulo living in Paris to extend beyond (any of) the limits of the location time. This can be particularly problematic for examples like (491), given that, in contradiction with the “normal” interpretation of these sentences, it permits that the described state has begun before 1980, in (491a), or goes beyond it, in (491b). Conversely, the “normal” interpretation of these sentences requires the introduction of the following additional conditions:

- (492) a.  $[beg(t) = beg(ev)]$      for *desde* / *since*  
       b.  $[end(t) = end(ev)]$      for *até* / *until* <sup>254</sup>

I will designate this as “exact location”, in the sense that the adverbials set not only the lower/upper bound of the location time, but also the lower/upper bound of the located eventualities themselves.

Now, it has been considered by many authors that these restrictive conditions do not constitute a specific (asserted) contribution of the temporal operators, rather they are an implicature of the discourse. Let us exemplify with the case of *until*, studied by Heinämäki (1974):

“the main clause [in a sentence with *until*] is asserted to be true up to the reference point given by the *until*-clause. Whether it ceases to be true there or not is not a matter of the logical structure of *until*” (p. 82).

In fact, for this author, an interpretation according to which the located eventuality does not necessarily end at the moment nailed down by the complement of *until* is natural in many cases (as in the following imperative sentences):

- (493) a. Keep the door open until I come! (Heinämäki, 1974: 82)  
           Mantém a porta aberta até que eu chegue!  
       b. Keep reading this poem until you have it memorized! (*ibid.*)  
           Continua a ler o poema até o teres memorizado.

As she puts it: “you have obeyed the order [in (493b)] if you have been reading the poem long enough so that you can memorize it; whether you stop at that point or not is irrelevant” (p. 82).

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<sup>254</sup> Note that, in structures involving causal connections between the main and the subordinate clause, the located eventuality does not cease to hold *at* – but rather *closely after* – the moment nailed down by the complement of *até* / *until* – cf. schema (478b’). That is:  $[t <_{\text{close}} end(ev)]$  rather than (492b) applies.

Furthermore, and quite crucially, the “normally assumed” condition (492b) can be “cancelled” in the subsequent discourse (cf. example *b*), whence Heinämäki concludes that “these are implicatures and not entailments” (p.111):

- (494)a. Mockingbirds sang until it got dark. (Heinämäki, 1974: 111)  
Os pássaros cantaram até anoitecer.
- b. Mockingbirds sang until it got dark, {if not latter / and maybe even later}.  
(*ibid.*)  
Os pássaros cantaram até anoitecer e talvez mesmo depois disso.

I do not want to delve into the specific problems raised by this exactness issue. The main reason to mention it here is to emphasise that the location conditions inserted in the DRSs by the rules I propose are relatively “loose”, allowing both for the “inexact” and “exact” location (an aspect in which, as said, I follow Kamp and Reyle 1993). Were stricter conditions to be explicitly required, the algorithm would necessarily have to be adapted accordingly. With respect to this, notice that some linguistic structures – e.g. direct out of-the-blue questions – interestingly seem to impose the “exact reading”:

- (495) *Até quando é que o Paulo viveu em Paris?*  
*Until when did Paulo live in Paris?*

In this case, the expression *pelo menos (até) / at least (until)*, which in many declarative sentences explicitly marks inexactness (of temporal location), cannot be added:

- (496)a. \**Pelo menos até quando é que o Paulo viveu em Paris?*  
\**At least until when did Paulo live in Paris?*
- b. O Paulo viveu em Paris *pelo menos até* 1980.  
Paulo lived in Paris *at least until* 1980.

## Chapter 9

### Interaction between quantification and (adverbial) temporal location<sup>255</sup>

In Chapter 1, I distinguished two fundamental temporal relations that can involve eventualities: temporal location and quantification (counting or temporal measurement) – cf. Table 1', on page 14. Furthermore, I stressed that, as a rule, quantification over eventualities – particularly (absolute) counting – is not an unbounded operation, but rather a temporally circumscribed one, the frame for which is often set by a time adverbial:

- (497) O Paulo foi ao cinema três vezes *na semana passada*.  
Paulo went to the cinema three times *last week*.

Note that the italicised adverbials above simultaneously provide a frame for *counting* Paulo's goings to the cinema ("a total of three occurrences took place within last week") and for *locating* the involved three cinema-goings ("they all occurred last week"). This type of interaction between quantification over eventualities and (adverbial) temporal location will be topic of this chapter.

#### 9.1. Simple vs. full-scanning inclusive location of events

##### 9.1.1. General characterisation

It is usually assumed in the literature that temporal location of events (accomplishments and achievements) through time adverbials involves a simple inclusive condition [ $e \subseteq t$ ], where **e** is the event described in the matrix structure, and **t** the location time, defined by the temporal adverbial:

- "This seems to be a general property of event-sentences with temporal adverbials such as **on Sunday**, **yesterday**, **tomorrow morning** and many others: they assert that the event falls entirely within the time denoted by the adverb" (Kamp and Reyle 1993: 513).

In other words, the basic function of the adverbial, in the relevant sentences, is to define a temporal frame, and to locate the described event by stating that it falls *anywhere* within that frame. This clearly happens in sentences like:

- (498) a. O Paulo casou em 1980.  
Paulo got married in 1980.

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<sup>255</sup> The core content of this chapter was presented at the Conference on (Preferably) Non-Lexical Semantics, Université de Paris VII, June 1996 (of which no Proceedings were published).

- b. \*O Paulo casou desde 1980.<sup>256</sup>  
 Paulo has got married since 1980.

As said in chapter 8, I will designate this type of location, representable by the simple condition  $[e \subseteq t]$ , **simple inclusive location**, in order to distinguish it from some more complex and interesting cases, on which I will concentrate in this chapter. These are exemplified in sentences like (497) above, or the following:

- (499) a. O Paulo escreveu três livros em 1980.  
 Paulo wrote three books in 1980.  
 b. O Paulo casou três vezes desde 1980.  
 Paulo has got married three times since 1980.

The event described in each of these sentences may be conceived of as a *complex event* composed of three *subevents*, of Paulo writing a book or of Paulo getting married, respectively. Furthermore, we observe that these three subevents constitute the *totality* of events of the described type that occurred within the time defined by the temporal adverbial (**t**): (499a) refers to the total amount of books written by Paulo – and, consequently, of book-writing events by Paulo – within the year 1980, and (499b) refers to the total amount of Paulo’s weddings between 1980 and the utterance time. In other words, the complex event these sentences represent is the *supremum* of the set of relevant subevents that occur within **t** (*maximality requirement*); formally, it can be represented by a non-atomic event discourse referent – **E** – obtained by *abstraction* over the subevents **e** of the relevant type that occur within **t**:

$$(500) \quad [E = \Sigma e: [ \dots [e \subseteq t] \dots ]_{K_1} ]^{257}$$

Now, the role of time adverbials in structures like (499), involving this complex condition, appears not to be the same as in structures like (498), which involve the simple condition  $[e \subseteq t]$ . In (499), their role is to provide a temporal frame for the above-mentioned abstraction operation. Unlike in (498), this frame – the location time **t** – is, metaphorically speaking, “fully-scanned” (no part of it being immaterial) in order to gather all the relevant subevents happening within it. In view of what has been said, I will designate the location

<sup>256</sup> As mentioned before, Portuguese *desde*-adverbials are normally incompatible with this simple inclusive location, a fact that I will extensively discuss in this chapter.

<sup>257</sup> I represent the subevents in the DRS **K<sub>1</sub>** with the Greek letter **e** (rather than with the lower case Roman letter **e**), taking into account the conventions mentioned in chapter 3 about the use of upper case, lower case, and Greek letters. In fact, as we will see later on, the abstraction in (500) is recursive, that is, the subevents in **K<sub>1</sub>** can also be complex events (**E'**) composed by abstraction over other subevents, as in (i) below if both NPs have a distributive reading (cf. section 9.3.1.2):

- (i) Três actores receberam três Óscares na década de 80.  
 Three actors received three Oscars in the eighties.

Consequently, the eventuality discourse referent of the inclusive condition in **K<sub>1</sub>** is represented as neutral (atomic / non-atomic): **e**.

mode that involves the condition (500) **inclusive location associated with a full-scanning of the location time**, or **full-scanning inclusive location**, for short<sup>258</sup>.

A fundamental characteristic of the full-scanning inclusive location, which distinguishes it from the simple inclusive one, is that, by providing a frame for abstraction, the temporal adverbial *plays a role in the definition* of the eventuality described in the matrix structure. In fact, this eventuality is defined as the set **E** of (all) subevents **e** that, at the same time, correspond to the description in the matrix structure, and happen within **t**. Thus, if the temporal frame changes, the eventuality **E** may be different, i.e. have a different composition. A consequence of this fact is that the enlargement of the frame does not necessarily guarantee truth value preservation (this happens, namely, with non-upward-monotone cardinal quantifiers):

- (501) O Paulo escreveu três livros em 1985.  
 Paulo wrote three books in 1985.  
 -/→  
 O Paulo escreveu três livros na década de 80.  
 Paulo wrote three books in the eighties.<sup>259</sup>

Obviously, matters are different in structures with simple inclusive location. There, the eventuality described in the matrix structure *is defined independently* of the location time, which acts as a mere location frame. Hence, if this frame is enlarged, the truth value of the sentence is preserved (which is obviously due to the transitivity of the inclusion relation):

- (502) O Paulo casou no Verão de 1985.  
 Paulo got married in the summer of 1985.  
 →  
 O Paulo casou em 1985.  
 Paulo got married in 1985.  
 →  
 O Paulo casou na década de 80.  
 Paulo got married in the eighties.

In sum, as we can gather from the examples given so far, the contribution of the temporal adverbial is significantly different in the two cases considered:

- in structures with *simple inclusive location*, it merely locates the described eventuality;

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<sup>258</sup> The term “full-scanning” was suggested to me by João Peres (p.c.). It must be stressed that, rigorously, **t** is not “fully-scanned” in the sense that all its subintervals are directly checked with respect to the occurrence of a relevant event within them. In fact, the processing mechanism is conceived as selecting the events that comply with the relevant predicate, and are contained in a subinterval of **t** (as expressed in the formal representation proposed). Accordingly, albeit indirectly, the set of subintervals of **t** is partitioned into those that are, and those that are not, the **loc** of the subevents being considered. For this reason, in a sense, the domain of subintervals of **t** is quantified over.

<sup>259</sup> In the relevant interpretation here, *three* is understood as *exactly three*, and the NP has a non-specific reading (cf. observations on pages 319-320, after (552)).

- in structures with *full-scanning inclusive location*, it (i) locates the sub-events **e** and, consequently, the maximal event **E** expressed in the matrix structure<sup>260</sup>, and (ii) it contributes, as a kind of modifier, to define the maximal event (that is, the inclusion in the frame associated with the adverbial is a defining property of the elements making up the maximal event).

Therefore, it should be stressed that, strictly speaking, what I term full-scanning inclusive *location* appears to be more than a mere mode of temporal location (given the role (ii) above). For simplicity, however, I will keep this term, despite its possible unrigorousness.

In the examples given so far, the full-scanning location appears in association with (we could perhaps say “is triggered by”) either (i) an explicit quantifier over events – *três vezes / three times* – or (ii) an NP containing a cardinal quantifier – *três livros / three books*. Two facts, however, must be noted: on the one hand, these are not the only “full-scanning triggers”, one of the aims of the present chapter being exactly to try and define the class of operators that have this property; on the other hand, they not always function as “full-scanning triggers”, that is, their presence in a sentence does not necessarily entail a full scanning of the location time. Observe, for instance, that the following sentence seems to involve a simple inclusive location, just like (498), in the reading where the NP *three friends* has a group interpretation (i.e. refers to a collective offer to the mentioned friends):

- |  |   |               |
|--|---|---------------|
| <p>(503) O Paulo ofereceu este quadro a três amigos em 1985.<br/>         Paulo offered this painting to three friends in 1985.<br/>         →<br/>         O Paulo ofereceu este quadro a três amigos na década de 80.<br/>         Paulo offered this painting to three friends in the eighties.</p> | } | group reading |
|--|---|---------------|

Finally, note that all structures involving full-scanning presented so far contain descriptions of telic eventualities. However, basic atelic eventualities can also be associated with this mode of location, provided they occur in the relevant quantificational environment:

- (504) a. O Paulo esteve em Paris três vezes no ano passado.  
 Paulo was in Paris three times last year.  
 b. O Paulo foi embaixador em três países (diferentes) desde 1980.  
 Paulo has been an ambassador in three (different) countries since 1980.

In these contexts, the described states are temporally bounded, and behave, for counting purposes, just like normal events<sup>261</sup>.

<sup>260</sup> Note that from  $[E = \Sigma e: [...[e \subseteq t]...]_{K1}]$  we can infer  $[E \subseteq t]$ .

<sup>261</sup> It has been often noted that bounded states behave like events, in many aspects. On quantification over state-like predicates, cf. e.g. Swart (1993: 124-128):

“states and processes are not always presented in the perspective of unbounded situations (...). Such specific bounded ‘portions’ of states / processes can be described as homogeneous situations that are considered as including a beginning- and an endpoint. They are often referred to as occasions or occurrences of a state or process” (pp. 125-126).

This author proposes to treat these “occurrences of” states and activities as primitive eventualities:

“(occurrences of) states and processes will both be treated as bounded, count-like primitives in the semantics, on a par with events” (p. 128).

### 9.1.2. Full-scanning and the distribution of time adverbials

The linguistic relevance of distinguishing the simple from the full-scanning inclusive location is evidenced by the distribution of time adverbials. In fact, some adverbials appear to be compatible with one type of location, but not with the other. The case I will explore in more detail is that of Portuguese *desde*-phrases, which will be compared with their English counterparts, *since*-phrases: whereas the former (like, for that matter, their equivalents in other Romance languages – cf. (508)) seem to be incompatible with the simple – but not with the full-scanning – inclusive location, the latter do not exhibit such restriction (at least so clearly). Observe the following contrast, already presented above:

- (505) a. O Paulo { \*casou / casou três vezes } desde 1980.  
b. Paulo { has got married / has got married three times } since 1980.

Given that Portuguese *desde*-adverbials permit a clear differentiation of these two location modes, I will take their analysis as the main means to try to further characterise the full-scanning construction, in particular, to (i) describe the contexts in which it occurs, i.e. identify the class of “full-scanning triggers”, and (ii) elaborate more on the formal aspects of its representation.

I will proceed as follows: in 9.2, I will discuss specific semantic aspects of the Portuguese *desde*- and the English *since*-adverbials, mentioning important differences between them. This subchapter will at the same time be an introduction to the subsequent one, containing some basic elements for analysis, and an excursus, containing information that is not directly relevant to assess the issue at stake but which contributes to a more comprehensive understanding of the linguistic behaviour of these expressions. In 9.3, I will study the occurrence of *desde*-adverbials in structures with full-scanning location. For methodological reasons, I will analyse separately two major types of contexts: in 9.3.1, those where *desde*-phrases occur adverbially within non-subordinate clauses, as in the examples considered so far:

- (506) O Paulo escreveu três livros desde 1980.  
[Paulo has written three books since 1980]

and in 9.3.2, those where *desde*-phrases occur either adverbially within clausal nominal modifiers – (507a) – or adnominally (i.e. directly as nominal modifiers) – (507b-c):

- (507) a. (os) livros que o Paulo escreveu desde 1980  
[(the) books that Paulo has written since 1980]  
b. (os) golpes de estado na América Latina desde 1980  
[(the) coups d'état in Latin America since 1980]  
c. (todos os) fins-de-semana desde o início do ano  
[(all the) weekends since the beginning of the year]

Although up from next subchapter I will concentrate only on Portuguese *desde*-adverbials, it must be emphasised that sensitivity to the simple *vs.* full-scanning inclusion is not a localised (relatively inconsequential) phenomenon, but rather – at least apparently – a quite widespread one. In fact, this is only expected, since two distinct functions of

temporal “locating” adverbials – **definition of frames for temporal location** vs. **definition of temporal frames for quantification** – is what ultimately is at stake. Below, I will mention some linguistic manifestations of this sensitivity, in different operators and languages, whose analysis I leave for further research:

1. The Romance counterparts of *desde* (at least Spanish *desde*, Italian *da*, and French *depuis*, as I have checked for a large amount of contexts) behave like Portuguese *desde* with respect to the issue in question:

- (508) a. O Paulo { \*casou / casou três vezes } desde 1980.  
 b. Paulo { \*se ha casado / se ha casado tres veces } desde 1980.  
 c. Paulo { \*si è sposato / si è sposato tre volte } dal 1980.  
 d. Paulo { \*s’est marié / s’est marié trois fois } depuis 1980.  
 vs. e. Paulo { <sup>OK</sup>has got married / has got married three times } since 1980.

2. English *since* and *until* appear to exhibit *some degree of sensitivity* to the contrast in question. The first preposition is normally assumed to allow both for an inclusive and a durative reading; quotations (509a-b) below, however, seem to indicate that the simple inclusive location is somehow more restricted, or marked, than the full-scanning option. The second preposition is normally assumed to allow only a durative reading; quotation (509c), however, seems to indicate that a full-scanning inclusive location is, at least in some contexts, possible.

- (509)a. “how good achievements are in (...) sentences [with *since*-phrases] is a matter of debate. (...) [the sentence *Messiaen has died since the beginning of this month*], for instance, seems to us a little awkward. But we believe the sentences are possible; we will assume that they are grammatical” (Kamp and Reyle 1993: 631, fn. 64).  
 b. “The main clauses (...) [in *the enemy has lost 200 airplanes since the fighting started*, *I have met only one Eskimo since I came here*, or *the roof has collapsed twice since they started the repairs*] have a quantified NP or adverb. If there is no such thing in the main clause, the sentence at first sight looks odd (...)” (Heinämäki 1974: 86).  
 c. “unlike [the sequence *I assure you I HAVE done the washing-up since I got married. Several times*, the sequence *I assure you I HAVE done the washing-up until now. Several times*] (...) is ungrammatical. This is an indication that the existential interpretation [= inclusive location] is even more strongly marked in the case of *until* than in the case of *since*. Still it remains possible to get it, as in [*until now John has done the washing-up only three times*] (...), even when we replace *now* by another indication of time: [*until yesterday John had done the washing-up three times*] (...). It is clear, then, that *until* can indicate a timespan in which a situation is said to actualize a specific number of times, or once, or not at all” (Declerck 1995: 80).

3. In Portuguese, other time adverbials exhibit differences with regard to the issue under analysis, as shown by the set of sentences in A-C below. In fact, whereas the sequences



with full-scanning location presented there are generally accepted, those with simple inclusive location are considered odd, in varying degrees. All the examples include sentence-initial adverbials, because the contrasts are sharper in this position; however, judgements are similar (in some, though not all, cases) for sentence-final position. It must be stressed that these sentences are mere illustrations, and that I will not try to assess the relevant factors of variation here, leaving this task for further research. The English prepositions in the glosses below are just approximate counterparts of the Portuguese ones.

- A.** sentence-initial adverbials formed by the prepositional operator *durante*, *ao longo de* or *em*, and a simple predicate of amounts of time (cf. Hitzeman's 1993 "p-definite readings" mentioned in 4.2.3.4 and at the end of 5.1.1)

- (510) a. Fui ao cinema: {durante / ao longo de / em} 90 minutos, vi quinze pessoas serem assassinadas.  
 "I went to the cinema: {during, for / over / in} 90 minutes, I watched fifteen people be murdered"
- b. Fui ao cinema: {\*durante / \*ao longo de / ??em} 90 minutos, vi o mau-da-fita ser assassinado.  
 "I went to the cinema: {during, for / over / in} 90 minutes, I watched the bad guy be murdered"

- B.** sentence-initial adverbials formed by the same prepositional operators and a definite expression containing a predicate of amounts of time:

- (511) a. {Durante / ao longo de / em} os seis anos em que o país esteve em guerra, morreram 15.000 pessoas.  
 "{During, for / over / in} the six years the country was at war, 15,000 thousand people died"
- b. {?Durante / ??ao longo de / OK/?em} os seis anos em que o país esteve em guerra, o líder da guerrilha morreu.  
 "{During, for / over / in} the six years the country was at war, the guerrilla leader died"

- C.** sentence-initial adverbials formed by *durante* and an extended interval-description (without a predicate of amounts of time); slight oddity may arise (only) sometimes:

- (512) a. Durante a Guerra Fria, muitos espões foram mortos.  
 "during the six years of war, many spies were killed"
- b. OK/?Durante a Guerra Fria, este espião foi morto.  
 "during the Cold War, this spy was killed"

## 9.2. On the semantic contribution of *desde* and *since* adverbials

Temporal locating adverbials headed by *desde* or *since* have, just like any temporal locating adverbial, a double semantic role: (i) they define a location time **t** and (ii) they determine, or at least affect, the relation between the entities  **$\pi$**  described in the matrix structures and this location time – **R ( $\pi$ , **t**)**. Let us consider these contributions separately.

### 9.2.1. Definition of a location time by *desde* and *since* adverbials

In section 4.2.2.2, I termed *since* and *desde* **single-boundary temporal locating operators** to express the fact that they explicitly define, through their complement, only one of the boundaries (namely the lower one) of the location time. However (with some exceptions for Portuguese *desde*, that I will mention later on), these operators also implicitly define, in interaction with the tense being used, the upper bound of the location time, which normally coincides with the TPpt of the sentence:

- (513) a. O Paulo está em Paris desde segunda-feira.  
           “Paulo IS in Paris since Monday”  
       b. Paulo has been in Paris since Monday.

In these sentences, the location time is a period stretching from (somewhere within) the mentioned Monday to the TPpt, which, given the use of the “presente” in Portuguese and of the present perfect in English, coincides with the utterance time ([TPpt := n]). The following two sentences are similar to (513), except for the fact that the TPpt (and therefore the upper bound of the location time) is, given the use of the “pretérito imperfeito” in Portuguese and of the past perfect in English, some moment in the past of the utterance time ([TPpt := o] and [o < n]):

- (514) a. A Ana chegou no sábado. O Paulo estava em Paris desde segunda-feira.  
           “Ana arrived on Saturday. Paulo WAS<sub>IMPERFEITO</sub> in Paris since Monday”  
       b. Ana arrived on Saturday. Paulo had been in Paris since Monday.

The location time of these sentences is a period stretching from (somewhere within) the mentioned Monday to the past TPpt, which is the moment of Ana’s arrival.

Examples (513) and (514) show that, in context, *since* and *desde* adverbials specify non-punctual location times whose lower and upper boundaries are defined. More specifically, the lower bound is fixed by the complement of the preposition (COMPL) and the upper bound (though not explicitly fixed) coincides with the TPpt, as established normally by the tense of the matrix structure. In other words, these adverbials behave as **double** (rather than single) **boundary temporal locating operators**. Formally, I will consider that *since* and *desde* adverbials insert the following two conditions in the representation, the latter expressing their acknowledged behaviour as deictically or anaphorically dependent expressions:

- (515) a. [beg (t) ⊆ t<sub>c</sub>]                      (where [COMPL (t<sub>c</sub>)])  
       b. [end (t) = TPpt]<sup>262</sup>

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<sup>262</sup> As will be observed in the next subsection, certain structures with Portuguese *desde* may require (depending on the analysis) a slightly different condition for the end of the location time, namely [end (t) <<sub>close</sub> TPpt] – cf. discussion in 9.2.2.1 about structures with “pretérito perfeito simples” in the main clause.

At this point, it must be noted that the Portuguese preposition *desde* can also occur as a strict single-boundary operator, that is, it can define a location time starting at the moment nailed down by its complement and extending up to a *non-specified* moment in its future. This happens in very few contexts (whose specific properties I will not attempt to define here, for time reasons), where *desde* is actually a counterpart of English *from*, rather than of *since*, and can be replaced without change in the interpretation by *a partir de* (the normal Portuguese equivalent of *from*). Let us observe two of these contexts:

**I. lower bound marked by the TPpt itself**

(via the deictically or anaphorically dependent expressions *agora / já* [now], *então / logo* [then], or *esse momento* [that time], for instance; the phrases *desde já* and *desde logo* are more or less idiomatic and may have a special rhetorical – not strictly temporal – role):

- (516) a. Estou desde agora à tua disposição.  
           “I am SINCE NOW at your disposal”  
       ⇔ b. Estou a partir de agora à tua disposição.  
           [I am from now on at your disposal]

**II. irrelevant upper bound (normally pragmatically induced)**

Note that, in the following sentence, the *desde*-phrase is a common locator, and its associated location time is represented by a bound variable in the nuclear scope of a duplex condition.

- (517) a. Antes de construírem este prédio, tínhamos luz na sala desde as 8 da manhã.  
           “before they build this building, we had light in the living-room SINCE 8.00”  
       ⇔ b. Antes de construírem este prédio, tínhamos luz na sala a partir  
           das 8 da manhã.  
           [Before they build this building, we had light in the living-room  
           (up) from 8.00]

I will henceforth ignore these peculiar uses of *desde*.

## 9.2.2. Definition of a location relation by *desde* and *since* adverbials

*Desde* and *since* adverbials allow different ways of locating the *relevant eventuality* **ev** represented in the matrix structure (the “relevant eventuality” being, as shown by Kamp and Reyle 1993, the one represented by the sentence without the auxiliary perfective verb, whenever it is present). Differences concerning temporal location are primarily determined (though not exclusively, as we will see) by the aktionsart of the located eventuality. For English *since*, the possibilities in (518) have been mentioned. Note that terminology may vary<sup>263</sup> (and the sub-distinction *a’/ a’’* is mine<sup>264</sup>):

<sup>263</sup> Regarding the two “uses” mentioned in (518), cf. e.g. Heinämäki (1974: 85) [non-durative vs. durative], Mittwoch (1988: 207) [existential vs. universal], or Vlach (1993: 256) [inclusive vs. durative].

- (518) a'.  $[ev \subseteq t]$  [inclusive location (for telics)] } non-durative  
 a''.  $[ev \circ t] \wedge [\neg[t \subseteq ev]]$  [non-durative location (for atelics)] } *since*  
 b.  $[t \subseteq ev]$ <sup>265</sup> [durative location (for atelics)]  $\Leftrightarrow$  durative *since*

For Portuguese *desde*, the possibility *b* is normally available, *a'* is available only in contexts involving full-scanning (i.e. where **ev** is obtained by abstraction, as in (500)), and *a''* is normally unavailable. These difference between *desde* and *since* will be discussed in the next two subsections.

The compatibility of *desde* and *since* adverbials with the different modes of temporal location is summarised in the following table:

**Table 12. Modes of temporal location and the distribution of *desde* and *since* adverbials**<sup>266</sup>

durative location (for atelics)	full-scanning inclusive location (for telics and bounded atelics)	non-durative location (for atelics)	simple inclusive location (for telics)
$[t \subseteq ev]$	$[ev = \Sigma \varepsilon: [...[\varepsilon \subseteq t]...]_{K1}]$	$[ev \circ t] \wedge [\neg[t \subseteq ev]]$	$[ev \subseteq t]$
<sup>OK</sup> <i>desde</i> <sup>OK</sup> <i>since</i>		* <i>desde</i> <sup>OK</sup> <i>since</i> (with restrictions)	

Finally, as mentioned in chapter 8, Portuguese *desde* (and arguably also English *since*) can locate a punctual eventuality together with an associated consequent state, a construction that I will ignore in the present chapter:

- (519) “DERIVED DURATIVE *DESDE*”  
 $[\text{beg}(t) <_{\text{close}} ev] \wedge [\text{end}(t) \circ s] \Leftrightarrow$  derived (semi-)durative location  
 (where  $[ev \supset \subset s]$ )

<sup>264</sup> As explained in 4.2.1.2, I use different conditions for the non-durative location of telic and atelic eventualities. In fact, while the former invariably involves inclusion, the latter doesn't necessarily, given that the described eventuality may extend beyond one of the boundaries of the location time.

<sup>265</sup> As mentioned in the previous chapter, whenever a causal link is established between the eventuality described in the *desde* (or *since*) adverbial and the main clause, the location is not *strictly* durative –  $[t \subseteq ev]$  – but rather *semi*-durative –  $[[\text{beg}(t) <_{\text{close}} ev] \wedge [\text{end}(t) \circ ev]]$ . This difference is irrelevant here, and I will henceforth ignore it.

<sup>266</sup> Note that the durative location (of atelics) and the full-scanning inclusive location have a common property – viz. they require a “global consideration” of the location time – which appears to be the relevant property in accounting for the distribution of Portuguese *desde*, and seems also to have a bearing on the distribution of English *since*. With respect to restrictions concerning *since* and simple inclusive location, see (509a-b) above; with respect to restrictions concerning *since* and non-durative location of atelics, see next footnote.

### 9.2.2.1. Location of atelic eventualities by *desde* and *since* adverbials

The durative / non-durative ambiguity of *since*-adverbials in combination with atelic descriptions has often been discussed. The following sentences, for instance, are considered (by the authors referred to in parentheses) as ambiguous between a reading where the described state fills the whole location time – durative – and a reading where it holds on just part (any part!) of that location time – non-durative<sup>267</sup>:

- (520) a. Sam has been in Boston since 7.00. (Heny 1982: 147, Mittwoch 1988: 206)
- b. I've been ill since September. (Vlach, 1993: 256)
- c. I've known Max since 1960. (*ibid.*)

For the sentence (520a) – uttered at 23.00, for instance – the durative reading would require that Sam had been permanently in Boston between 7.00 and the utterance time, and the non-durative one that Sam had been in Boston at any moment between 7.00 and 23.00, even if for a short period long before the utterance time (say, between 8.00 and 8.30).

As I said, Portuguese *desde*-adverbials behave differently in combination with descriptions of (simple) atelic eventualities, being only compatible with the durative location<sup>268</sup>. In fact, the Portuguese counterparts of the English sentences (520) are unambiguous, and exclude the interpretation according to which the described states hold

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<sup>267</sup> The ambiguity at stake appears not to be indisputable. For instance, Richards (1982), contrary to Heny (1982), only assigns a durative reading to sentence (520a):

“in contrast to [*Sam has been in Boston for 20 minutes*] (...) there is no ambiguity in the sentence [*Sam has been in Boston since 7.0*] (...). This can have but one reading, viz. the one characterized by the structure

(145) *Pres*<sub>(w,i)</sub> [*Since 7.0* [*Have* (Sam be in Boston)]]” (p. 97).

With respect to the same sentence, Mittwoch (1988: 207) admits the ambiguity, but considers the durative (her “universal”) interpretation “the stronger reading”. Furthermore, this author claims that, for many stative sentences, the non-durative (her “existencial”) interpretation is very hard to obtain (as in (i) below), or even impossible to get (as in structures with the perfect progressive, like (ii)):

- (i) John has {wanted to be a doctor / owned a house} since 1980. (*ibid.*: 210)
- (ii) John has been running since 7.00. (*ibid.*: 237)

Dowty (1979) mentions that:

“For most speakers (though apparently not quite all), **since**  $\alpha$  has an interpretation (...) that need not entail that its sentence has been true at all times since  $\alpha$ , but only at some time since  $\alpha$ . That is, **John has been in Boston since 1971**, when used in the right context, need not entail that he is still there now” (p. 347).

This author also notes that the non-durative reading is lost (once more, for most speakers) when the adverbial is preposed:

- (iii) Since 1971, John has been in Chicago. (*ibid.*)

<sup>268</sup> At this point, I am not considering the cases that involve quantification over *bounded* atelic eventualities (and full-scanning inclusive location), like those described in (504).

on just (any) part of the location time. There are, however, differences between the possible Portuguese translations of (520), having mainly to do with the tense of the main clause, that deserve some comment:

- (521) a. O Sam {está / esteve / tem estado} em Boston desde as 7 horas.  
“Sam {IS / WAS / HAS BEEN} in Boston since 7.00”
- b. {Estou / Estive / Tenho estado} doente desde Setembro.  
“I {AM / WAS / HAVE BEEN} ill since September”
- c. {Conheço / \*Conheci / \*Tenho conhecido} o Max desde 1960.  
“I {KNOW / KNEW / HAVE KNOWN} Max since 1960”

The three verb forms in these sentences are: “presente” / “pretérito perfeito simples” / “pretérito perfeito composto”; for facility, I glossed them with a simple present, a simple past, and a past perfect, respectively, although, as noted in chapter 2, these forms are not equivalent. All these Portuguese sentences mean that the described state extends *continuously* from the moment nailed down by the complement of *desde* up to (i) the utterance time (i.e. the TPpt), in the examples with “presente”, or (ii) a moment *closely before* the utterance time, in the sentences with “pretérito perfeito simples”; both possibilities – extension of the state to the utterance time or not – are, in principle, open for the sentences with “pretérito perfeito composto”<sup>269</sup> (which is a general characteristic of this tense in combination with atelic descriptions, as observed in chapter 2). Note, for that matter, that the oddity of (521c) with the (simple or compound) “pretérito perfeito” seems due to the fact that it describes a state – somebody knowing somebody else – which can hardly be associated with an endpoint.

The fact that the Portuguese sentences with “pretérito perfeito simples” only have a durative-like reading, according to which the described states extend up to a moment in the near past of the utterance time, is illustrated by the following sequences:

- (522) a. O Sam esteve em Boston desde as 7 horas. Acabou de partir para Miami.  
“Sam WAS in Boston since 7.00. He has just left for Miami”
- b. ??/\*O Sam esteve em Boston desde as 7 horas. Partiu para Miami há horas.  
“Sam WAS in Boston since 7.00. He left for Miami hours ago”

While in (522a) the second sentence, asserting that the described state ceased to hold shortly before the utterance time, seems a natural continuation of the first one, in (522b) the

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<sup>269</sup> For pragmatic reasons, in the sentence (521b) with “pretérito perfeito composto”, the extension (of the described state) up to the TPpt is normally assumed. If the Subject of the sentence does not represent the speaker, this is no longer assumed:

- (i) O Sam *tem estado* doente desde Setembro. Não sei se já estará bom.  
“Sam HAS BEEN sick since September. I don’t know whether he has already recovered”

second sentence is an extremely odd continuation. The same holds, with the relevant adaptations, for sentences with past TPpts (i.e. with “pretérito mais-que-perfeito”):

- (523) a. O Sam tinha estado em Boston desde as 7 horas. Acabara de partir para Miami.  
 “Sam HAD BEEN in Boston since 7.00. He had just left for Miami”
- b. ??/\*O Sam tinha estado em Boston desde as 7 horas. Partira para Miami muitas horas antes.  
 “Sam HAD BEEN in Boston since 7.00. He had left for Miami many hours before”

Let me comment on these facts from a general perspective now. The Portuguese examples presented here illustrate the fact that the main clauses of sentences with *desde* exhibit a more varied spectrum of tense forms than their English counterparts with *since*. It is a well-known fact about English that, with few exceptions, *since*-adverbials only combine with perfective main clauses<sup>270</sup> (no such restriction applying to any Romance language, or to German, for instance, whose counterparts of *since* can combine with tenses like the simple present). The tense of the main clause varies in English essentially according to the position of the TPpt relative to the utterance time (cf. Kamp and Reyle 1993: 628):

<sup>270</sup> This seems to be an idiosyncrasy of English, for which I will not attempt to find a reason here. On exceptional cases, cf. e.g. Quirk *et al.* (1985):

“Apparent exceptions to the requirement of a perfective verb occur when a phrase or clause introduced by *since* correlates with a superlative or ordinal:

Yesterday was the hottest day since I came to live here.

Joan came to work in her car last week for (only) the second time since October.

Such *since*-constructions are best regarded as post modifications in noun-phrase structure and not as adjuncts” (Quirk *et al.* 1985: 539, fn. [b]).

Note, for that matter, that the constructions mentioned in section 9.3.2 ahead – with *desde*-adverbials included in nominal modifiers (and therefore not directly interacting with a verbal constituent) – have grammatical English counterparts.

“More substantial exceptions occur in AmE, especially where the clause in which the *since* adjunct operates refers to the present; and increasingly, these exceptions apply to BrE as well (...):

It is *ages* since she was (last) here. (...) NB '...since she's been here', '...\*since she's been last here' (...)

[illegible]

I'm doing well since I bought those oil shares. (...)

But in AmE we also have:

Since I last saw you, my mother *died*. (...)

I was here since before 8 a.m.” (*ibid.*).

- (524) a. present TPpt  $\wedge$  present perfect  
 Mary *has lived* in Amsterdam since 1975.
- b. past TPpt  $\wedge$  present perfect  
 Mary *had lived* in Amsterdam since 1975.
- c. future TPpt  $\wedge$  future perfect  
 Mary *will have lived* in Amsterdam since 1975.

In Portuguese, the tense of the main clause varies according to two factors: (i) the position of the TPpt with respect to the utterance time, as in English; (ii) the position of the TPpt with respect to the described eventuality. Therefore, for each of the three TPpts – present, past and future – there are in principle (at least) two possibilities in Portuguese<sup>271</sup>:

- A.**  $\langle$ located eventuality overlaps with the TPpt $\rangle$   
 Tenses used are: “presente”, “pretérito imperfeito” and “futuro imperfeito”, for present, past and future TPpts, respectively.
- B.**  $\langle$ located eventuality *closely* anterior to the TPpt $\rangle$   
 Tenses used are: “pretérito perfeito simples”, “pretérito mais-que perfeito” (simple or compound, with apparently no interpretive differences) and “futuro perfeito”, for present, past and future TPpts, respectively.
- The “pretérito perfeito composto” is a particular case expressing anteriority (of the described eventuality) to the (present) TPpt, but with possible overlapping with it.

In what concerns the formal representation, cases **A** are unproblematic: the TPpt marks the end of the location time – [end (t) = TPpt] (as seems to be the case for all English sentences, given the use of the perfect); the described atelic eventuality is located duratively – [t  $\subseteq$  ev]; hence, we infer that this eventuality holds at the TPpt – [ev  $\circ$  TPpt]<sup>272</sup>. This happens in sentences (521) above, with “presente”, or in the following ones, with “pretérito imperfeito” (and thus a past TPpt):

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<sup>271</sup> Structures with future TPpts are possible, though very often somewhat odd. I will henceforth ignore them. Observe the following Portuguese sentences, where the tense forms are “futuro imperfeito” (glossed with the English simple future) in (i), and “futuro perfeito” in (ii):

- (i) Nessa altura, a Ana *estará* a viver em Paris provavelmente desde Janeiro.  
 “at that time, Ana WILL BE living in Paris probably since January”  
 [At that time, Ana will have been living in Paris probably since January]
- (ii) A essa hora, a Ana já deve ter desligado o computador. Provavelmente, *terá estado* a trabalhar desde o meio-dia e já estará a preparar o jantar.  
 [At that time, Ana must have already turned off her computer. Probably, she will have been working since noon and she will be already preparing the dinner]

<sup>272</sup> In fact, the condition [ev  $\circ$  t] is actually *asserted* in the relevant sentences, if we assume, in accordance with what was advocated in section 4.2.2.3, that tense forms introduce directly in the semantic representation a condition relating the located eventuality to the TPpt (cf. the feature TENSE LOCATION in that subchapter and in chapter 2, and the relation **E,R** in Reichenbach).



- (525) a. A Ana chegou às 11 horas. O Sam estava em Boston desde as 7.  
 “Ana arrived at 11.00. Sam WAS<sub>IMPERFEITO</sub> in Boston since 7.00”  
 [Mary arrived at 11.00. Sam had been in Boston since 7.00]
- b. Chovia ininterruptamente desde o meio-dia.  
 “It RAINED<sub>IMPERFEITO</sub> uninterruptedly since noon”  
 [It had been raining uninterruptedly since noon]

Cases **B** are slightly more complex, and require either a different definition of the location time, or a different location condition. First, recall that, in the relevant sentences, the described eventuality is understood to obtain *all through* the interval associated with the *desde*-adverbial, up to a moment that is *shortly before* the TPpt. Now, there are at least two different ways of formally representing this (which yield the same result):

1. Maintaining the location condition as in A –  $[t \subseteq ev]$  (i.e. *strict* durative location) – and consider that the upper bound of the location time  $t$ , because of the tense used, is defined by the condition  $[end(t) <_{close} TPpt]$  rather than  $[end(t) = TPpt]$ .<sup>273</sup>
2. Maintaining the condition that defines the upper bound of the location time as in A –  $[end(t) = TPpt]$  – and replacing the location relation  $[t \subseteq ev]$  by e.g.  $[ev \circ beg(t)]$ ,  $[ev \circ t']$  and  $[t' <_{close} end(t)]$ . In this case, the location mode would be *semi-durative* (“the eventuality covers *almost all* the location time, its final part possibly excluded”) rather than *strictly durative*.

The conditions stated in 1 and 2 seem also adequate to represent sentences with “pretérito perfeito composto”. In fact, this tense form leaves open whether the described state ends before the utterance time or not (cf. below), which is perfectly compatible with the conditions therein stated:

- (526) O Paulo *tem estado* muito doente desde Janeiro. Não sei se agora já estará recuperado porque não falo com ele há dois dias. (cf. Peres 1993: 26)  
 “Paulo HAS BEEN very sick since January. I don’t know if he has already recovered, because I haven’t talked to him in the last couple of days”

To end this subsection, I will mention some differences in the formal representation of the Portuguese and English sentences, concerning the use of auxiliary perfective verbs. According to Kamp and Reyle’s treatment of the perfect (described in chapter 2), in sentences with *since*, which normally include a perfective form, the following two facts are to be noted: (i) a result state  $s'$  is always associated with the *relevant eventuality*  $ev$ , or with its beginning, if  $ev$  is stative (the relevant eventuality being the one represented by the sentence without the auxiliary perfective verb); (ii) this result state holds at the TPpt (i.e. at the upper bound of the location time), as established by the tense of the main clause (e.g.  $n$  for the present perfect) – cf. Kamp and Reyle (1993: 628 ff.). The associated conditions are as follows:

<sup>273</sup> Note that from the conjunction of  $[t \subseteq ev]$  and  $[end(t) <_{close} TPpt]$ ,  $[ev < TPpt]$  is not inferred. This is not a problem, if we take this information to be the specific contribution of the tense of the verb, and not of the locating adverbial (cf. previous footnote).

- (527) a'.  $[ev \supset \subset s']$  (if **ev** is telic)  
 a''.  $[e = \text{beg}(ev)] \wedge [e \supset \subset s']$  (if **ev** is stative)  
 b.  $[s' \circ \text{TPpt}]^{274}$

Accordingly, the DRS for the English sentence below, in its durative reading, would include the appended conditions:

- (528) Sam has been in Boston since 7.00.  
 $[s: \text{Sam be in Boston}]$   
 $[t \subseteq s], [\text{beg}(t) = t_c], [7.00(t_c)], [\text{end}(t) = n]$   
 $[\text{beg}(s) \supset \subset s']^{275}, [s' \circ n]$

Presumably, as advocated in Peres (1993), similar conditions involving result states also apply to the Portuguese structures with the auxiliary verb *ter*, namely “pretérito perfeito composto” (present TPpt), “pretérito mais-que-perfeito composto” (past TPpt) and “futuro perfeito” (future TPpt). Assuming this, the DRS for the Portuguese counterpart of (528) with “pretérito perfeito composto” includes the following conditions (where the set of alternative conditions 1 / 2 corresponds to the two possible analyses mentioned above, and the bolded conditions distinguish Portuguese from English)<sup>276</sup>:

- (529) O Sam *tem estado* em Boston desde as 7 horas.  
 $[s: \text{Sam be in Boston}]$   
 $[1] \left\{ [t \subseteq s], [\text{beg}(t) = t_c], [7.00(t_c)], [\text{end}(t) <_{\text{close}} n] \right\}$   
 $[2] \left\{ [s \circ \text{beg}(t)], [s \circ t'], [t' <_{\text{close}} \text{end}(t)], [\text{beg}(t) = t_c], [7.00(t_c)], [\text{end}(t) = n] \right\}$   
 $[\text{beg}(s) \supset \subset s'], [s' \circ n]$

I will assume, lacking better evidence to the contrary, that Portuguese simple tense forms do not introduce a result state (and the associated conditions) in the representation. Therefore, structures with *desde* and simple verbal forms, like “presente”, “pretérito imperfeito”, “pretérito perfeito simples” or “pretérito mais-que-perfeito simples” will have a relatively simpler representation:

<sup>274</sup> (527b) is slightly different from Kamp and Reyle’s original formulation. In fact, these authors do not relate the result state  $s'$  and **TPpt** directly (but rather indirectly, via a time discourse referent, corresponding, in cases with *since*, to the endpoint of the location time). This has to do with their (already commented) option of relating located eventualities and TPpts indirectly, through mediation of the location time. Since I do not follow this option (cf. 4.2.2.3), and the difference at stake is immaterial here, I’ll adopt the representation (527b). Accordingly, in (528) below I will use the (simpler) conditions  $[s' \circ n]$  and  $[\text{end}(t) = n]$ , rather than Kamp and Reyle’s (equivalent) conditions  $[s' \circ t']$ ,  $[t' = n]$  and  $[t' = \text{end}(t)]$  (cf. their representations on pp. 632-633).

<sup>275</sup> The condition  $[\text{beg}(s) \supset \subset s']$  is a notational simplification for  $[[e = \text{beg}(s)] \wedge [e \supset \subset s']]$ .

<sup>276</sup> In order to facilitate the reading of the DRSs to non-Portuguese speakers, I translate, here and henceforth, the lexical items in the formal representations.

(530) O Sam *está* em Boston desde as 7 horas.

“Sam IS in Boston since 7.00”

[s: Sam be in Boston]

[ $t \subseteq s$ ], [ $\text{beg}(t) = t_c$ ], [ $7.00(t_c)$ ], [ $\text{end}(t) = n$ ]

(531) O Sam *esteve* em Boston desde as 7 horas.

“Sam WAS in Boston since 7.00”

[s: Sam be in Boston]

[1]  $\left\{ [t \subseteq s], [\text{beg}(t) = t_c], [7.00(t_c)], [\text{end}(t) <_{\text{close}} n] \right\}$   
 [2]  $\left\{ [s \circ \text{beg}(t)], [s \circ t'], [t' <_{\text{close}} \text{end}(t)], [\text{beg}(t) = t_c], [7.00(t_c)], [\text{end}(t) = n] \right\}$

### 9.2.2.2. Location of telic eventualities by *desde* and *since* adverbials

The inclusive location of telic descriptions with *desde* and *since* phrases is the focus of this chapter, and will be extensively discussed over the next subsection. Here, I will only make some general observations, focusing on the differences between the Portuguese and the English phrases (specially regarding compatibility with tense forms) which are important for the analysis to be made in 9.3.

As already said, the outstanding difference between *desde* and *since* with regard to event location is the incompatibility of former *vs.* the compatibility of the latter with the simple inclusive location, which contrasts with the compatibility of both with the full-scanning inclusive location:

(532) a. O Paulo *escreveu* três livros desde 1980.

“Paulo WROTE three books since 1980”

b. Paulo *has written* three books since 1980.

The TPpt (= the upper bound of the location time) of these sentences is the utterance time. In this situation, Portuguese uses the “pretérito perfeito simples” and English the present perfect. In sentences with past TPpts, Portuguese uses the “pretérito mais-que-perfeito” (simple or compound, apparently with no interpretive differences<sup>277</sup>) and English the past perfect<sup>278</sup>:

(533) a. O Paulo {*escrevera* / *tinha escrito*} três livros desde 1980.

b. Paulo *had written* three books since 1980.

<sup>277</sup> Arguably, in the representation, these two forms are distinguished, by association of a result state with the compound – but not with the simple – form. I will ignore this question here.

<sup>278</sup> I will ignore the (often odd) structures with future TPpts, which include future perfect in English and “futuro perfeito” in Portuguese:

(i) O Paulo *terá escrito* três livros desde 1980.

(ii) Paulo *will have written* three books since 1980.

The conditions concerning the contribution of the English perfect mentioned in the end of the previous subsection also apply here: sentences with *since* and event-descriptions involve a result state *s*, and the conditions  $[ev \supset \subseteq s]$  and  $[s \circ TPpt]$  (where *ev* is the event described by the main clause without the auxiliary). (535) integrates my proposed representation for full-scanning:

(534) Paulo has got married since 1980.

[e: Paulo get married]

$[e \subseteq t]$ ,  $[beg(t) \subseteq t_c]$ ,  $[1980(t_c)]$ ,  $[end(t) = n]$

$[e \supset \subseteq s]$ ,  $[s \circ n]$

(535) Paulo has got married three times since 1980.

$[E = \Sigma e: [[e: \text{Paulo get married}] \wedge [e \subseteq t]], [E \subseteq t]$  (redundant)<sup>279</sup>

$[|E| = 3]$

$[beg(t) \subseteq t_c]$ ,  $[1980(t_c)]$ ,  $[end(t) = n]$

$[E \supset \subseteq s]$ ,  $[s \circ n]$

Again, for the Portuguese sentences that do not include the auxiliary verb *ter*, I will not introduce in the representation the result state *s* and the associated conditions, this being the main difference to be noted in the DRSs for Portuguese and English examples to be presented in the next subchapter.

(536) O Paulo casou três vezes desde 1980.

“Paulo MARRIED three times since 1980”

$[E = \Sigma e: [[e: \text{Paulo get married}] \wedge [e \subseteq t]], [E \subseteq t]$  (redundant)

$[|E| = 3]$

$[beg(t) \subseteq t_c]$ ,  $[1980(t_c)]$ ,  $[end(t) = n]$

Sentences with the “pretérito mais-que-perfeito composto” will have a relatively more complex representation (just like the English sentences with past perfect), since a result state *s* will be inserted in the DRS:

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<sup>279</sup> The condition  $[E \subseteq t]$  explicitly *asserts* that the set of events represented in the main clause falls within the location time. Given the presence of  $[e \subseteq t]$  in the sub-DRS (not inserted by the adverbial! – cf. formal analysis in 9.3.1.2),  $[E \subseteq t]$  is in fact redundant (though harmless, anyway). Its introduction results from the (formal) assumption that the *desde*-adverbial, just like any other locating adverbial, always introduces a location condition when it is processed. In all the structures of 9.3.1, the locating PP-adverbial is processed – according to the rule proposed in 4.2.2.5 – independently from the S-node, introducing in the main DRS the condition  $[E \subseteq t]$  (where *E*, the entity described by the S-node as a whole, is its referential argument). In this respect, structures in 9.3.1 differ from those in 9.3.2.

- (537) a. O Paulo tinha casado três vezes desde 1980.  
 b. Paulo had got married three times since 1980.

$[E = \Sigma e: [[e: \text{Paulo get married}] \wedge [e \subseteq t]], [E \subseteq t]$  (redundant)

$[|E| = 3]$

$[\text{beg}(t) \subseteq t_c], [1980(t_c)], [\text{end}(t) = o]$  (where  $[TPpt := o]$  and  $[o < n]$ )

$[E \supset \subset s], [s \circ TPpt]$

### 9.3. Portuguese *desde*-adverbials and the full-scanning inclusive location

The aim of this subchapter is two-fold: on the one hand, to identify the contexts (at least some of the most prominent) entailing full-scanning of location times; on the other hand, to elaborate on formal issues, namely by providing DRS-construction rules for an illustrative set of constructions. As said, this will be done essentially by looking at data involving Portuguese *desde*-adverbials, which permit a particularly clear-cut demarcation of the full-scanning structures.

Let us reconsider some examples showing the incompatibility of *desde*-adverbials with the simple inclusive location<sup>280</sup>:

- (538) a. \*O Paulo morreu desde 1980.  
 “Paulo has died since 1980”  
 b. \*O Paulo casou desde 1980.  
 “Paulo has got married since 1980”  
 c. \*O Paulo escreveu este livro desde 1980.  
 “Paulo has written this book since 1980”

A important caveat is in order here. Portuguese speakers are quite assertive in what concerns the ungrammaticality (or at least the serious oddity) of the constructions above, irrespective of the context in which they occur. In fact, matters of acceptability in this area are apparently more straightforward in Portuguese (and in Romance languages, in general) than in English – cf. quotations in (509a-b) above. Nevertheless, among the constructions with *desde* and simple temporal inclusion, there are (often quite subtle) grammaticality gradations, within the area of oddity, which at the limit nearly touch acceptance. Let me give just some examples of linguistic factors that appear to affect acceptability, in some way or other. I state them with some reserve, since grammaticality judgements are quite hesitant, and variable among speakers:

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<sup>280</sup> In this section, I will not try to assess the grammaticality of the English counterparts of the Portuguese odd examples, whence they will be presented as glosses (within commas), rather than as translations (within brackets). If English *since* were unrestrictedly compatible with the simple inclusive location, these glosses should, in principle, constitute grammatical English sentences; I believe that this is not always the case (some of these “glosses” being hardly acceptable as rightful English sentences).

(i) *Event repeatability*. Sentences describing unrepeatable events are generally worse than those describing repeatable events.

- (539) a. \*O Paulo morreu desde 1980.  
“Paulo has died since January”  
b. ??O Paulo foi ao Brasil desde 1980.  
“Paulo has been to Brazil since January”

(ii) *Event punctuality*. Sentences describing instantaneous events are normally considered odder than those describing extended telic events.

- (540) a. \*O Paulo comprou *Os Lusíadas* desde Janeiro.  
“Paulo has bought *Os Lusíadas* since January”  
b. ??O Paulo leu *Os Lusíadas* desde Janeiro.  
“Paulo has read *Os Lusíadas* since January”

(iii) *Adverb position*. Sentences with sentential-initial *desde*-adverbials tend to be considered (at least slightly) better than the parallel ones with sentence-final adverbials; in general, constituent order – and, more importantly, stress – is relevant to determine acceptability.

- (541) a. ??O Paulo completou a tese desde Janeiro.  
“Paulo has finished his thesis since January”  
b. ??Desde Janeiro, o Paulo completou a tese.  
“Since January, Paulo has finished his thesis”

(iv) *Size of the location time*. This interacts with pragmatic factors.

- (542) a. \*O Paulo torceu o pé desde 1980.  
“Paulo twisted his ankle since 1980”  
b. ??/\*O Paulo torceu o pé desde ontem.  
“Paulo twisted his ankle since yesterday”

(v) *Eventuality- vs. time-related definition of the location time*. Sentences with an eventuality-describing adverbial are normally better (specially if some rhetorical connection can be established between located and locating eventuality) than those with strictly temporal adverbials. In fact, sentences with “discourse-relevant” locating eventualities are those more closely approaching total acceptance; the three examples below are possibly odder with e.g. *Janeiro / January* as a complement of *desde*.

- (543) a. OK/?O Paulo esteve com a Ana desde que regressou de férias.  
“Paulo has met Ana since he returned from his holidays”  
b. OK/?O Paulo casou desde que o vi pela última vez.  
“Paulo has got married since I last saw him”  
c. OK/?Este problema foi resolvido desde que a novo governo foi eleito.  
“This problem has been solved since the new government was elected”

In this chapter, I will ignore all the variations just described, and assume the general ungrammaticality of simple inclusive *desde*-constructions, that is, I will assume that the processing system does not take [<sub>S</sub> S<sub>π</sub> [<sub>PP</sub> *desde* XP]] (where  $\pi$  identifies S as an atomic event-description) as a triggering configuration. In any case, were some of these constructions – e.g. (543), or similar – to be acknowledged, the discourse rules would just have to be made more flexible (with the appropriate sieves).

### 9.3.1. Portuguese *desde*-adverbials not included in nominal modifiers

#### 9.3.1.1. Triggers of full-scanning

In this subsection, I will enumerate and briefly describe **seven** (adverbial) contexts where the combination of *desde* and main clause event-descriptions is perfectly grammatical, in contrast with what happens in (538). I will hypothesise that the factor unifying all these contexts is that they involve a full-scanning of the location time (in the terms described at the beginning of 9.1), triggered by some linguistic element. In other words, I will assume that **the licensors of inclusive *desde* are full-scanning triggers**. As we will see, most contexts involve, on a par with the summation of events proper, explicit (direct or indirect) quantification over the obtained sums, that is to say the location time provides a frame for counting – or, more generally, quantifying over – events.

I must emphasise that the (formal) analysis of most contexts presented here entails specific problems that cannot be tackled within this dissertation. Therefore, I will attempt to achieve a more detailed formal analysis, including the relevant DRS-construction rules, for illustrative purposes, only for one context, namely that involving NPs with cardinality quantifiers (CONTEXT 2 below). This will be done in section 9.3.1.2. The remaining contexts will be treated with varying degrees of detail, depending on the complexity of the problems they raise.

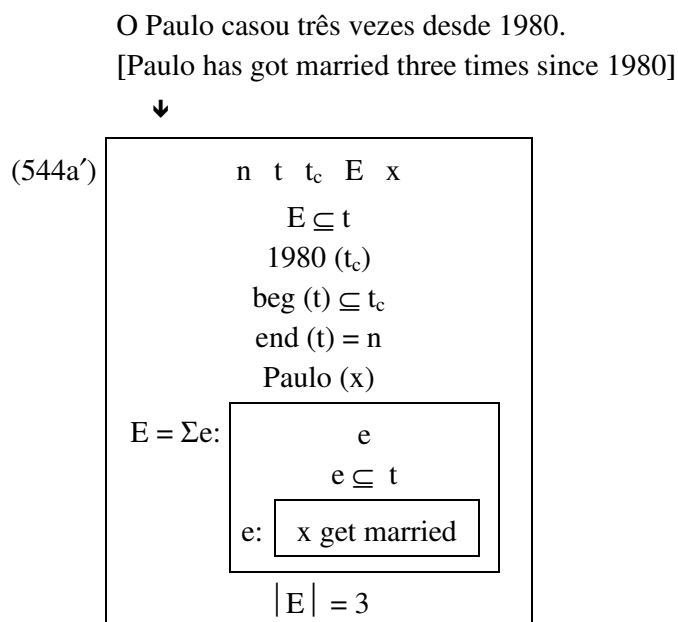
#### CONTEXT 1: (EXPLICIT) QUANTIFIERS OVER EVENTS

- (544) a. O Paulo casou *três vezes* desde 1980.  
           [Paulo has got married *three times* since 1980]
- b. O Paulo leu este livro *três vezes* desde 1980.  
           [Paulo has read this book *three times* since 1980]
- (545) O Paulo (só) casou *uma vez* desde 1980.  
           [Paulo has got married (only) *once* since 1980]

These sentences show that the inclusive *desde* is licensed by the presence of a quantifier over events, such as *três vezes* [*three times*] or *uma vez* [*once*]. This quantifier involves explicit reference to a set of events, namely the set of *all* events of the relevant type occurring within the location time, and direct specification of its cardinality. Sentence

(545) shows, furthermore, that a *single event* can be located within the interval defined by a *desde*-phrase, provided its uniqueness (within that interval) is stated. As can be easily seen, in any of the sentences above, the assertion made involves the location time *in its entirety*. Formally, a sentence like (544a), for instance, can be associated with the following DRS:

(NB: here and in all subsequent representations, I ignore the contribution of tense and, as already said, translate the lexical items into English)



It must be noted that, in some specific contexts, the event-quantifier need not be explicit. This happens namely in structures with *já* (the Portuguese counterpart of *already*):

- (546) O Paulo *já* encontrou a Ana desde ontem.  
“Paulo has *already* met Ana since yesterday”

Apparently, the adverb *já* licenses the omission of quantifier (which can nevertheless be expressed as *pelo menos uma vez* [*at least once*]). In fact, the sentence above without *já* is notably odder. I will not try to account here for the grammaticality of sentences like (546)<sup>281</sup>.

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<sup>281</sup> This probably relates with the fact that *já* – in combination with *desde*, though not alone – requires that the described eventualities be repeatable, that is, apparently involves an implicit *pelo menos uma vez* [*at least once*] quantifier:

- (i) \*o Paulo *já* morreu desde ontem. [“Paulo has already died since yesterday”]  
 vs. (ii) <sup>OK</sup>o Paulo *já* encontrou a Ana desde ontem. [“Paulo has already met Ana since yesterday”]  
 vs. (iii) <sup>OK</sup>o Paulo *já* morreu. [“Paulo has already died”]



- (547) a. *Três mil pessoas* morreram aqui desde 1980.  
[Three thousand persons have died here since 1980]
- b. O Paulo escreveu *três livros* desde 1980.  
[Paulo has written three books since 1980]
- c. O Paulo restaurou o altar da igreja matriz de *três cidades* desde 1980.  
[Paulo has restored the altar of the parish church of three towns since 1980]
- (548) O Paulo escreveu (só) *um livro* desde 1980.  
[Paulo has written (just) one book since 1980]

These sentences show that the inclusive *desde* is licensed by the presence of a nominal cardinal quantifier, like *three*, in an NP with distributive reading, either in Subject position – (547a) – or in Object position – (547b) – or even, among others, in the complement or modifier of a nominal predicate, therefore occupying a relatively deeper syntactic position – (547c)<sup>282</sup>. It must be emphasised that all these sentences (in their distributive reading) involve (at least) as many events as objects that emerge as relevant in the quantificational process. In fact, we can consider – as is, for that matter, common in the literature<sup>283</sup> – that there is quantification over events also in these cases, although an *indirect* one, via the nominal quantifier. These sentences can therefore be taken to represent a set of events – **E** – whose cardinality equals, or is greater than, that of the relevant set of objects: in (547a) and (547b), for instance, there are, respectively, 3000 persons / 3000 dying-events and 3 books / 3 writing-events<sup>284</sup>. The crucial fact to note here is that **E** can again be conceived of

<sup>282</sup> The licensing NP can also occur as the complement (or modifier) of a nominal predicate in structures with adnominal *desde*-phrases:

- (i) [A abertura de *três novas escolas* desde Janeiro] foi mencionada pelo ministro ontem.  
[[The opening of three new schools since January] was mentioned by the minister yesterday]

vs. (ii) \*[A abertura desta escola desde Janeiro] foi mencionada pelo ministro ontem.  
“the opening of this school since January was mentioned by the minister yesterday”

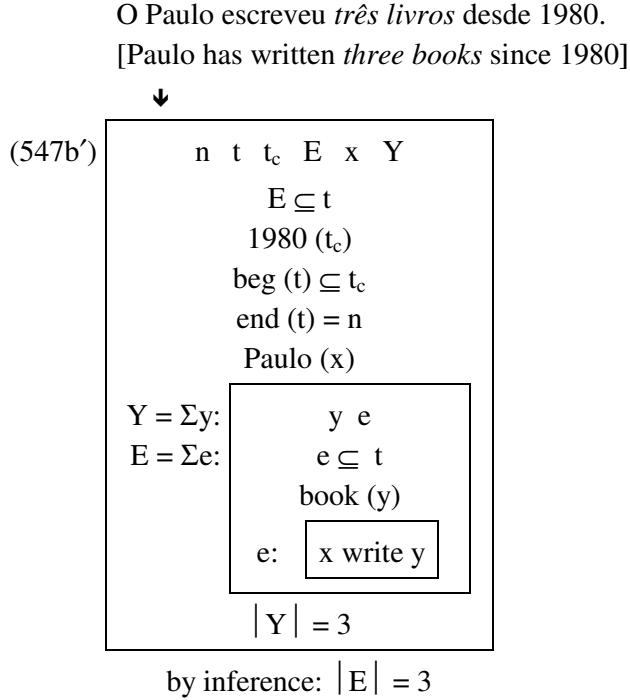
<sup>283</sup> Cf. e.g. Schein (1993: 118): “to quantify over objects is to quantify concurrently over events and their parts”.

<sup>284</sup> If the same object can be involved more than once in the relevant relation, events may outnumber objects. For instance, the sentence *Paulo read three books* can describe an eventuality comprising six reading-subevents, if each book was read twice. Obviously, matters are different with the sentence *Paulo wrote three books*, since book-writings are unrepeatable. Note also that, if more than one distributive NP with a cardinal quantifier occurs in a given structure, as in

- (i) Three students wrote three essays.

the cardinality of the hierarchically higher set of events equals, or is greater than, the result of multiplying the numbers associated with each quantifier: for instance, the sentence above refers to a set of nine (three times three) events (if both NPs are interpreted distributively). I thank Hans Kamp and Rainer Bäuerle for these remarks.

as the set of *all* events of the relevant type occurring within the location time  $t$  (which is thus “fully-scanned”)<sup>285</sup>. Accordingly, a sentence like (547b), for instance, can be represented as:



What is worth noticing in this representation is the introduction of a **double abstraction operation** over the same sub-DRS<sup>286</sup>: one over atomic discourse referents for objects  $y$ , creating the representation of a set of objects (books)  $Y$ , like in Kamp and Reyle (1993); another over atomic discourse referents for events  $e$  (in this case, each single event of Paulo writing a book within the location time  $t$ ), that creates a representation of a set of events  $E$ , namely the set of *all* book-writing-events having Paulo as an Agent that happened within  $t$ . It is this set of writing-events that the adverbial, as a whole, locates:  $[E \subseteq t]$  (cf. fn. 279).

The contrast between the grammatical sentence (548) and the ungrammatical (538c), repeated below, is particularly interesting:

- (549)    O Paulo escreveu (só) *um livro* desde 1980.  
          [Paulo has written (only) *one book* since 1980]
- (550)    \*O Paulo escreveu *este livro* desde 1980.  
          “Paulo has written *this book* since 1980”

<sup>285</sup> Strictly speaking, in order to determine the truth value of sentences with upward-monotone cardinal quantifiers, as *o Paulo escreveu pelo menos três livros desde 1980* [Paulo has written *at least three books* since 1980], the scanning of the *whole* location time (modulo the provisos in footnote 258) may not be necessary. In fact, if (just) *part* of the location time contains three book-writings by Paulo, this is enough to guarantee the truth of the sentence (the rest of the interval being irrelevant). Nevertheless, sentences like the one above are in a sense assertions about the whole location time, being representable with the same abstraction mechanisms required by structures with non-monotone cardinal quantifiers.

<sup>286</sup> Multiple abstraction has been used in DRT by e.g. Eberle (1995?, 1998).

Both sentences describe a single event, but with a critical difference: the assertion associated with the cardinal numeral *um* [*one*] – viz. that the set of books written within the relevant interval has (only) one member – requires the scanning of the whole interval, while that involving the singular demonstrative *este* [*this*] does not; more generally, this is the case for any singular definite or indefinite NP, like *este livro* [*this book*], *o livro X* [*the book X*], or *um livro*<sup>287</sup> [*a book*], none of which licenses the inclusive *desde*. This difference is straightforwardly represented in Kamp and Reyle’s system, since only cardinal numerals are associated with abstraction over individual discourse referents (cf. *ibid.*: 455).

At this point, it must be stressed that the presence of an NP with a cardinal quantifier is not sufficient to sanction the use of an inclusive *desde*. For instance, NPs with a **group reading** apparently do not have a licensing capacity. Compare the following two sentences:

- (551) a. Três estudantes compraram um computador nesta loja.  
           [Three students (have) bought a computer in this store]  
       b. Três estudantes compraram um computador nesta loja desde a semana passada.  
           [Three students have bought a computer in this store since last week]

Whereas the first Portuguese sentence can have both a distributive reading, involving three different buying-events, and a group reading, involving a single corporate buying-event by the three students, the second sentence can only have the distributive reading. Formally, I assume, in line with Kamp and Reyle (1993), that NPs with cardinal quantifiers and group readings are not associated with an abstraction operation, contrary to those that have a distributive reading (cf. formalisation in section 9.2.2.1). This amounts to saying that, in such cases, it is existential quantification that is involved. Things being so, it is only natural that the operating monotonicity properties are those of existential quantification, not the (non-)monotonicity of (distributively interpreted) cardinals. That this is the effective inferential pattern for these NPs was already seen above (cf. (503), on page 298), and is confirmed by the following sequence:

- |  |   |                  |
|--|---|------------------|
| <p>(552) Três estudantes compraram um computador nesta loja<br/>             no dia 15 de Maio.<br/>             Three students bought a computer in this store on May 15.<br/>             →<br/>             Três estudantes compraram um computador nesta loja em Maio.<br/>             Three students bought a computer in this store in May.</p> | } | group<br>reading |
|--|---|------------------|

It is interesting to note, in passing, that NPs with cardinals and distributive interpretation can exhibit the same behaviour as group NPs concerning this sort of entailment and, hence, not trigger a full-scanning interpretation. This is the case, for instance, if a sentence like (551a) above is used to describe a (distributional) purchase of

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<sup>287</sup> In Portuguese, like in French for instance, the singular cardinal numeral, *um* [= *one*], is a homonym of the singular indefinite article, *um* [= *a*]. I take it that, in the relevant grammatical structures with *desde*, *um* is always interpreted as a numeral.

computers by three individuals (say, Peter, Susan and Mary) that *the speaker has in mind* but does not want to name. In these utterance conditions, the relevant NP has a referential type of interpretation, and the sentence cannot be assigned a full-scanning reading. Accordingly, the inferential pattern in (552) is valid for these NPs, and they are not licensors of the inclusive *desde*<sup>288</sup> (cf. similar behaviour of the definite NP *estes três estudantes* [*these three students*]).

The incapacity of an NP with a cardinal numeral to license the inclusive *desde* is also verified when this NP is combined with collective-like expressions such as *juntos* [*together*], *colectivamente* [*collectively*], *ao mesmo tempo* [*at the same time*], or similar<sup>289</sup>:

- (553) a. \*O Paulo viu três pessoas *juntas* desde ontem.  
 “Paulo has seen three persons *together* since yesterday”  
 b. \*Três pessoas receberam este prémio *colectivamente* desde 1980.  
 “Three persons have won this prize *collectively* since 1980”

These Portuguese sentences are ungrammatical with the expressions in italics, but are good without them. Arguably, the cause of ungrammaticality is that these expressions render part of the location time irrelevant, that is, when they are present, the sentences are not assertions about how many objects are involved in the pertinent relation taking into account the whole location time, but rather assertions about the (simple) inclusion of a certain complex event in a given time frame. I will not attempt a representation of this type of sentences here.

A similar blocking effect is obtained, without these collective-like adverbials if, by virtue of the lexical content of the expressions involved (and given our world knowledge), the interpretation involving multiple temporally discontinuous events is excluded. This happens in (554a) below (in the normal reading, where the Subject-NP has wide scope over the Object-NP<sup>290</sup>):

- (554) a. \*Uma bomba destruiu três edifícios desde a semana passada.  
 “a bomb has destroyed three buildings since last week”  
 b. Uma *bulldozer* destruiu três edifícios desde a semana passada.  
 [A bulldozer has destroyed three buildings since last week]

<sup>288</sup> I have ignored this type of interpretation of NPs with cardinal quantifiers and distributive interpretation (which arguably have a formal representation similar to that of definite NPs) until now, and I will continue to do so henceforth. The assertion that NPs with cardinal quantifiers and distributive readings are inclusive-*desde* licensors (and full-scanning triggers), which I make for simplicity, has to be relativised by excluding these cases.

<sup>289</sup> Cf. e.g. Link (1984: 17): “Normal distributive verbs can also be made collective by attaching collective adverbs like *together*, *simultaneously*, (...), *at once*, *at the same time*”. For Portuguese, cf. Alves (1992).

<sup>290</sup> A reading of (554a) where *três edifícios* [*three buildings*] has scope over *uma bomba* [*a bomb*] (and is therefore equivalent to the grammatical sentence below) does not seem available:

- (i) Três edifícios foram destruídos por uma bomba desde a semana passada.  
 [Three buildings have been destroyed by a bomb since last week]

Given that a bomb can only be dropped once, and its effects on buildings normally take place instantaneously, sentence (554a), with *bomba*, contrary to sentence (554b), with *bulldozer*, is predictably incompatible with *desde*.

At this point, it is important to stress that, contrary to what these examples might seem to indicate, the subevents *need not* temporally distribute over the location time. In fact, they can be simultaneous:

- (555) O Paulo comprou três fatos desde Janeiro. Por acaso, comprou-os todos ao mesmo tempo.  
[Paulo has bought three suits since January. As a matter of fact, he bought them all at the same time]

Now compare this discourse sequence with the following sentence:

- (556) \*O Paulo comprou três fatos *ao mesmo tempo* desde Janeiro.  
“Paulo has bought three suits *at the same time* since January”

What seems to cause ungrammaticality is that the simultaneity of the subevents is explicitly asserted – e.g. by way of an adverbial like *at the same time* – in the sentence that contains the *desde*-adverbial, as in (556) (or else, that it is pragmatically coerced, as in (554a)). In this case, I hypothesise, the full-scanning of the location time is blocked within the sentence with *desde*, thus causing the observed ungrammaticality.

So far, I have only considered distributive and group readings. Let us briefly mention the **cumulative readings** (cf. Scha 1981) now. The following sentence shows that they are also compatible with the inclusive *desde*<sup>291</sup>:

- (557) Estes três estudantes compraram dez livros desde o início do ano.  
[These three students have bought ten books since the beginning of the year]

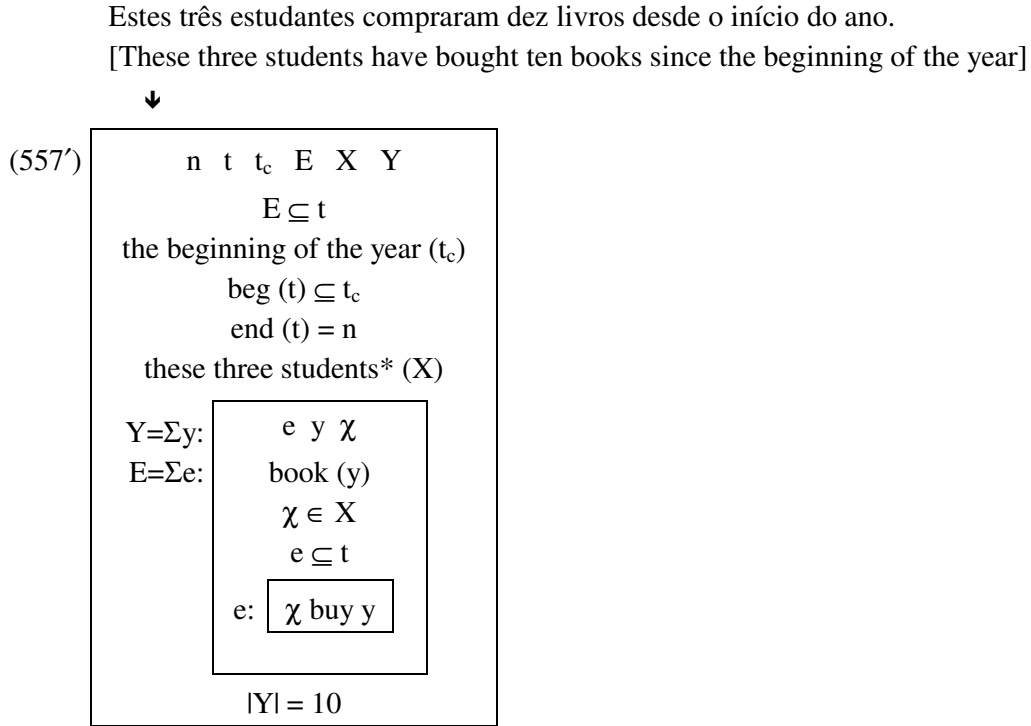
This sentence can describe a situation in which, for instance, the three mentioned students – A, B and C – bought a *total* amount of 5, 2 and 3 books, respectively, within the relevant period. Obviously, this interpretation requires a full-scanning of the whole location time (in order to count all the book-buying events involving each of the three mentioned students). The following entailment impossibility furthermore shows that these “cumulative structures” behave like those with distributive NPs (and unlike those with group NPs), with respect to the location time impact on *defining* the main clause eventuality (NB: *ten* is intended to mean *exactly ten* here):

- |   |   |                       |
|---|---|-----------------------|
| <p>(558) Estes três estudantes compraram dez livros no dia 15 de Maio.<br/>These three students bought ten books on May 15.<br/>–/→<br/>Estes três estudantes compraram dez livros em Maio.<br/>These three students bought ten books in May.</p> | } | cumulative<br>reading |
|---|---|-----------------------|

In the (illustrative) formal treatment to be proposed in the next subsection, I will not take these readings, which pose many specific problems, into account, but leave their analysis

<sup>291</sup> For extensive representations of cumulative readings in DRT, cf. Eberle (1998).

for further research. Note, however, that the cumulative reading of (557) can tentatively be represented with event-abstraction, as follows (where  $\chi$  is a neutral atomic / non-atomic discourse referent, i.e. it can stand for an atom or an i-sum):



With respect to the interference of NP-readings in the licensing of inclusive *desde*, it is still interesting to observe examples with predicates like *reunir-se* [*gather/meet*]. This predicate is quasi-divisible with respect to its first argument<sup>292</sup>, and therefore, unless this argument contains a collective noun (like *equipa* [*team*]), a distributive reading of that NP is blocked. Now, consider the following sentence:

- (559)      Trezentas pessoas reuniram-se nesta sala desde o ano passado.  
[Three hundred persons have gathered/met in this room since last year]

This sentence is grammatical in (at least) the following interpretation: “the (total) number of people involved in some meeting or other having taken place in the mentioned room, since the year that preceded the one containing the utterance time, is 300”. In other words, this sentence can “count” the atoms of all the i-sums involved in a pertinent meeting relation within the location time<sup>293</sup>. Note that (559) could be given as an answer to the question

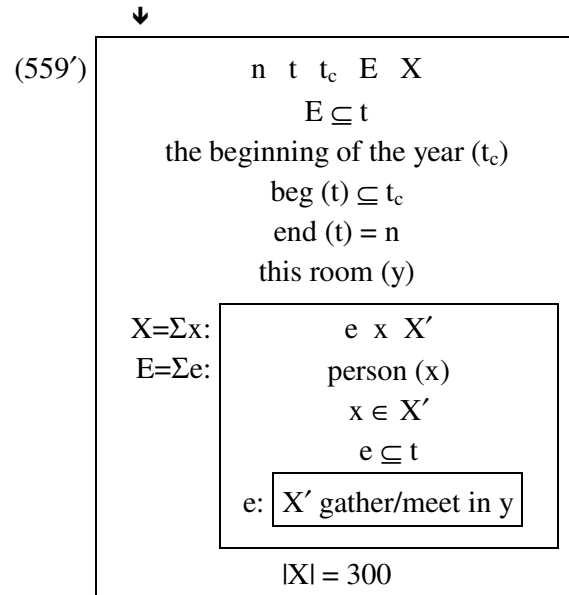
<sup>292</sup> This notion, introduced in Peres (1987), is defined in the following terms in Peres (1998a: 358-359): “A predicate is **quasi-divisible** with respect to its  $i^{\text{th}}$  argument if, when some individual is in the  $i^{\text{th}}$  set of coordinates of a non-empty extension of the predicate, so are all the members of the principal ideal generated by the set containing it, except for the atoms and the zero element (cf. *predicates closed under subgroups* in Hoeksema 1983)”.

<sup>293</sup> This sentence raises formal questions that I do not wish to explore here. In particular, it raises the question as to whether (i) necessarily different persons are being counted, or else (ii) just

- (560) Quantas pessoas se reuniram nesta sala desde o ano passado?  
 [How many people have gathered/met in this room since last year?]

The following tentative representation evinces the similarity between this construction and that in (557), with cumulative reading. I will leave a more elaborate analysis of these structures for further research.

Trezentas pessoas reuniram-se nesta sala desde o ano passado.  
 [Three hundred persons have gathered/met in this room since last year]



It must be stressed that, obviously, a full-scanning trigger – e.g. an NP with a cardinal quantifier and distributive reading – only licenses the use of an inclusive *desde*-phrase if it directly operates on the interval defined by that phrase. This proviso is relevant for structures containing a second adverbial where the full-scanning triggered by the relevant NP involves the time defined by that second adverbial, and not the one defined by the *desde*-phrase<sup>294</sup>. Observe the following sequences:

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meeting-participants, irrespective of their specific identity (possibly preferred reading). In the first case, if somebody had participated in three meetings, for instance, he/she would be counted only once; in the second case, he/she would be counted three times. This type of variation is extensively discussed in Krifka (1990). Here, I will only say that the Portuguese counterpart of Krifka's sentence *four hundred ships passed through the lock* [*quatrocentos navios passaram pela comporta*] is compatible with *desde* both in the "object-reading" (400 different ships, possibly more than 400 passages) and in the "event-reading" (400 different passages, possibly less than 400 different ships involved). In both cases, a full-scanning of the location time clearly takes place. What is unavailable is the single-event reading (400 simultaneous ship-passages) made explicit by an expression like *ao mesmo tempo* [*at the same time*] in the main clause:

- (i) \**Quatrocentos navios passaram pela comporta ao mesmo tempo desde Janeiro.*  
 "Four hundred ships have passed through the lock *at the same time* since January"

<sup>294</sup> This situation obviously blocks the licensing effect of any of the expressions described in this section, and not just of NPs with cardinal quantifiers and distributive reading.

- (561) a. \*O Paulo visitou três estâncias de esqui *no Verão de 1985* desde 1980.  
 “Paulo has visited three ski resorts *in the summer of 1985* since 1980”
- b. \*O Paulo bebeu três cervejas *antes do jantar da passada quarta-feira* desde o início da semana.  
 “Paulo has drunk three beers *before last Wednesday’s dinner* since the beginning of the week”,<sup>295</sup>

The ungrammatical sentences above contain, besides the *desde*-phrase, a “proper” locating expression (in italics) which uniquely defines a subinterval ( $t_1$ ) of the time specified by the *desde*-phrase ( $t$ ): [ $t_1 \subseteq t$ ]. Now, the period which is fully-scanned in these structures is this subinterval  $t_1$ , and not  $t$ . The fact that the interval defined by *desde* ( $t$ ) is not fully-scanned seems, again, to explain the ungrammaticality<sup>296</sup>.

The structures in (561) contrast with the following grammatical ones:

- (562) a. O Paulo visitou três estâncias de esqui *no Verão* desde 1980.  
 [Paulo has visited three ski resorts *in the summer* since 1980]
- b. O Paulo bebeu três cervejas *antes do jantar* desde o início da semana.  
 [Paulo has drunk three beers *before dinner* since the beginning of the week]

These cases differ from those in (561) in that the sequences in italics are “common” locators (cf. formal analysis in 4.2.2.5). They represent intervals ( $t_1$ ) that recur cyclically, and may occur several times within the location time  $t$  defined by the *desde*-adverbial. In fact, the temporal restrictions they impose (e.g. [the summer ( $t_1$ )] and [ $t_1 \subseteq t$ ]) are inserted in the sub-DRS associated with the full-scanning of  $t$ . I leave the study of the (relatively more complex) structures containing sequences of time adverbials, which raise important questions of scope, for further research.

<sup>295</sup> In the English “glosses” of (561), as well as in those of (i)-(ii) in the next footnote, there is a clash between the tense required by the *in- / before*-adverbial (simple past) and the *since*-adverbial (present perfect).

<sup>296</sup> Curiously, if we reverse the order of the temporal adverbials, and use the italic expressions as an apposition, grammaticality seems to improve (specially if a relatively long pause follows the *desde*-adverbial):

- (i) ?O Paulo visitou três estâncias de esqui desde 1980, *no verão de 1985*.  
 “Paulo has visited three ski resorts since 1980, *in the summer of 1985*”
- (ii) ?O Paulo bebeu três cervejas desde o início da semana, *antes do jantar da passada quarta-feira*.  
 “Paulo has drunk three beers since the beginning of the week, *before last Wednesday’s dinner*”

Here, the licensing NP is directly under the scope of the *desde*-adverbial, and I hypothesise that the full-scanning of the location time associated with it can apply. The adverbials at the end of the sentence function as appositions, reducing the location time *a posteriori*, so to speak. The strategy in (i)-(ii) seems to be somewhat unnatural, though. A more natural way of expressing these temporal relations is to resort to two different clauses, like the following (compare with (555)):

- (iii) O Paulo bebeu três cervejas desde o início da semana. Por acaso, tomou-as todas de seguida *antes do jantar da passada quarta-feira*.  
 [Paulo has drunk three beers since the beginning of the week. Actually, he took them all in a row *before last Wednesday’s dinner*]



Before proceeding to a third context, a brief reference to the behaviour of universal quantifiers is in order. See the following sentence:

- (563) ?O Paulo leu *todos os livros* do Kafka desde 1980.  
 [Paulo has read *all the books* by Kafka since 1980]

Generally, speakers consider that these quantifiers do not generate sentences as grammatical as cardinal quantifiers (at least as impeccably so). Notice, for that matter, that in Kamp and Reyle's DRT universal quantifiers, contrary to cardinal ones, do not introduce an abstraction operation (which, as claimed, appears to be the crucial factor in accounting for the acceptability of the inclusive *desde*). I will ignore this type of structures from now on.

The subsequent three contexts contain different types of quantifying elements, which, unlike those observed up to now, express some form of **measurement** rather than **counting**, the quantified entities being: parts of (discrete or massive) "ordinary" objects, in context 3, the duration of (atelic) eventualities, in context 4, and properties varying on a scale, in context 5. Still, as in the previous cases, the sentences with these elements involve a full-scanning of the location time (which sets a temporal frame for quantification in like manner). In fact, the sentences below can be taken as representations of the set of *all* subevents of a given type (involving parts of the relevant entities) that occur within the location time *t*. Furthermore, as we will see, the restrictions on the licensing capacities of the quantifiers and the blocking effects are parallel to those observed before.

### CONTEXT 3: NOMINAL QUANTIFIERS OVER PARTS OF (DISCRETE OR MASSIVE) OBJECTS

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- (564) a. O Paulo leu *dois terços deste livro* desde ontem.  
 [Paulo has read *two thirds of this book* since yesterday]  
 b. 80 % *deste edifício* foi destruído desde 1980.  
 [80 % of *this building* has been destroyed since 1980]  
 (565) O Paulo bebeu *dois litros de água* desde ontem.  
 [Paulo has drunk *two litres of water* since yesterday]

An illustration of some (already familiar) blocking effects is provided by the addition of the expression *de uma só vez* [*all at once*] to (564b), or by the use of *uma bomba* [*a bomb*] as Agent of the eventuality represented in that sentence.

- (566) a. \*80 % *deste edifício* foi destruído de uma só vez desde 1980.  
 "80 % of *this building* has been destroyed all at once since 1980"  
 b. \*Uma bomba destruiu 80 % *deste edifício* desde 1980.  
 "a bomb has destroyed 80 % of *this building* since 1980"

The formal representation of sentences like (564)-(565) poses questions, concerning the (Boolean) structure of discrete objects and masses, that are well beyond the scope of this dissertation. I will just present two indicative "DRS-sketches" showing that the postulated full-scanning analysis seems to apply here as well. In the representation below, **water\*** and **book\*** signal that these predicates represent entities with subparts, and **⊆** marks the subpart relation:

O Paulo leu dois terços deste livro desde ontem.

[Paulo has read two thirds of this book since yesterday]

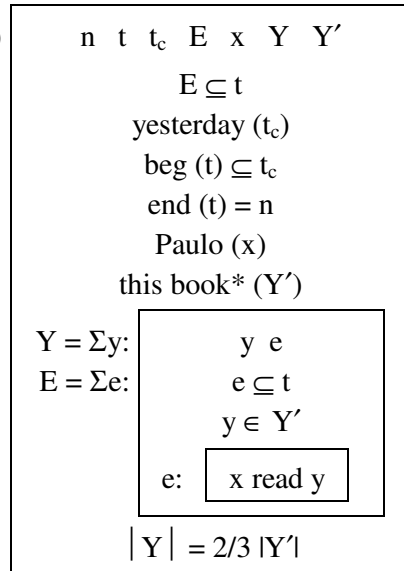


O Paulo bebeu dois litros de água desde ontem.

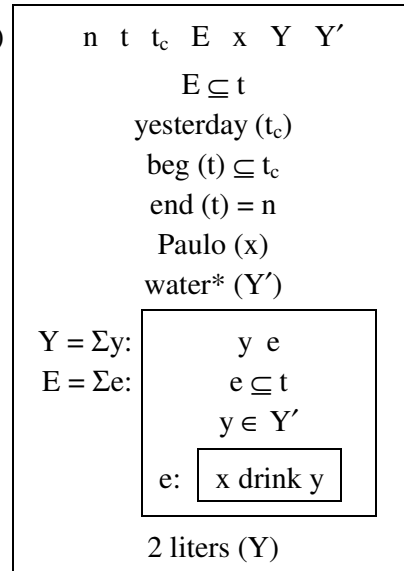
[Paulo has drunk two litres of water since yesterday]



(564a')



(565')



#### CONTEXT 4: TEMPORAL MEASURE ADVERBIALS (FOR ATELICS)

(567) a. O Paulo esteve no escritório (*durante*) *mais de 50 horas* desde segunda-feira.

[Paulo has been in the office *for more than 50 hours* since last Monday]

b. O Paulo dormiu (*durante*) *cinco horas* desde anteontem.

[Paulo has slept *for five hours* since the day before yesterday]

These sentences with temporal measure adverbials, headed by *durante* [*for*] or (arguably) a null preposition, can be taken to involve a set of multiple (discontinuous) eventualities of smaller duration than the one expressed by the adverbial as a whole – e.g. several stays of Paulo in the office, or several naps taken by him, within the location time  $t$ . Furthermore, we observe that cancelling this “multiple-event possibility” (which justifies the full-scanning of  $t$ ), by forcing a single-event interpretation causes ungrammaticality:

(568) \*O Paulo dormiu (*durante*) cinco horas {seguidas / ontem à tarde}  
desde anteontem.

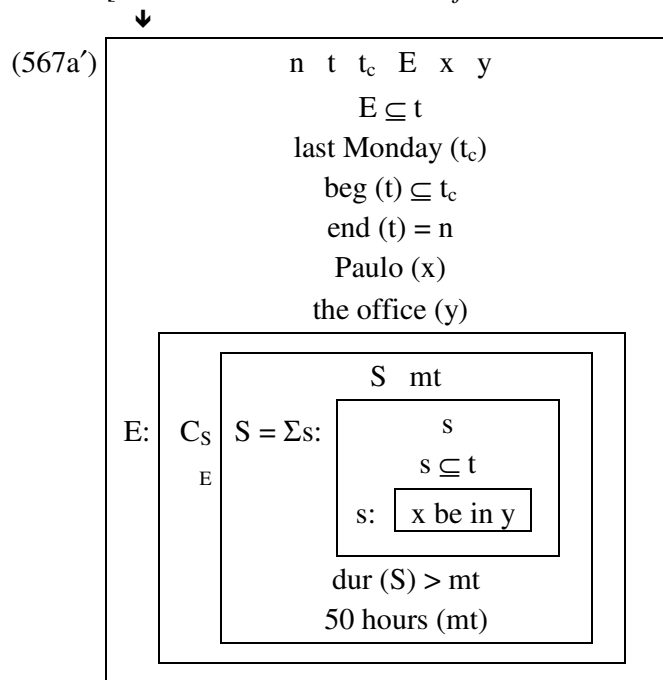
“Paulo has slept (for) five hours {consecutively / yesterday afternoon}  
since the day before yesterday”

It must be noted that the sentences illustrating this context contain basic atelic descriptions whose combination with the measure adverbial (arguably) “aktionsart-shifts” them into

accomplishments-descriptions<sup>297</sup>. In the following “DRS-sketch” (for which, once more, I will provide no rules, since it is not my purpose to study in detail the contribution of temporal measure phrases), I will represent this fact, in a way inspired by Swart (1998)<sup>298</sup>, by framing the conditions that characterise the summation of atelic eventualities (S) in a box preceded by C<sub>SE</sub> (standing for “coercion of state into event”) and by E:

O Paulo esteve no escritório (*durante*) *mais de 50 horas* desde segunda-feira.

[Paulo has been in the office *for more than 50 hours* since last Monday]



<sup>297</sup> This analysis has been advocated by many authors. For instance:

- Bach (1981): “The combination of a specific durational adverbial with a process predicate (or sentence) acts in every way like an event predicate (or sentence)” (p. 74).
- Nerbonne (1983): “if a proposition which includes a durative is true at  $i$ , then it is not true of subintervals of  $i$ . Thus, somewhat surprisingly, atelic propositions to which duratives are added are not atelic, but rather telic. (...) This is an automatic consequence of Taylor’s (1977) proposal on Aktionsart, given any reasonable position on duratives” (p. 59).
- Moens (1987): “process expressions (...) combine unproblematically with *for*-adverbials, which put a specific time length on the process. The result is a culminated process” (p. 50)
- Mittwoch (1988): “Events sentences lack the subinterval property. (...) By this criterion stative verbs (...) with durationalals like *for two months* form event sentences (...), and they do indeed occur within the existential perfect [the existential perfect selects mainly for event sentences; however certain state sentences can have an existential perfect reading even in the absence of such an adverbial]: (...)”

(23) John has lived in his new house for only two months since he bought it; most of the time he has been away on business” (p. 210).

Note that the sentence above illustrates exactly the type of construction under analysis here!

<sup>298</sup> My representation (of sentences with *for*-adverbials) is different from de Swart’s, given that the author does not resort to summation of (sub)states included in  $t$  ( $[s \subseteq t]$ ); I borrow from her the notation for aktionsart shift (and assume, as she does, that temporal measure adverbials behave as aktionsart shifters).

Quite interestingly, temporal measure adverbials that quantify the duration of telic eventualities, headed by the preposition *em* [*in*] in Portuguese, do not license the use of the inclusive *desde*:

- (569) \*O Paulo leu este livro *em duas horas* desde ontem.  
 “Paulo has read this book *in two hours* since yesterday”

This difference in the licensing capacity of *durante* [*for*] and *em* [*in*] parallels the following one, concerning entailments of the type presented before in this chapter, which assess whether the location frame contributes to *define* the main clause eventuality:

- (570) O Paulo leu este livro *em duas horas* no dia 15 de Maio.  
 [Paulo read this book *in two hours* on May 15]  
 →  
 O Paulo leu este livro *em duas horas* em Maio.  
 [Paulo read this book *in two hours* in May]
- (571) O Paulo trabalhou (*durante*) *duas horas* no dia 15 de Maio.  
 [Paulo worked *for two hours* on May 15]  
 -/→  
 O Paulo trabalhou (*durante*) *duas horas* em Maio.  
 [Paulo worked *for two hours* in May]

What this contrast seems to indicate is that *durante* [*for*] measure phrases (may) trigger a full-scanning of the location time, according with the representation (567a’): there, the main clause eventuality is defined partially by the inclusive condition in the sub-DRS (which involves the frame *t*, set by the locating adverbial); if that frame changes, the eventuality may as well be different. Conversely, *em* [*in*] measure phrases are not full-scanning triggers, whence the sentences where they occur with a locating adverbial involve simple inclusive location (if no other trigger occurs in it). The following putative representation of (569), with simple temporal inclusion as required by the sentence to which the locating adverbial applies, is not generated by the DRS-construction rules for *desde*-phrases<sup>299</sup>:

<sup>299</sup> In this DRS, I represent the event of Paulo reading a book as atomic (*e*). This is not crucial, though. In fact, accomplishments may be conceived of as composed by (continuous or discontinuous) subevents, which are part of their preparatory phase (e.g. events of Paulo reading subparts of the mentioned book, here). Note, for that matter, that, when the duration of an accomplishment is expressed by an *em/in* adverbial two significantly different types of duration may be meant by the speaker, one of which – (ii) below – clearly involves a subevent structure. Take the sentence *o Paulo corrigiu os testes em dez horas* / *Paulo graded the tests in ten hours*. The two types of duration are:

■ what I term **loose duration**, i.e. the time elapsed between the beginning and the end of the accomplishment, ignoring pragmatically irrelevant interruptions (imagine Paulo started grading the tests at 8 a.m and finished at 6 p.m.)

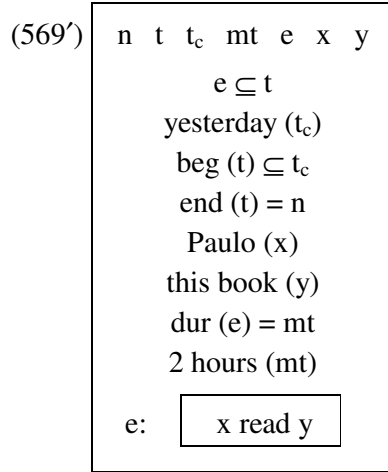
(i) **loose-dur** (*e*) =<sub>def</sub> **dur** (*t*), such that [beg (*t*) = beg (*e*)] and [end (*t*) = end (*e*)]

■ what I term **strict duration**, i.e. the duration of all the possibly discontinuous subparts of the accomplishment, ignoring, for each subpart, pragmatically irrelevant interruptions (imagine Paulo graded the tests in three different days and timed it: 3,5 + 2 + 4,5 hours)

(ii) **strict-dur** (*e*) =<sub>def</sub> **dur** (*S*), such that [*S* =  $\Sigma$  *s*: [*s* ∈ preparatory phase (*e*)] ]

\*O Paulo leu este livro em duas horas desde ontem.  
 “Paulo has read this book in two hours since yesterday”

↓



Obviously, temporal measure *em*-adverbials can occur in sentences with inclusive *desde* if another licensing expression is present. Observe, for instance, the following example, which includes a temporal measure *em*-adverbial and a NP with a cardinal quantifier and distributive reading:

(572) O Paulo leu dois livros em duas horas desde ontem.  
 [Paulo has read two books in two hours since yesterday]

The Portuguese sentence (572) is ambiguous without the *desde*-adverbial, allowing for at least the following readings: (i) “the reading of the two books occupied altogether a (continuous) time span of two hours”; (ii) “the amount of time spent in reading one book plus the amount of time spent in reading the other totals two hours”; (iii) “the number of books, such that the reading of each one took two hours, is two”<sup>300</sup>. When the *desde*-

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Of course well-known issues of granularity arise, whence the restriction “pragmatically irrelevant interruptions”.

<sup>300</sup> The readings (i) and (ii) correspond to the loose and strict duration, respectively, applied to sums of events, which I define as follows:

Consider a non-atomic event discourse referent **E**, such that:

$[E = e_1 \oplus e_2 \oplus \dots \oplus e_n], [\text{beg}(e_i) < \text{beg}(e_{i+1})]$  and

$[\forall e_i, e_j ([e_i \in E] \wedge [e_j \in E] \wedge [e_i \neq e_j]) \rightarrow [\neg[e_i \circ e_j]]]$  (Hans Kamp, p.c.)

(NB: if the subevents can overlap, the definition of ‘loose-/strict-dur’ is more complicated)

Then:

(i) **loose-dur** (**E**) =<sub>def</sub> **dur** (**t**), such that  $[\text{beg}(t) = \text{beg}(e_1)]$  and  $[\text{end}(t) = \text{end}(e_n)]$

(ii) **strict-dur** (**E**) =<sub>def</sub> **dur** (**e**<sub>1</sub>) + ... + **dur** (**e**<sub>n</sub>)

the latter with possibly two variants:

(ii') **loose strict-dur** (**E**) =<sub>def</sub> **loose-dur** (**e**<sub>1</sub>) + ... + **loose-dur** (**e**<sub>n</sub>)

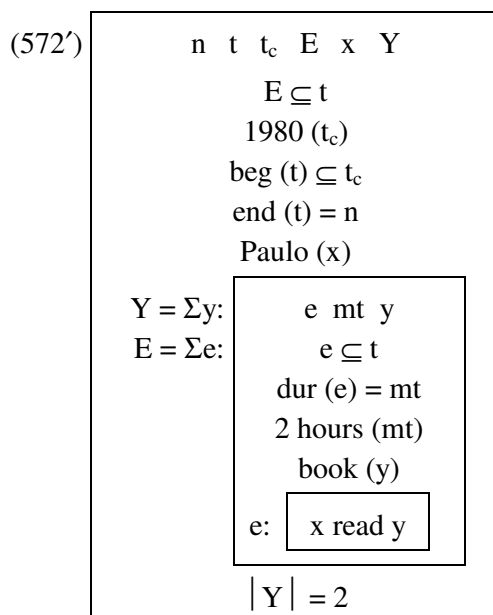
(ii'') **strict strict-dur** (**E**) =<sub>def</sub> **strict-dur** (**e**<sub>1</sub>) + ... + **strict-dur** (**e**<sub>n</sub>)

(where **loose-dur** (**e**<sub>i</sub>) and **strict-dur** (**e**<sub>i</sub>) are defined as in the previous footnote).

adverbial is added, only the last reading survives. Symptomatically, this is the only one in which the nominal cardinal quantifier associated with the Object-NP has scope over the temporal measure adverbial (which specifies the duration of each reading-a-book subevent and whose associated conditions therefore occur embedded in a sub-DRS). In this case, the inclusive *desde* is licensed by the cardinal quantifier (like in the structures of context 2, above):

O Paulo leu *dois livros em duas horas* desde ontem.  
 [Paulo has read *two books in two hours* since yesterday]

↓



#### CONTEXT 5: QUANTIFIERS OVER PROPERTIES VARYING ON A SCALE

- (573) a. O Paulo cresceu *5 cm* desde 1990.  
 [Paulo {has become *5 cm* taller / has grown *5 cm*} since 1990]  
 b. O Paulo enriqueceu *muito* desde 1990.  
 [Paulo has become *much* richer since 1990]

The scalar properties at stake are associated with a specific group of verbs, such as *crescer* [“get taller”], *aumentar* [“get bigger”], *diminuir* [“get smaller”], *emagrecer* [“get thinner”], *engordar* [“get fatter”], *enriquecer* [“get richer”], etc. I will not attempt a representation of

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In some situational contexts, these differences may matter, but often they don’t. In fact, many times speakers only express durations *approximately* (which may neutralise some of these differences).

With respect to sentences like (572), it must still be noted that an “at-most-two-hours reading” (rather than an “approximately-two-hours-reading”) is also possible, perhaps requiring a special analysis. I will ignore all these variations here.

these (formally rather complex) sentences, which clearly also involve a full-scanning of the location time, as indicated by the invalidity of the following entailment:

- (574) O Paulo cresceu 5 *cm* desde 1990.  
 [Paulo has become 5 *cm* taller since 1990]  
 -/→  
 O Paulo cresceu 5 *cm* desde 1980.  
 [Paulo has become 5 *cm* taller since 1980]

Observe also the familiar blocking effects of single-event coercion:

- (575) \*O Paulo enriqueceu muito com a venda súbita e inesperada  
 deste terreno desde 1990.  
 “Paulo has become much richer with the sudden and unexpected  
 sale of this piece of land since 1990”

To end this subsection, I will mention two more contexts with sanctioned occurrences of inclusive *desde*, which differ from the previous five in that they do not directly involve a quantifying expression (though they do involve a full-scanning of the location time). I will consider them in a relatively superficial way, thereby avoiding questions which are beyond the scope of this dissertation.

#### **CONTEXT 6: PRESENCE OF EXCLUSION OPERATORS**

Inclusive *desde* adverbials can occur in structures with *só*, the Portuguese counterpart of *only*. This operator may appear in combination with other licensing expressions (e.g. NPs with cardinal quantifiers and distributive reading, as in (576)), but this need not be so (cf. (577)), which is the relevant case to consider here.

- (576) O Paulo só escreveu {um livro / três livros} desde 1980.  
 [Paulo has written only {one book / three books} since 1980]  
 (577) O Paulo só escreveu este livro desde o ano passado.  
 [Paulo has only written this book since last year]

The last Portuguese sentence (ungrammatical without the exclusion operator) has different readings, depending on which constituent is focussed. Let us consider three possibilities:

- (i) Focus on *this*: “Paulo has written only one book since last year: this one”, “the set of books that Paulo has written since last year is formed only by this book” (note that he may have written other things – e.g. papers – within this period).
- (ii) Focus on *this book*: “Paulo has written only one thing since last year: this book”, “the set of things that Paulo has written since last year is formed only by this book”.
- (iii) Focus on *written this book*: “Paulo has done only one thing since last year: write this book”, “the set of (relevant) things that Paulo has done since last year is formed only

by the event of writing this book”. Obviously, some restriction (to be defined contextually) on the type of events that are “in contrast” with book-writings by Paulo is needed here. In fact, this sentence obviously does not require, in the reading under analysis, that during the location time Paulo was not involved in *any other* event (in absolute terms), only that he was not involved in *any other relevant* one. There are a lot of things that he may have done during the time in question (walking, crossing his legs, drinking water,...) that do not necessarily preclude the truth of the assertion.

The paraphrases I gave evince the parallelism between these constructions and those with (singular) cardinal quantifiers<sup>301</sup>, showing that a full-scanning of the location time also operates here. I will not develop the analysis of these structures, since the study of exclusion operators is a topic of its own, but I assume that a representation along the lines provided for previous examples can be used for these cases as well, and is furthermore in line with the analyses proposed in the literature for exclusion operators (cf. in particular Rooth’s 1985 semantics for focus).

Consider, for instance, the following sentence, which does not include *só* and is incompatible with *desde*:

- (578) \*O Paulo escreveu este livro desde o ano passado.  
 “Paulo has written this book since last year”



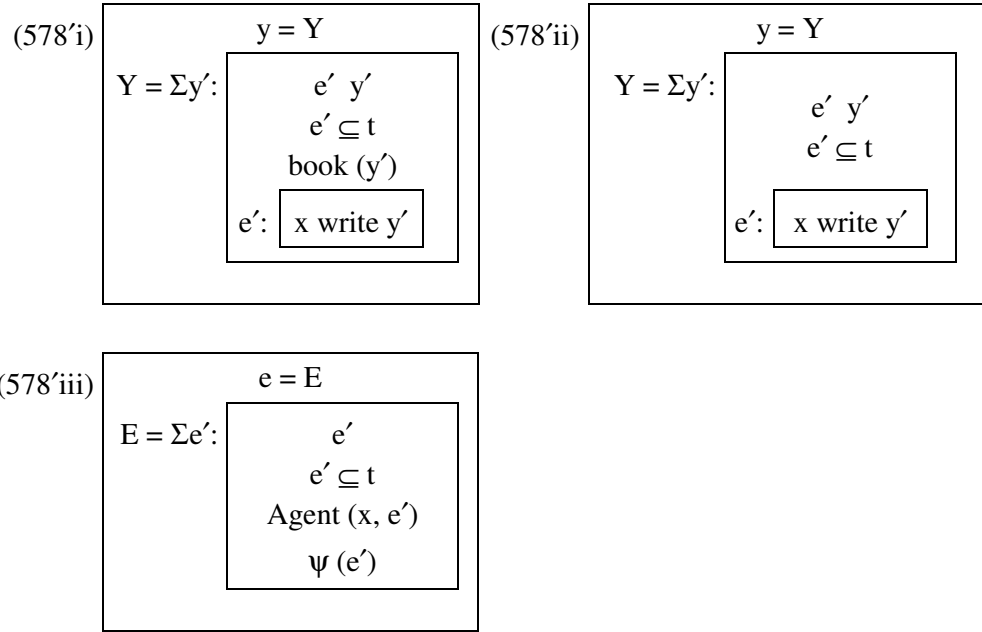
(578’)

n	t	t <sub>c</sub>	e	x	y
e ⊆ t					
last year (t <sub>c</sub> )					
beg (t) ⊆ t <sub>c</sub>					
end (t) = n					
Paulo (x)					
this book (y)					
e:	x write y				

As said, the addition of *só* [only] makes the sentence grammatical – cf. (577). Now, the contribution of the exclusion operator can be represented, depending on its focus, as an equation between *y* or *e*, as in (578’) above, and **Y** or **E**, respectively, as in (578’i-iii) below. Crucially, **Y** and **E** can be defined with resort to an abstraction operation that takes the location time specified by the *desde*-phrase as a frame. Note that in (578’iii), **ψ** is a variable standing for the relevant “alternatives” to book-writing events by Paulo in the context of utterance (cf. Rooth 1985).

<sup>301</sup> Constructions with plural expressions – e.g. *estes (n) livros* [these (n) books] instead of *este livro* [this book] – are of course also possible.





**CONTEXT 7: COORDINATION ASSOCIATED WITH  
DISTRIBUTIVE READINGS AND “EXHAUSTIVE ENUMERATION”**

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The last context I will consider is illustrated by sentences with (nominal, verbal or sentential) coordination, again associated with a distributive reading:

- (579) a. O Paulo construiu esta casa, esta ponte e esta igreja desde 1980.  
[Paulo has built this house, this bridge and this church since 1980]
- b. O Paulo construiu esta casa, pintou este muro e aumentou esta garagem desde o ano passado.  
[Paulo has built this house, has painted this wall and has enlarged this garage since last year]

In my opinion, these Portuguese sentences are only indisputably grammatical if they represent an **exhaustive enumeration** of the relevant events within the interval defined by the *desde*-phrase (exhaustiveness emerging possibly as an implicature)<sup>302</sup>. Take for instance (579a) and imagine that Paulo is an architect: this sentence seems to be (indisputably) felicitous only if the named three works are *all* Paulo accomplished within the mentioned period. Should he have built a baseball stadium, for instance, during that time, the sentence would be an inaccurate – insufficient – description of the facts. Accordingly, (579a) is paraphrasable as “the set of (*all*) things that Paulo has built since 1980 is formed by this house, this bridge and this church” or, evincing the similarity with contexts 2 and 6 above, “Paulo has (only) built three things since 1980: this house, this

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<sup>302</sup> It is disputable whether these sentences can also have a simple inclusive reading (where each of the three events is simply located anywhere within the location frame, and no exhaustiveness is implied). I consider this reading odd.

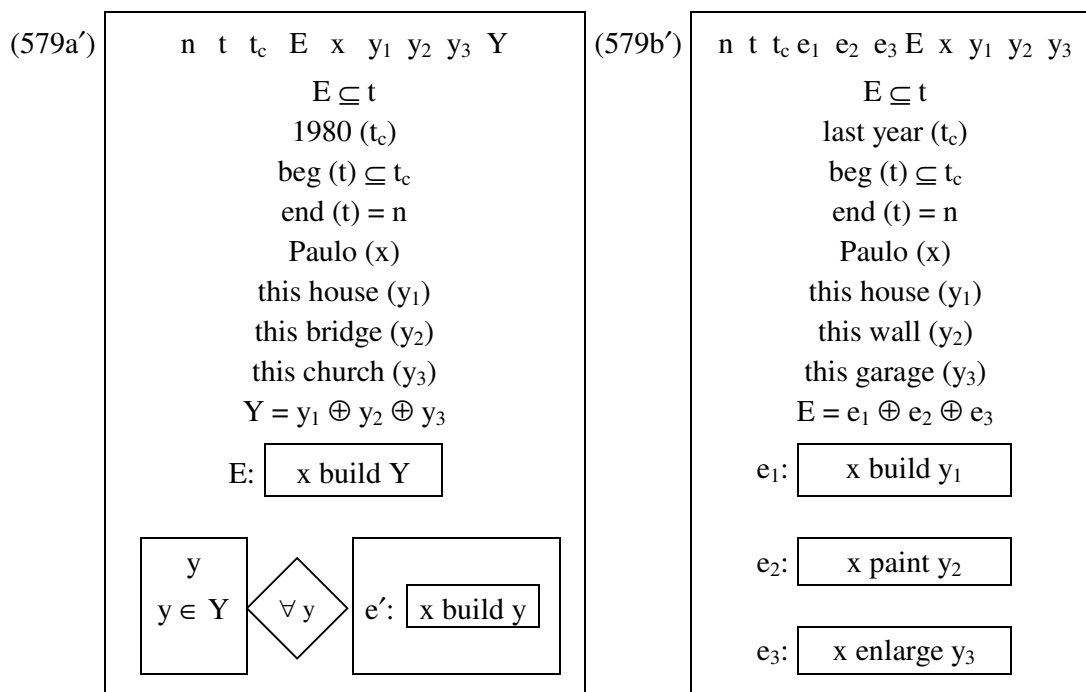
bridge and this church”. Likewise, sentence (579b) appears to be undoubtedly felicitous only if *all* Paulo’s *relevant* accomplishments within time defined by the *desde*-phrase are taken into account. Note that, in this case, as in comparable ones analysed above (in context 6), the “relevant” proviso is fundamental, since Paulo may have done many other things in the meantime. For (579b), a plausible context of utterance could be one where the works he did in his farm is under discussion: in this context, should he have built a swimming-pool or paved a road there, within the relevant period, the sentence would again be felt as an inaccurate description of the facts.

Consider now the following (tentative and simplified) representations of (579a) and (579b), which do not encode a full-scanning of the location time<sup>303</sup>

<p>O Paulo construiu esta casa, esta ponte e esta igreja desde 1980. [Paulo has built this house, this bridge and this church since 1980]</p>	<p>O Paulo construiu esta casa, pintou este muro e aumentou esta garagem desde o ano passado. [Paulo has built this house, has painted this wall and has enlarged this garage since last year]</p>
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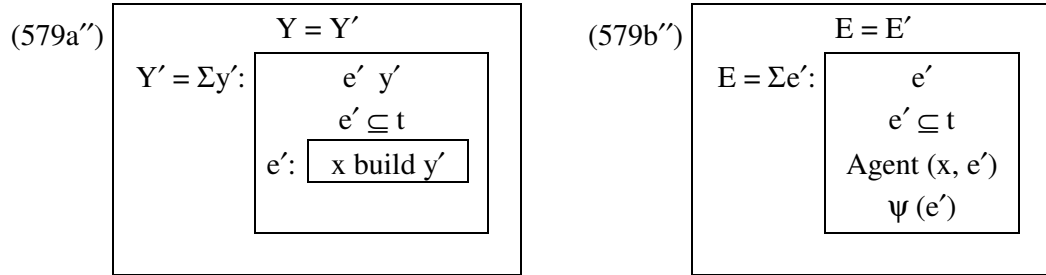
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Now, the exhaustiveness requirement, which can be represented as below, is what involves the full-scanning of the location time (note the similarity of the following representations with those associated with exclusion operators):

<sup>303</sup> In (579a'), I opted for a representation with the condition [E: x build Y] (and distribution over the set Y; cf. Kamp and Reyle 1993: 436), instead of a representation with explicit event-summation ([E =  $e_1 \oplus e_2 \oplus e_3$ ], where [ $e_1$ : x build  $y_1$ ], [ $e_2$ : x build  $y_2$ ], ...), because the coordination involves NPs, rather than VPs.



With respect to coordinated structures, it is still interesting to investigate the cases where the conjuncts themselves contain full-scanning triggers (e.g. NPs with cardinal quantifiers and distributive readings):

- (580) a. O Paulo construiu quinze casas e três pontes desde 1980.  
[Paulo has built fifteen houses and three bridges since 1980]
- b. O Paulo construiu quinze casas e esta ponte desde 1980.  
[Paulo has built fifteen houses and has this bridge since 1980]

In these cases, the full-scanning has to be considered at two levels: that of each conjunct, and that of the coordination. At the first level, the full-scanning always operates, that is, if the conjunct contains an appropriate trigger (which need not be the case), the time frame set by the adverbial is fully-scanned at that level (e.g. in (580a), the total number of house-buildings by Paulo between 1980 and the utterance time is 15, and the total number of bridge-buildings in the same period is 3)<sup>304</sup>. At the second level, it is unclear whether there is an independent exhaustiveness requirement applies (e.g. whether Paulo's works as an architect only include houses and bridges<sup>305</sup>); this seems to depend very much on the context, the topic under discussion, etc. I will not pursue this issue here, but leave it for further research.

The example (581) below illustrates the blocking effect of collective-like expressions (e.g. *juntos* [together]) in structures with coordination; the example (582), shows that disjunctive coordinators are not licensors of the inclusive *desde* (for reasons that seem obvious, in view of what has been said):

- (581) \*O Paulo viu o pai, a mãe e o irmão juntos desde ontem.  
"Paulo has seen his father, his mother and his brother together since yesterday"
- (582) \*O Paulo construiu esta casa, esta ponte ou esta igreja desde 1980.  
"Paulo has built this house, this bridge or this church since 1980"

<sup>304</sup> I thank João Peres for calling my attention to these facts.

<sup>305</sup> Cf. the possibility of the sentences (580) being an answer to:

- (i) Quantas casas e (quantas) pontes construiu o Paulo desde 1980?  
[How many houses and (how many) bridges has Paulo built since 1980?]
- (ii) O que é que o Paulo construiu desde 1980?  
[What has Paulo built since 1980?]

I will end this subsection with an observation about the full-scanning of (bounded) atelic eventualities, mentioned at the end of section 9.1.1:

- (583) a. \*O Paulo viveu em Paris desde 1980.<sup>306</sup> (non-durative reading)  
 [Paulo has lived in Paris since 1980]  
 b. O Paulo viveu em Paris *duas vezes* desde 1980.  
 [Paulo has lived in Paris *twice* since 1980]  
 c. O Paulo viveu em *três cidades* (diferentes) desde 1980.  
 [Paulo has lived in *three* (different) *towns* since 1980]  
 d. O Paulo viveu em *Paris, Londres e Lisboa* desde 1980.  
 [Paulo has lived in *Paris, London and Lisbon* since 1980]  
 e. O Paulo *só* viveu em Paris desde 1980.  
 [Paulo has *only* lived in Paris since 1980]

This set of sentences illustrates that the full-scanning inclusive location of (bounded) atelic eventualities operates like that of telic eventualities.

Note that, in these contexts, the Portuguese tenses used are the “pretérito perfeito simples” (for present TPpt) and the “pretérito mais-que-perfeito” (for past TPpt), i.e. tenses expressing anteriority between the described eventuality and the TPpt. Given this possibility, and the possibility of using the same forms in the durative location (cf. 9.2.2.1), sentences like the following, with “pretérito perfeito simples”, are ambiguous in Portuguese:

- (584) a. O Paulo trabalhou em duas empresas desde Janeiro.  
 “Paulo WORKED<sub>PERFEITO</sub> in two companies since January”  
 [Paulo has worked in two companies since January]  
 b. O Paulo trabalhou numa loja e num escritório desde Janeiro.  
 “Paulo WORKED<sub>PERFEITO</sub> in a shop and in an office since January”  
 [Paulo has worked in a shop and in an office since January]

Let us take (584a), for instance. In the **full-scanning inclusive reading**, it is asserted that the total number of companies in which Paulo has worked since January is two (he need not have worked in the two at the same time); in the **durative reading**, it is asserted that between January and some moment *shortly before* the utterance time Paulo has continuously worked in two companies *at the same time* (he might have got tired of having two jobs and have left one of the companies in the meantime, for instance). The same, with the relevant adaptations, applies to (584b). The English sentences in brackets are also ambiguous, and have similar interpretations (though the durative one involves extension up to the TPpt).

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<sup>306</sup> This sentences is ungrammatical in the non-durative reading (“somewhere between 1980 and the utterance time Paulo lived in Paris”), but grammatical in the durative reading (“Paulo lived continuously in Paris between 1980 and some moment *closely before* the utterance time”).

The ambiguity at stake obviously does not arise (in Portuguese) with tenses expressing overlapping of the described eventuality with the TPpt, as “presente” or “pretérito imperfeito”. In these Portuguese structures, only the durative reading is available; in English, the same happens with the perfect progressive (contrary to the simple perfect):

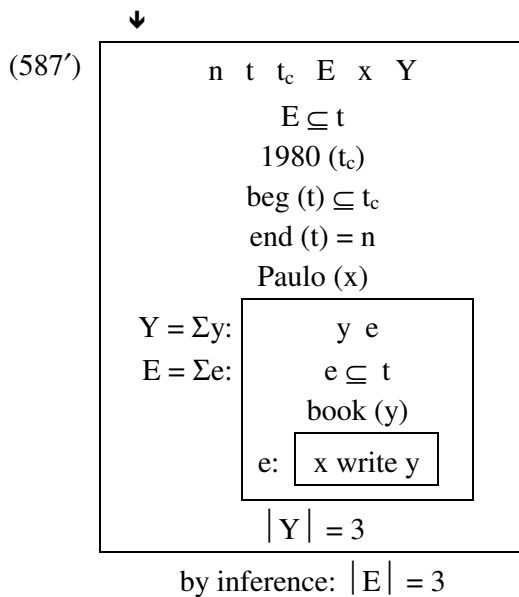
- (585) a. O Paulo trabalha em duas empresas desde Janeiro.  
 “Paulo WORKS in two companies since January”  
 [Paulo has been working in two companies since January]  
 b. O Paulo trabalha numa loja e num escritório desde Janeiro.  
 “Paulo WORKS in a shop and in an office since January”  
 [Paulo has been working in a shop and in an office since January]

### 9.3.1.2. Formal analysis of an illustrative context: structures with cardinal quantifiers

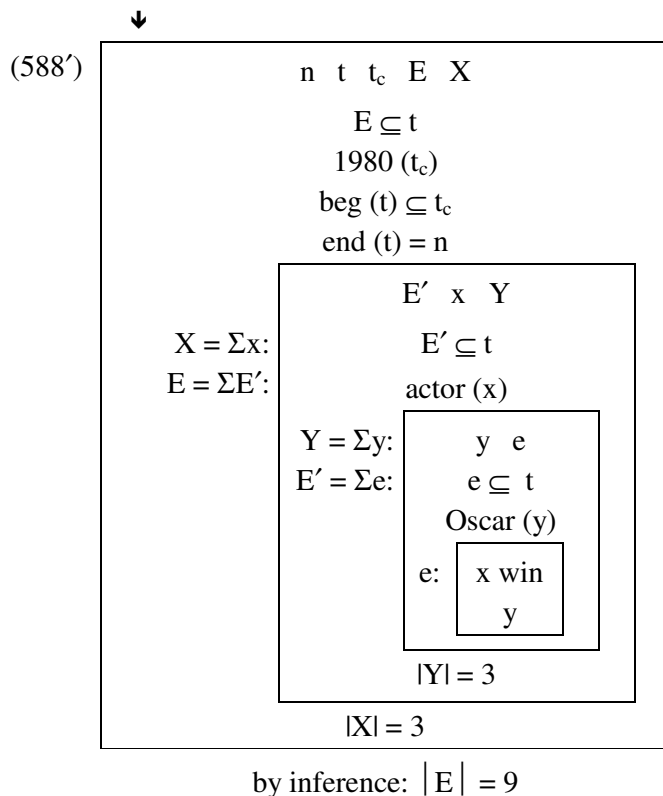
In this subsection, I will try to schematise, for illustrative purposes, the DRS-construction rules required to process a subgroup of grammatical constructions presented above, viz. those with cardinal quantifiers (and inclusive *desde*-adverbials). Although I will try to go into as much detail as possible, some simplifications are made; for instance, I will not be concerned with questions of scope between NPs, or with cumulative readings.

Let us consider two representative examples, the first – (587) – with just one licensing quantifier (already presented above), the second – (586) – with two licensing quantifiers. This last example is particularly important because it shows that the full-scanning of location times is a recursive operation, that is, *each* full-scanning trigger introduces an independent abstraction and inserts the condition expressing the full-scanning –  $[\pi \subseteq t]$  (where  $\pi$  represents the relevant summed entity) – in the associated sub-DRS.

- (587) O Paulo escreveu *três livros* desde 1980.  
 [Paulo has read *three books* since 1980]



- (588) *Três actores receberam três Óscares desde 1980.* [distributive-distributive  
[Three actors have won three Oscars since 1980] interpretation]



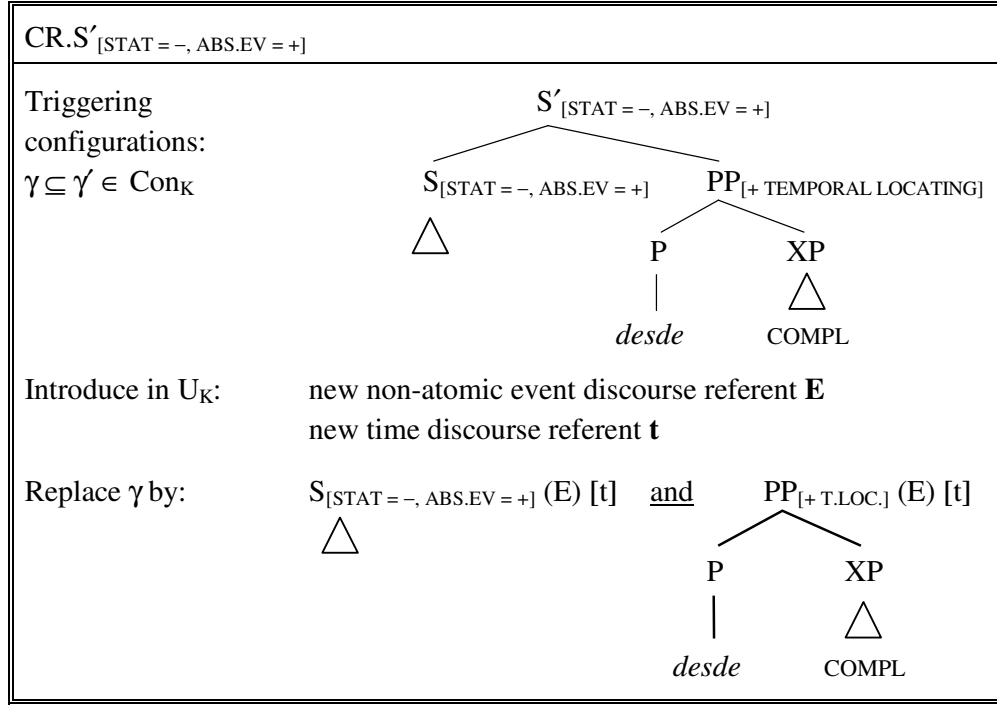
Here, I focus only on the interpretation where both NPs – *três actores* and *três Óscares* – are assigned a distributive reading, that is, one which involves nine winning-events, three by each actor, and could be the answer to the question: *quantos actores receberam (um total de) três Óscares desde 1980?* [how many actors have won (a total of) three Oscars since 1980?].

As we can see, in the distributive-distributive reading of (588), the double object/event-abstraction applies twice (a more complex representation therefore resulting). It must be stressed that grammaticality merely requires the existence of *at least one* full-scanning trigger (though there may be more); the sentence below, with two NPs with cardinal quantifiers, for instance, is ungrammatical in the “single-event reading”, i.e. one where a particular meeting-event, involving simultaneously the 33 individuals in question, is being referred to (group-group interpretation), because it contains no full-scanning triggers:

- (589) *Três deputados encontraram-se com trinta eleitores desde o mês passado.*  
[Three MPs have met with thirty constituents since last month]

I will present now, tentatively, and with some simplifications, the DRS-construction rules that seem required to generate the representations above. The first, DRS-CR 9 below, deals with the S'-node. I assume that this rule also applies to sentences with English *since*, with the relevant adaptations to account for the interference of the perfect (cf. note (v) after the rule):

**DRS-CR 9. Event-describing sentences containing a temporal locating *desde*-adverbial**



With respect to this rule, the following must be observed:

(i) As noted, the presence of an NP with a cardinal quantifier and distributive reading is relevant to determine the possibility of using the *desde*-adverbial. In this rule, I propose that the information about this presence percolates up the syntactic tree under the form of the (feature-)value  $[ABS.EV = +]$ , where **ABS.EV** stands for abstraction over events, an operation that applies whenever this kind of NP occurs; thus, if the  $NP_{[+ABS.EV]}$  is in Subject position, for instance, this feature percolates to the S and S' nodes above it; if it is in (Direct) Object position, it percolates to the VP, VP', S and S' nodes. The assignment of a distributive reading to a given NP, which is an independent topic, hinges on several sentence components, among which the nominal quantifier it contains and the verbal predicate with which it combines stand out. About this issue, see e.g. Peres (1987, 1998a).

(ii) This construction rule applies to S'-nodes with values  $[STAT = -]$  and  $[ABS.EV = +]$ , i.e. event-describing sentences that contain at least one NP with a cardinal quantifier and distributive reading. In these conditions, a non-atomic event discourse referent **E** is introduced. If the S'-node does not have the feature  $[ABS.EV = +]$  (which stems here from the distributive NP, but is more generally associated with any full-scanning trigger), it will not combine with Portuguese *desde*-PPs.

(iii) Structures with full-scanning location of (bounded) atelic eventualities are treatable with a similar rule (with the necessary adaptations, that I will not try to formulate here).

(iv) According to the algorithm proposed in chapter 4, the discourse referent for the location time  $t$  is introduced while processing the  $S'$ -level and is then “passed down” both to the temporal PP-node – **PP** [ $t$ ] – and to the S-node – **S** [ $t$ ]. Note that the last move is crucial, since it will allow the correct binding of  $t$  when processing the (licensing)  $NP_{[ABS.EV = +]}$  (which inserts  $[e \subseteq t]$  in the sub-DRS, thus guaranteeing the full-scanning of the location time – cf. DRS-CR 10 below).

(v) As emphasised by Kamp and Reyle (1993), *since*-adverbials in combination with perfective sentences have the peculiar property that they *do not* locate the main clause eventuality (the result state  $s$  associated with the perfect), but rather the “underlying eventuality” **ev**, i.e. the “eventuality described by the underlying non-perfect verb phrase”. For sentence (587), *Paulo has read three books since 1980*, for instance, this means that the *since*-phrase does not locate the result state of Paulo having read three books, but rather the three book-reading events proper. In Portuguese, the same occurs in sentences with the auxiliary verb *ter* (e.g. with “pretérito mais-que-perfeito composto”):

- (590) Conheci o Paulo em 1990. Tinha escrito três livros desde 1980.  
I met Paulo in 1990. He had read three books since 1980.

Now, this constitutes, as Kamp and Reyle stress, a relatively exceptional situation among temporal location adverbials:

“a **since**-phrase is not used to characterize the location time of the state  $s$  described by the sentence itself, but rather the location of some other, related, eventuality. As a matter of fact this constitutes only a weak violation of the general principle governing location adverbs. For if the underlying VP is stative, then the two states run concurrently (...). If the underlying VP is non-stative, however, there remains a problem” (Kamp and Reyle 1993: 632).<sup>307</sup>

From the perspective of discourse processing, I suggest the following adaptation of the  $S'$ -rule to account for the facts described:

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<sup>307</sup> In fact, this may happen with other locating adverbials, like *em* / *in* phrases:

- (i) O Paulo tinha lido três livros em Março.  
Paulo had read three book in March.

These two sentences are ambiguous: in one reading, the mentioned March is a time where the result state of Paulo reading the three books holds (he may have read them in February, for instance); in another reading, March is a time within which a total amount of three books was read by Paulo (full-scanning reading). This second interpretation poses the same problem as *since*-constructions.

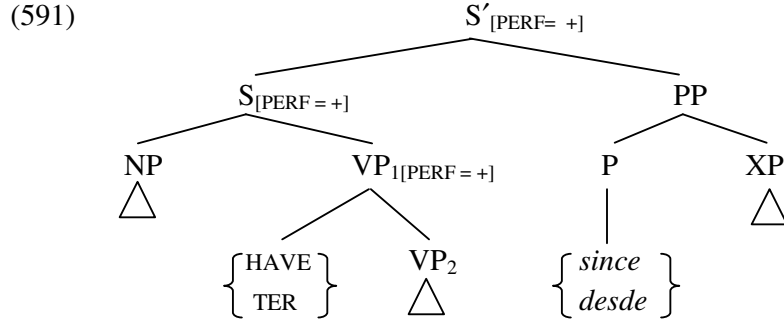
The type of ambiguity in (i) has long been noticed in the literature – cf. e.g. Declerck (1991: 362), who refers back to Huddleston (1969) as remarking the ambiguity of sentences like *In March John had read only two of the books*.

Note still that sentences with other locating adverbials, like (ii) below, with an *enquanto* / *while* phrase, seem to have (like those with *since*) only the full-scanning reading:

- (ii) O Paulo tinha lido três jornais enquanto esperava pela Ana.  
Paulo had read three news papers while waiting for Ana.



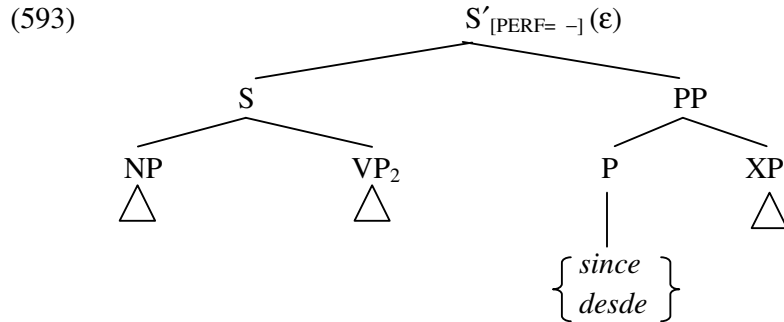
Given a triggering configuration with a perfective  $S'$  and a *desde / since* phrase (or any other comparable locating adverbial, like those mentioned in footnote 307) <sup>308</sup>



the construction rule for the  $S'$ -node will process immediately the contribution of the HAVE/TER-constituent (as if it had wider scope<sup>309</sup>), by doing the insertions in (592) and by replacing the triggering configuration (591) with that in (593), to which the rule DRS-CR 9 above can then normally apply (with  $\mathbf{E}$  there being the  $\epsilon$  introduced here):

- (592) a. Introduce into  $U_K$  the new discourse referents  $\epsilon$  and  $s$ .<sup>310</sup>  
 b. Introduce into  $Con_K$  the new condition  $[\epsilon \supset c s]$ .

Replace the triggering configuration (591) by



Let us now consider the rule that processes NPs containing a full-scanning trigger:  
 $NP_{[ABS.EV = +]}$ :

<sup>308</sup> I assume here a syntactic configuration where the HAVE/TER-constituent does not c-command the locating adverbial – cf. Kamp and Reyle's (1993) syntactic rules. This is quite disputable in fact, but I will not attempt to evaluate possible alternatives.

<sup>309</sup> Cf. similar process proposed to deal with sentences with wide-scope negation and wide scope every-NPs in section 4.2.2.5.

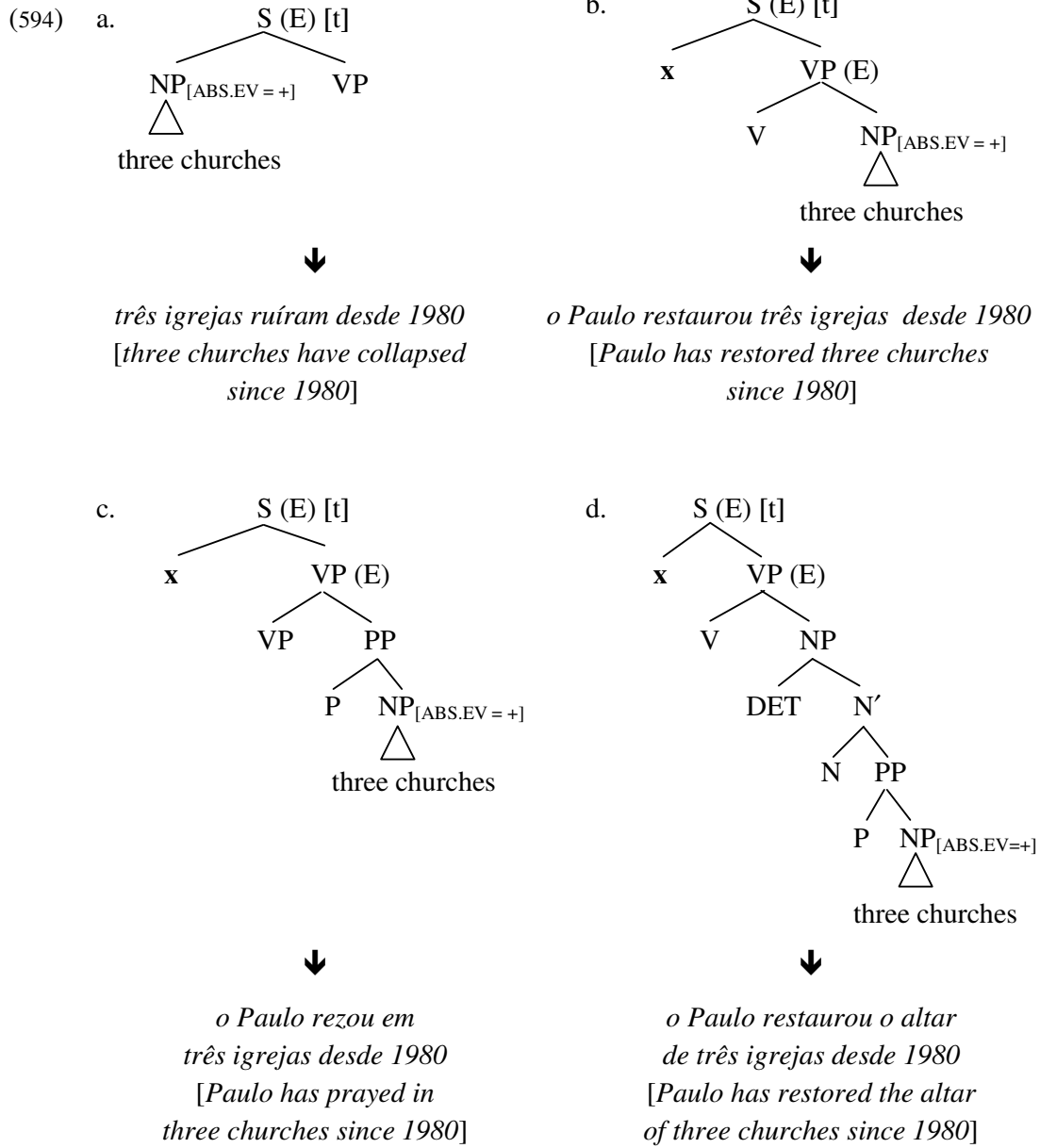
<sup>310</sup> I use a neutral discourse referent  $\epsilon$ , because this rule can also apply to atomic eventuality-descriptions, as in English constructions with *since* and simple inclusive location.

**DRS-CR 10. NPs with a cardinal quantifier and distributive interpretation**

CR.NP <sub>[ABS.EV = +]</sub>	
Triggering configurations: $\gamma \subseteq \gamma' \in \text{Con}_K$	<p style="text-align: center;"> <math>S(E) [t]</math>  <math>\vdots</math>  <math>NP_{[ABS.EV = +]}</math>  <math>\swarrow \quad \searrow</math>  <math>DET \quad N'</math>  <math>  \quad \triangle</math>  <math>Q</math>  <math>(\text{cardinal})</math> </p>
Introduce in $U_K$ :	new non-atomic discourse referent <b>X</b>
Introduce in $\text{Con}_K$ :	new conditions: $- [  X  = Q ]$ $- [ X = \Sigma x: K_1 ]$ $- [ E = \Sigma \epsilon: K_1 ]$
Introduce in $U_{K_1}$ :	new object discourse referents <b>x</b> new event discourse referent <b><math>\epsilon</math></b>
Introduce in $\text{Con}_{K_1}$ :	new conditions: $- [ \beta(x) ]$ (where <b><math>\beta</math></b> is the name under the node $N'$ ) $- [ \epsilon \subseteq t ]$
Replace the NP by <b>x</b> in the condition that is being processed (this condition is to be inserted in $K_1$ – cf. Kamp and Reyle 1993: 455-456 )	
Specify <b><math>\epsilon</math></b> as the argument of the “root of next triggering condition” (cf. Kamp and Reyle 1993: 532).	

With respect to this rule, the following must be noted:

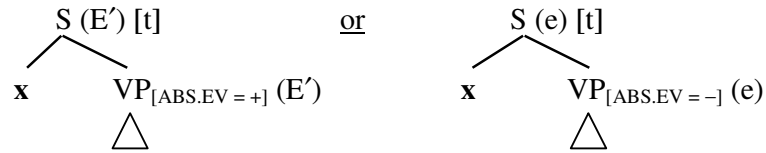
- (i) I assume a top-down processing à la Kamp and Reyle (1993), where the relevant  $NP_{[ABS.EV = +]}$ -nodes appear in (triggering) configurations such as the following (and can therefore be sensitive to information in the nodes hierarchically above):



(ii) By the instruction “specify  $\epsilon$  as the argument of the root of the next triggering condition”, the eventuality discourse referent  $\epsilon$  is made to pass down the configuration as an argumental discourse referent, in the fashion of Kamp and Reyle (1993: 532-533); e.g. after processing the Subject-NP it will pass to the VP' and VP nodes, that will be represented as  $\mathbf{VP}'(\epsilon)$  and  $\mathbf{VP}(\epsilon)$  –  $\epsilon$  will be non-atomic (i.e.  $\mathbf{E}'$ ) if the root of the next triggering condition has value [ABS.EV = +], otherwise, it will be atomic (i.e.  $\mathbf{e}$ ); eventually, after processing the last NP of the sentence,  $\mathbf{e}$  will pass down to the V-node.

(iii) I assume, in line with Kamp and Reyle (1993: cf. 573), that the referential argument changes to  $\epsilon$  in all the relevant nodes (S, VP', VP) above the root of the next triggering

configuration, after application of the  $\text{NP}_{[\text{ABS.EV} = +]}$  construction rule; e.g. after processing a Subject- $\text{NP}_{[\text{ABS.EV} = +]}$  the rule that is being processed is inserted in the sub-DRS  $K_1$  and will look like:



(iv) This construction rule is formulated for an ordered processing (Subject-NP before Object-NP); some adaptations may be required for a non-ordered processing.

(v) Inferences on the cardinality of  $\mathbf{E}$  are possible, namely that  $|\mathbf{E}| \geq |\mathbf{X}|$  (sometimes  $|\mathbf{E}| = |\mathbf{X}|$ ); cf. footnote 284.

(vi) If the NP has a cardinal quantifier but a group reading, the construction rule is much simpler (as in Kamp and Reyle 1993: 407-409, 430-431):

- (595) Introduce into  $U_K$  : new non-atomic discourse referent  $\mathbf{X}$ .  
 Introduce into  $\text{Con}_K$  :  $[|\mathbf{X}| = Q]$ .  
 Introduce into  $\text{Con}_K$  :  $\beta^*(\mathbf{x})$  (where  $\beta$  is the name under the node  $N'$ ).  
 Replace the NP by  $\mathbf{X}$  in the condition that is being processed.

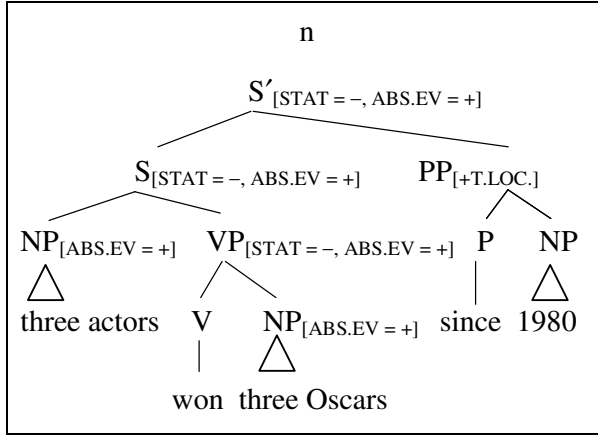
To end this subsection, I will present the step-by-step processing of sentence (588), *três actores receberam três Óscares desde 1980*, where the differences in the final DRS in Portuguese and English involve mainly the contribution of the perfect. For simplicity, I ignore the contribution of tense, omit the node  $\text{VP}'$ , and translate the Portuguese lexical items in the representations:

- (i) initial DRS
- (ii) DRS after processing the  $S'$ -node
- (iii) DRS after processing the temporal locating adverbial
- (iv) DRS after processing the Subject-NP
- (v) final DRS, after processing the Object-NP
- (v') simplified notation of (v) (cf. Kamp and Reyle 1993: 533-534)

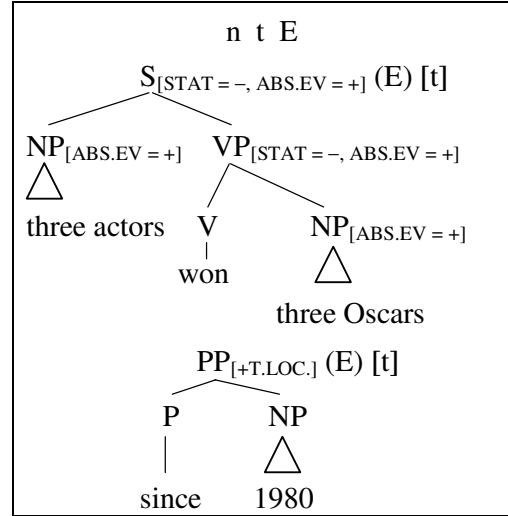
(596) Três actores receberam três Óscares desde 1980.  
 [Three actors have won three Oscars since 1980]



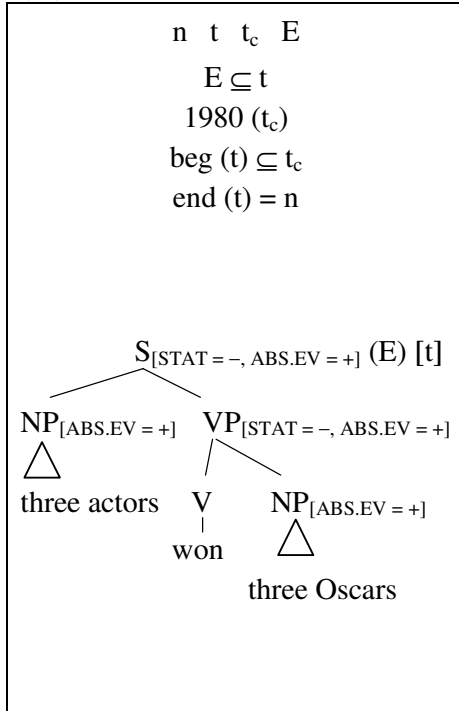
(i)



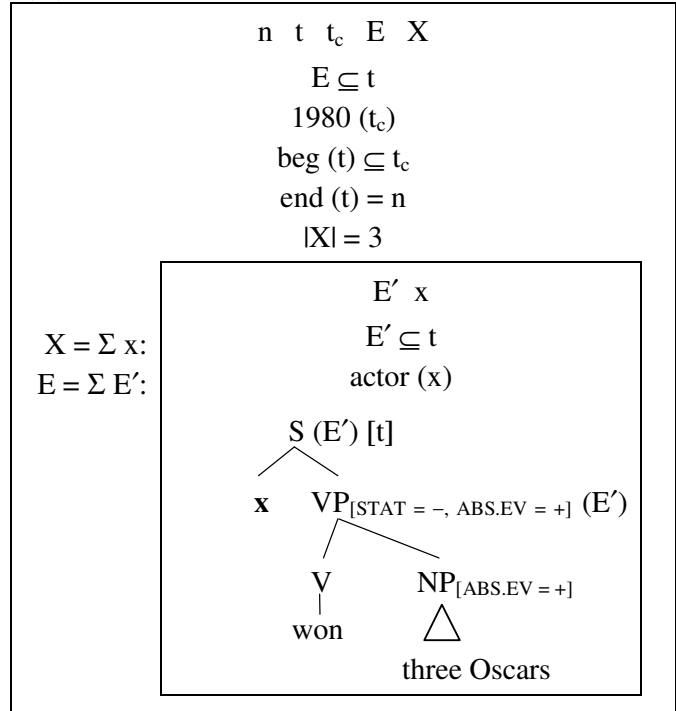
(ii)



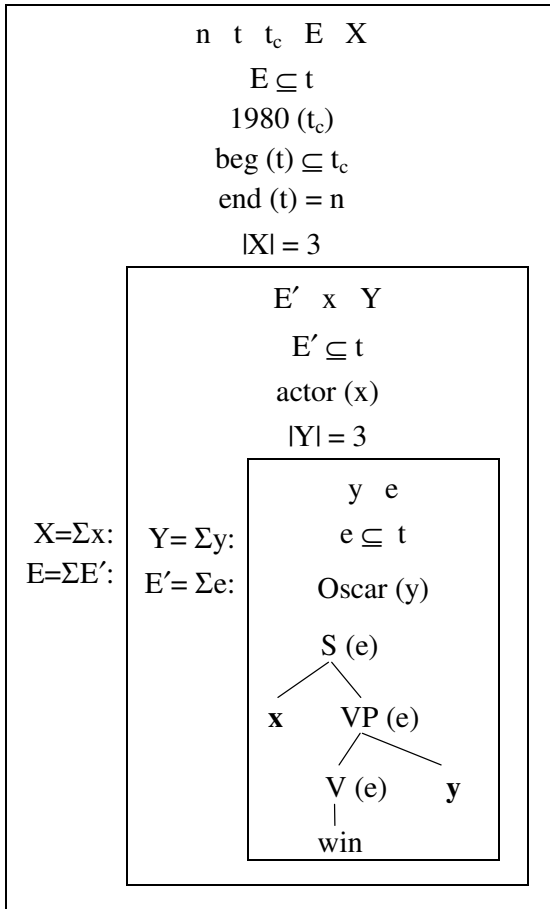
(iii)



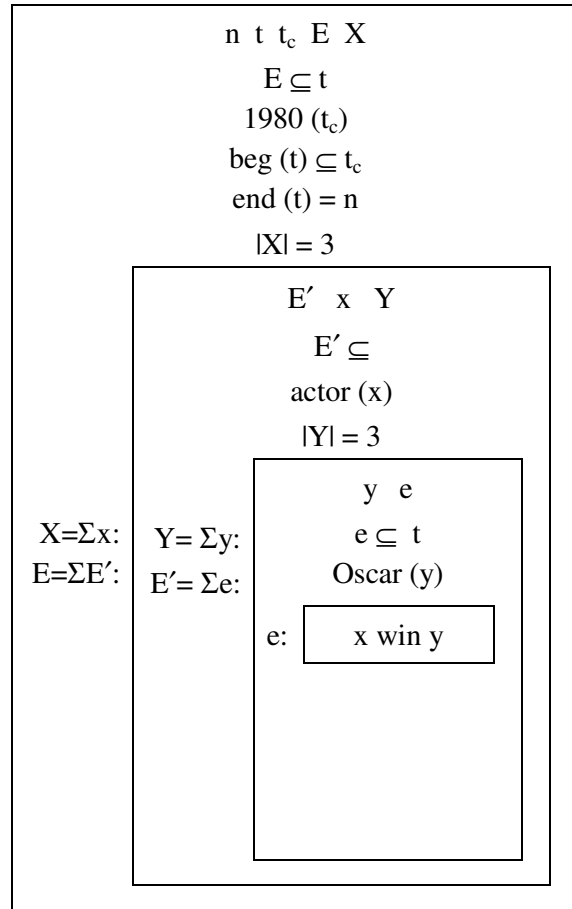
(iv)



(v)



(v')



### 9.3.2. Portuguese *desde*-adverbials included in nominal modifiers

In 9.3.1, I analysed the occurrence of *desde*-expressions in adverbial position within main clauses. Now I will consider their occurrence in adverbial position within nominal modifiers, e.g. relative clauses – (597a) – or participial clauses<sup>311</sup> – (597b) – and in adnominal position – (598). English *since* apparently behaves in like manner in these contexts.

- (597) a. Muitos dos [livros que o Paulo escreveu desde 1980] foram premiados.  
 Many of the [books that Paulo has written since 1980] were awarded a prize.
- b. Muitos dos [livros escritos pelo Paulo desde 1980] foram premiados.  
 Many of the [books written by Paulo since 1980] were awarded a prize.

<sup>311</sup> I will henceforth ignore participial clauses.

- (598) a. Todos os [golpes de estado na América Latina desde 1980] foram perpetrados pelos militares.  
 All (the) [coups d'état in Latin America since 1980] were carried out by the military.
- b. Todos os [domingos desde o início do ano] foram muito agitados.  
 All the [Sundays since the beginning of the year] were hectic.

It must be observed that, in (597), the use of the inclusive *desde* is grammatical (in adverbial position) despite the absence of a licensing operator like those described in 9.3.1.1 within the relative clause (though it may of course be present, as in *muitos dos livros que o Paulo leu TRÊS VEZES desde 1980 foram premiados* / *many of the books that Paulo has read THREE TIMES since 1980 were awarded a prize*). In (598), there is also no licensing operator of the types mentioned within the nominal constituent containing the *desde*-phrase. The grammaticality of (597)-(598) in the absence of such full-scanning triggers is accounted for by the fact – so I hypothesise – that the *desde*-adverbial itself is processed, in these contexts, within a sub-DRS created by abstraction. In fact, the bracketed structures in these sentences are of the type:

- (599) [N' N<sub>[+PLURAL]</sub> MOD]  
 (where the locating adverbial occurs inside MOD – the relative or participial clause – in (597), and is MOD, in (598)).

As observed in section 6.2.5.1, these nominal constituents often represent the sum of *all* entities corresponding to the descriptive content of N that have the property expressed by MOD, e.g. all the books that Paulo wrote between 1980 and the TPpt, in (597a), and all the coups d'état occurred in Latin America between 1980 and the TPpt, in (598a). Formally, they can be taken to represent the non-atomic object  $\Pi$  (schematically) defined as

$$(600) \quad \Pi = \Sigma \pi: \begin{array}{c} \pi \\ N(\pi) \\ MOD(\pi) \end{array}$$

Now, as was explained in 6.2.5.1, the processing of the temporal locating adverbial inside this sub-DRS:

- (i) inserts there the inclusive location condition [ $p \subseteq t$ ] (where  $p$  represents the relevant summed entity), which embodies the full-scanning of the location time  $t$ ;
- (ii) inserts outside the sub-DRS the conditions defining  $t$  – [ $\text{beg } t \subseteq t_c$ ], [ $\text{end } (t) = \text{TPpt}$ ] and [ $\text{COMPL } (t_c)$ ] – given the definite character of this location time.

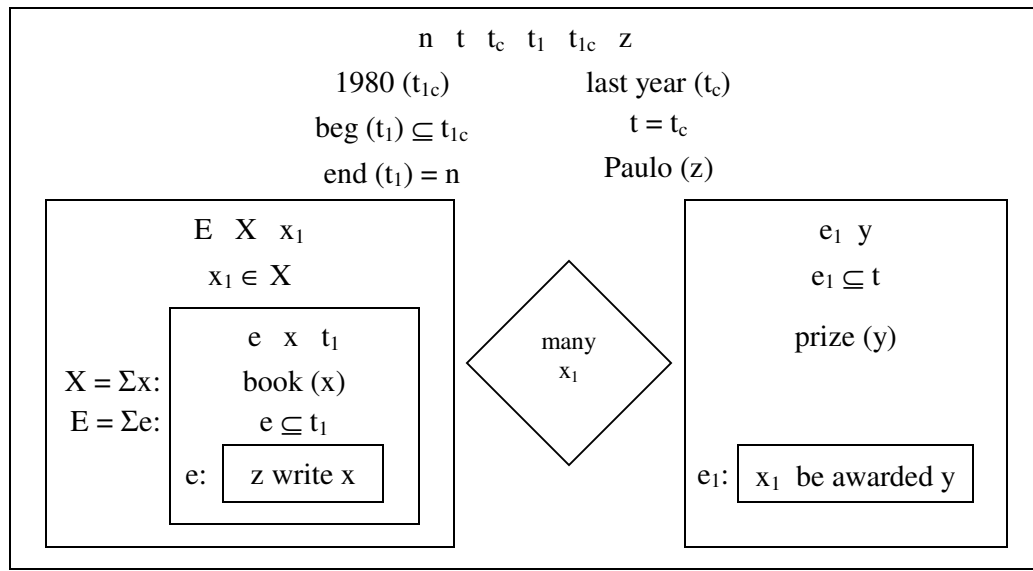
Hence, the distribution of the Portuguese inclusive *desde* in these constructions is accounted for by the same principle as those in 9.3.1, to wit: inclusive *desde* is only sanctioned in contexts where the interval it represents is fully-scanned.

Let us now see two illustrative DRSs (for the Portuguese sentences, though with translated lexical material), and the relevant DRS-construction rules:

(601)

Muitos dos livros que o Paulo escreveu desde 1980 receberam um prêmio o ano passado.

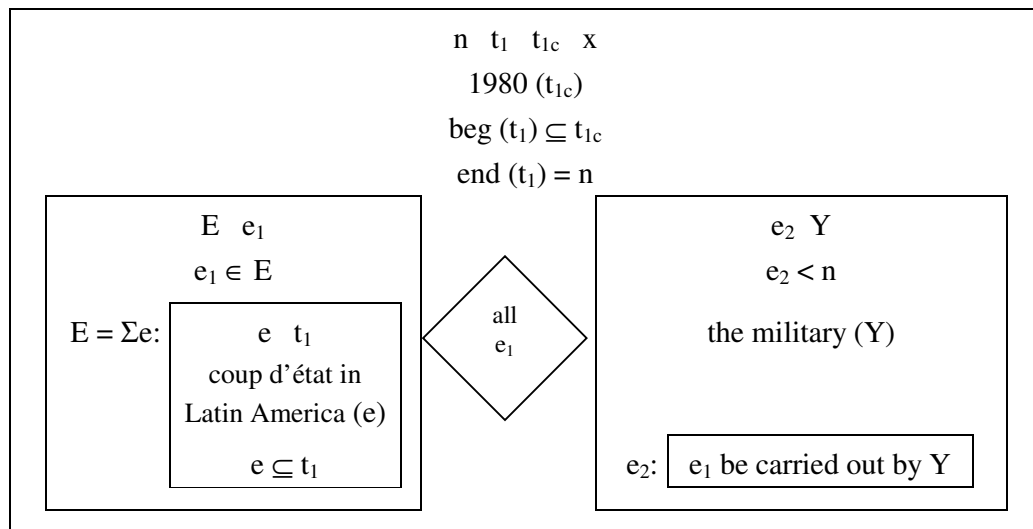
[Many of the books that Paulo has written since 1980 were awarded a prize last year]



(602)

Todos os golpes de estado na América Latina desde 1980 foram perpetrados pelos militares.

[All (the) coups d'état in Latin America since 1980 were carried out by the military]

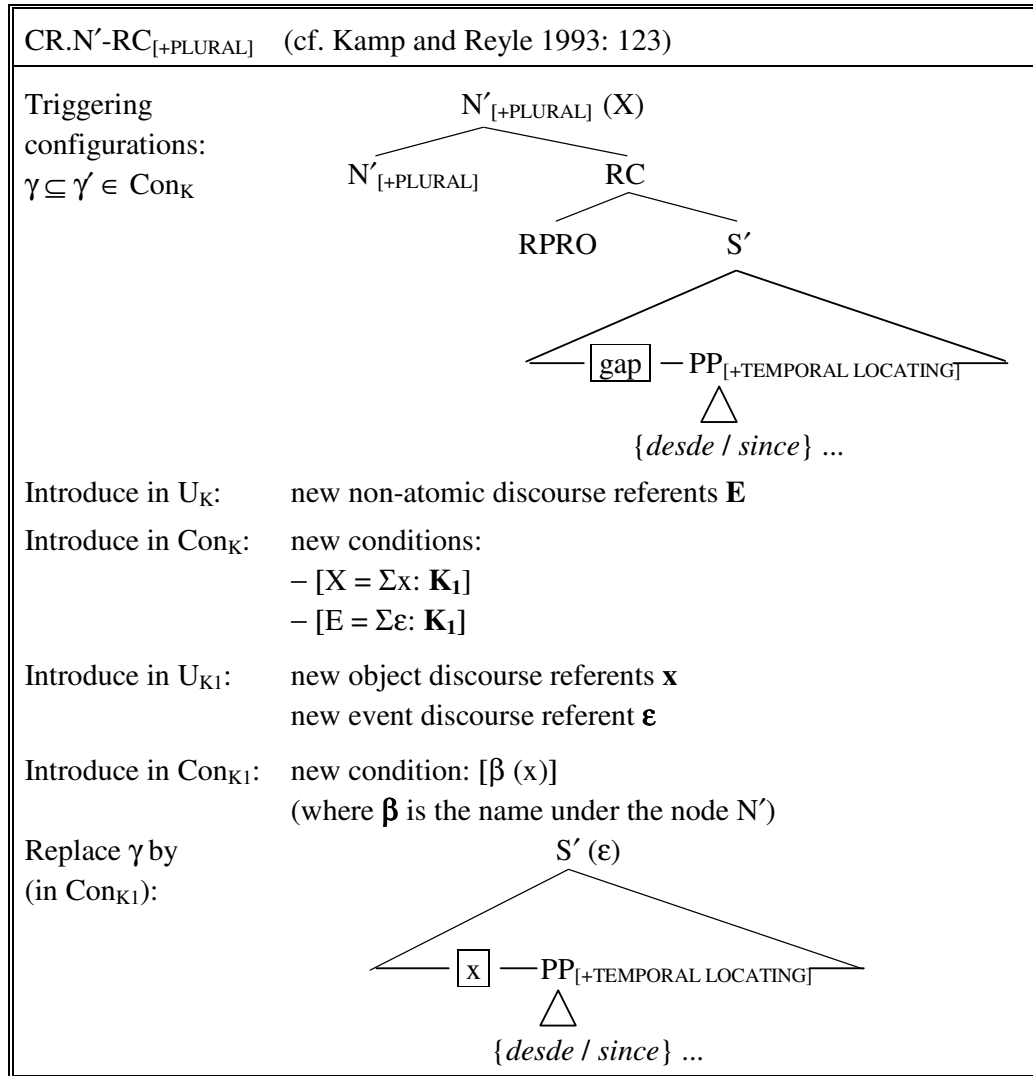




With respect to (601), the following must be noted: (i) I assume a distributive reading, where each book received its own, possibly different, prize; (ii) the location time  $t_1$ , if it ends at  $n$  as I consider here, is larger than  $t$  – thus, if the sentence had a universal quantifier *todos os livros que...* / *all books that...*, the implication would emerge that in the year where the utterance takes place Paulo did not write any book.

With respect to (602), note the following: (i) I represent de definite *os militares* [*the military*] in a subordinate position, assuming that its reference is dependent on each coup d'état; (ii) unlike in previous structures, I represent here, for perspicuity, the contribution of the tense of the main clause – [ $e_2 < n$ ].

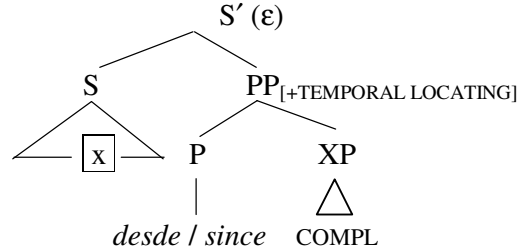
**DRS-CR 11. Plural nominal constituents (N') containing  
a relative clause with a temporal locating desde-adverbial**



With respect to this rule, the following must be noted:

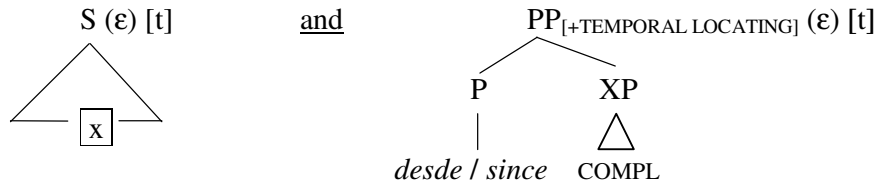
(i) The discourse referent **X** is the referential argument of **N'** (and occurs in the restrictor of the duplex condition in the example given above: “many of the X were awarded a prize”).

(ii) The processing of **S'**



will, as normally, introduce (in  $U_K$ ) a new discourse referent **t** (location time).

Observe that, since we are dealing with a subordinate clause, the **S'**-rule will not introduce a new eventuality discourse referent, but rather take the already introduced **ε** and specify it as the referential argumental of the **S** and the locating **PP** nodes, that is, the triggering configuration above will be replaced (in the familiar way) by:



The processing of the locating **PP** normally inserts  $[\epsilon \subseteq t]$  (inside the sub-DRS  $K_1$  where the **PP** is processed) and  $[\text{beg}(t) \subseteq t_c]$ ,  $[\text{end}(t) = \text{TPpt}]$  and  $[\text{COMPL}(t_c)]$  (in the main DRS). The processing of **S** normally contributes  $[\epsilon: z \text{ write } x]$  (where **z**, and  $[\text{Paulo}(z)]$  are inserted in the main DRS). This yields the relevant part of (601).

(iii) **ε** can be atomic (**e**), as in (601). It can also be non-atomic (**E**), this being the case if the relative clause contained a full-scanning trigger (e.g. an  $\text{NP}_{[\text{ABS.EV} = +]}$ ), as in *os livros que foram lidos por TRÊS ESTUDANTES desde ontem... / the books have been read by THREE STUDENTS since yesterday....*

As said, the occurrence of inclusive *desde*-adverbials in these subordinate clauses contrasts with their occurrence in main clauses in that only here can these phrases apply to atomic eventuality-descriptions (**e**).

**DRS-CR 12. Plural nominal constituents (N') modified by a temporal locating adverbial**

CR.N' <sub>[+PLURAL]</sub>	
<p>Triggering configurations:  <math>\gamma \subseteq \gamma' \in \text{Con}_K</math></p>	
Introduce in $U_K$ :	new discourse referent $\mathbf{t}$
Introduce in $\text{Con}_K$ :	new condition: $[\Pi = \Sigma\pi: \mathbf{K}_1]$
Introduce in $U_{K1}$ :	new discourse referents $\pi$ ( $\mathbf{e}$ or $\mathbf{t}'$ )
Introduce in $\text{Con}_{K1}$ :	new condition: $[\beta(\pi)]$ (where $\beta$ is the name under the node N')
Replace $\gamma$ by (in $\text{Con}_{K1}$ ):	

With respect to this rule, note that:

- (i) The non-atomic discourse referent  $\Pi$  is the referential argument of N' and can be an eventuality ( $\mathbf{E}$ ) or a time ( $\mathbf{T}$ ) discourse referent – cf. (598a) / (598b); in the examples given above,  $\Pi$  occurs in the restrictor of the duplex condition: “all the  $\mathbf{E}$  were carried out by the military”, “all the  $\mathbf{T}$  were hectic”.
- (ii) As said, the processing of the temporal locating PP introduces: (i)  $[\pi \subseteq t]$  (inclusive location), inside the DRS; (ii)  $[\text{beg}(t) \subseteq t_c]$ ,  $[\text{end}(t) = \text{TPpt}]$  and  $[\text{COMPL}(t_c)]$  outside the DRS (if the location time is definite, as is normally the case with *desde / since* adverbials)<sup>312</sup>. This yields the relevant part of (602).

<sup>312</sup> Note the discourse referent accessibility in the following sentences:

- (i) A Ana soube enumerar todos os golpes de estado na América Latina [desde 1980]<sub>i</sub>, o que não é fácil, visto que [este  $\emptyset$ ]<sub>i</sub> foi um período muito turbulento naquela região. Ana was able to enumerate all the coups d'état in Latin America [since 1980]<sub>i</sub>, which is not easy, for [this  $\emptyset$ ]<sub>i</sub> was a very turbulent period in that region.

Finally, I would like to introduce an issue for further research. Note that all structures described in this subsection contain plural N's. In fact, singular N's do not, as a rule, license the use of inclusive *desde* (which is not surprising, given that they do not appear to require an abstraction of the type described above):

- (603) a. \*Conheço um [livro que o Paulo escreveu desde 1980].  
 “I know a [book that Paulo has written since 1980]”  
 vs. b. Conheço os [livros que o Paulo escreveu desde 1980].  
 [I know the [books that Paulo has written since 1980]]
- (604) a. \*[Um terremoto (ocorrido) na Índia desde 1980] matou milhares de pessoas.  
 “[An earthquake (occurred) in India since 1980] killed thousands of people”  
 vs. b. [Os terremotos (ocorridos) na Índia desde 1980] mataram milhares de pessoas. [better with the participle!]  
 [[The earthquakes (occurred) in India since 1980] killed thousands of people]

Of course, if a singular N' contains a full-scanning trigger like those of section 9.3.1.1, the inclusive *desde* is licensed. Compare the ungrammatical example (603a) with:

- (605) Conheço um [livro que o Paulo leu *cinco vezes* desde 1980].  
 [I know a [book that Paulo has read *five times* since 1980]]

Now, there are structures where the N' is singular, none of the triggers considered in 9.3.1.1 is present, and still the use of the *desde*-adverbial is sanctioned. These structures are not extraordinary, though: they symptomatically contain **ordinals**, **superlatives**, and ***o único* [the only]**, which I hypothesise are also full-scanning triggers (in fact, they are quite intuitively so).

- (606) a. o terceiro livro que o Paulo escreveu desde 1980  
 [the third book that Paulo has written since 1980]  
 b. um livro que o Paulo leu por [a terceira vez desde 1980]...  
 [a book that Paulo has read for [the third time since 1980]...]  
 c. O Paulo leu este livro por [a terceira vez desde 1980].  
 Paulo has read this book for [the third time since 1980].
- (607) o livro mais interessante que o Paulo escreveu desde 1980...  
 [the most interesting book that Paulo has written since 1980...]
- (608) o único livro que o Paulo escreveu desde 1980...  
 [the only book that Paulo has written since 1980...]

I leave the analysis of these constructions for future research<sup>313</sup>, and proceed now to the final conclusions of the dissertation.

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<sup>313</sup> Cf. the cases discussed in Quirk *et al.* (1985: 539, fn. [b]), mentioned in footnote 270, and still Mittwoch (1988: 222-224, section “the perfect after superlatives, cardinal numbers and only”), who mentions similar examples.

# Conclusions

This dissertation has two topics: the **identification** of the class of temporal locating adverbials, by distinguishing it from other semantically “bordering” categories, namely temporal measure adverbials and time-denoting expressions; the **semantic computation** of temporal locating adverbials in the formal framework of Discourse Representation Theory, including as a subtopic the analysis of the **interaction** between (adverbial) temporal location and other semantic domains, namely temporal structure of eventualities (aktionsart), causality and quantification, which significantly affect the temporal relations expressed by locating adverbials.

## I. Identification (categorisation)

With respect to the identification topic, i.e. the categorisation of temporal locating adverbials, I advocated a semantic-syntactic definition that clearly sets these expressions apart from the two “bordering” categories of temporal measure adverbials and time-denoting expressions. Let us briefly recall the problems at stake.

The demarcation of temporal locating adverbials with respect to temporal measure phrases is problematic inasmuch as there are expressions, *for the last three hours* being a paradigmatic example, which appear to be ambivalent, simultaneously locating eventualities and expressing their duration. I proposed that the dividing line be fixed according to the following distinction:

1. Temporal locating adverbials contain a (basic or derived) time-denoting expression as an immediate constituent – structurally, [<sub>TLA</sub> TLO TDE] (abbreviations standing for “temporal locating adverbial”, “temporal locating operator” and “time-denoting expression”, respectively).
2. Temporal measure adverbials include a bare predicate of amounts of time in the parallel position – structurally, [<sub>TMA</sub> TMO PAT] (abbreviations standing for “temporal measure adverbial”, “temporal measure operator” and “predicate of amounts of time”, respectively).

Taking into account that the NP *the last three hours* clearly identifies an interval (i.e. is time-denoting), adverbials like *for the last three hours* – like, for that matter, any other containing predicates of amounts of time as non-immediate constituents – belong in the first category. *A fortiori*, other adverbials also referred to as ambivalent (by some authors) which do not contain such predicates (e.g. *from two to five*, *until noon*, or *desde a semana passada* [*since last week*]) are uniformly categorised as temporal locating.

This analysis is supported by linguistic facts, evincing the analogous behaviour of the so-called ambivalent locating-measure adverbials and the (strictly) locating ones. Hence, a tripartite taxonomy comprising an “ambivalent class” precludes a homogeneous characterisation of closely related groups of adverbials, thereby reducing the generalisation power of the system.

I took the apparent ambivalence of the adverbials at issue as a linguistic manifestation of **inference**, a component of capital importance in the semantics of natural language in general, and in the temporal domain in particular. In the present instance, the asserted information concerns, on the one hand, the temporal relation between an eventuality **ev** and an interval **t** – viz. that the former totally covers the latter – and, on the other hand, the explicit definition of the size of that (location) interval. As for the deduced information, it concerns the duration of the located eventuality: it is at least as large as the location interval. Formally:

$$(608) \quad [t \subseteq \text{ev}] \rightarrow [\text{dur}(\text{ev}) \geq \text{dur}(t)]$$

This in accordance with the self-evident fact that *Ana has played the piano for the last three hours* entails that Ana has played the piano for an amount of time of (at least) three hours.

The demarcation of temporal locating adverbials with respect to time-denoting expressions is problematic inasmuch as there are expressions – e.g. *antes da guerra* / *before the war*, *há três semanas* / *three weeks ago*, *quando a Ana saiu* / *when Ana left* – that can occur, with the same surface form, in characteristic contexts of both categories. For instance, an *antes* / *before* phrase can occur as in

$$(609) \quad \begin{array}{lcl} \text{morar em Paris} & \left. \begin{array}{l} \text{morar em Paris desde} \\ \text{datar de} \end{array} \right\} & \text{antes da guerra} \\ \text{to live in Paris} & \left. \begin{array}{l} \text{to live in Paris since} \\ \text{to date from} \end{array} \right\} & \text{before the war} \end{array}$$

I proposed a uniform categorisation of the phrases with this sort of distributional properties (taken as they stand, say, in phonetic form) as mere time-denoting expressions, and associated their occurrence in “full” adverbial position to a null locating operator with a value close to that of Portuguese *em* and English *in*. Therefore, the first two constructs in (609) were analysed as

$$(610) \quad \begin{array}{lcl} \text{morar em Paris} & \left\{ \begin{array}{l} \emptyset_{\text{em}} \\ \text{desde} \end{array} \right\} & \text{antes da guerra} \\ \text{to live in Paris} & \left\{ \begin{array}{l} \emptyset_{\text{in}} \\ \text{since} \end{array} \right\} & \text{before the war} \end{array}$$

A similar null-operator analysis has been proposed and widely used in the literature for structurally simpler temporal expressions, like *yesterday* or *last week*, and has been suggested (although, to my knowledge, not elaborated upon) for some structurally more complex expressions, like *before*-phrases. However, the present contribution appears to be relevant, in that (i) arguments are adduced in favour of this analysis (involving several linguistic properties of the expressions at stake), (ii) its formal implementation is elaborated upon, and (iii) important consequences of its adoption for the interpretive system are made explicit. Among these consequences, I underline:

1. A simpler design of the *adverbial* temporal locating system, which now involves only overlapping relations between located entities and location times (though with variants – e.g. partial or total overlapping, or (im)possibility of extension beyond the boundaries of the location time). In this design, the (non-overlapping) anteriority and posteriority relations expressed by time adverbials are computed at the level of **inference** rather than assertion.
2. A partition of the set of expressions traditionally classified as temporal locating adverbials, by ruling out – and categorising as simple time-denoting expressions – all the (relevant) adverbials headed by *antes / before*, *depois / after*, *entre / between*, *há / ago*, *quando / when*, and the like.

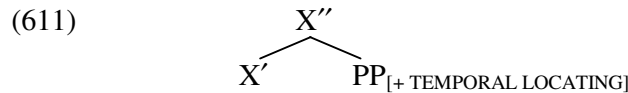
In sum, with respect to the identification / categorisation topic, I circumscribed the class of temporal locating adverbials by including (as its rightful member) the group of “ambivalent” measure/locating adverbials, and by excluding the group of “ambivalent” locating/time-denoting expressions. The outcome is, I argue, a manifestly simpler and more regular *adverbial* temporal locating system, with a stronger generalisation power.

## II. Semantic computation

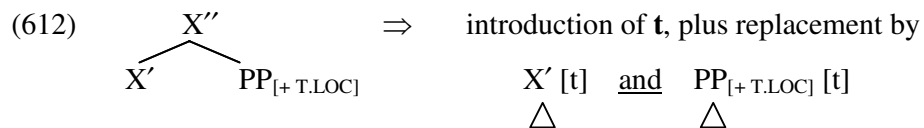
With regard to the semantic computation topic, I proposed a general DRS-construction rule/mechanism, which is based on Kamp and Reyle’s (1993) but departs from it in some significant respects. The changes I suggested are motivated essentially by the analysis of structures that were not contemplated in that work.

Concerning the rule that processes the temporal locating adverbials, it must be stressed that my focus was on structures where these adverbials identify a *single definite* location time, rather than a single indefinite one, or a set of location times. I assume, however, that its general design can be maintained in a (desirable) extension to these other structures. Specifically, I proposed that:

- The discourse referent for the location time **t** defined by the locating adverbial is systematically introduced when processing the node hierarchically above it, i.e.  $X''$  in the schema below.  $X''$  can be  $S'$  (cf. DRS-CR 1, on page 103),  $VP$  (cf. DRS-CR 2, on page 106), or  $N'$  (cf. DRS-CR 12, on page 351), for instance. This is in keeping with Kamp and Reyle’s  $S'$ -construction rule (cf. *ibid.*: 543, 610).



- As a rule, the time discourse referent in question is “passed down” to the temporal locating PP and to its sister node. This is meant to guarantee the correct binding of **t** in the further rules that will affect it (which can be associated with both constituents).



Note that  $t$  is assumed not to be the referential argument of any of the two constituents. This “passing down” is a purely technical mechanism (of “information storage” so to speak), which does not occur in Kamp and Reyle (1993).

- My assumptions regarding the predication over  $t$  inside the locating PP match Kamp and Reyle’s, namely in that two different intervals are always taken into consideration: (i) the location time proper –  $t$  – which comes from the  $X''$ -rule, and is already attached to the locating PP when this node is processed; (ii) the time defined by the complement of the locating operator (preposition, conjunction, or similar) –  $t_c$  – which the locating PP rule inserts<sup>314</sup>.

Temporal locating operators fall into groups according to the relationship they establish between  $t$  and  $t_c$  (cf. table 4, on page 91):

(613)	$[t = t_c]$	→	em / {in/on}, durante / during, enquanto / while
	$[\text{beg}(t) \subseteq t_c]$	→	desde / since
	$[\text{end}(t) \subseteq t_c]$	→	até / until

With respect to the location time  $t$ , the main difference between my proposal and Kamp and Reyle’s concerns the status of this discourse referent: I emphasise that  $t$  *is not* the referential argument of the locating operator/adverbial (contrary to what seems to be suggested by Kamp and Reyle’s condition [Adv ( $t$ )], in the  $S'$ -rule of their page 610, for instance). In fact, my assumption is based on these authors’ theory about predication in general, and their analysis of prepositions as predicates in particular (cf. *ibid.*: 260-279).

- I identified two constructions which show the relevance of passing  $t$  down to the sister-node ( $X'$ ) of the locating adverbial as well. In these constructions, the processing of a constituent of  $X'$  inserts a condition directly involving  $t$ . They are:
  - (i) structures with a (common) locating adverbial at VP-level and another (proper) one at  $S'$ -level, and where the former identifies a subinterval  $t_1$  of the time defined by the latter ( $t$ ), i.e.  $[t_1 \subseteq t]$ ; note that this inclusion condition is introduced when processing the VP, i.e. a constituent of  $X'$  in (611) above – cf. DRS-CR 2, on page 106.
  - (ii) structures with full-scanning of the location time  $t$  triggered by a constituent of  $X'$  (e.g. an NP with a cardinal quantifier and distributive reading) – cf. DRS-CR 10, on page 342.
- The discourse referent for the located entity  $\pi$  (an eventuality  $ev$ , or an interval  $t'$ ), described by the sister-node ( $X'$ ) of the temporal locating adverbial is also systematically introduced when processing the node  $X''$ . This is in keeping with Kamp and Reyle’s first version of the  $S'$ -construction rule (cf. p. 543), but not with their revised  $S'$ -construction rule (cf. p. 610).

Let us consider just the eventuality-location case.

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<sup>314</sup> Actually, Kamp and Reyle (1993) do not formulate a DRS-construction rule for temporal locating adverbials, but what is said here is in keeping with their output representations.



- I proposed that the discourse referent for the located eventuality **ev** (introduced while processing  $S'$ ) is also “passed down” both to the locating adverbial and to its sister node. However, contrary to **t**, **ev** is assumed to be the *referential argument* of both constituents (a property conventionally represented by means of parentheses, rather than square brackets). In sum:

$$(614) \quad \begin{array}{c} X'' \\ \swarrow \quad \searrow \\ X' \quad PP_{[+T.LOC]} \end{array} \quad \Rightarrow \text{introduction of } \mathbf{t} \text{ and } \mathbf{ev}, \text{ plus replacement by} \quad \begin{array}{ccc} X'(\mathbf{ev})[t] & \underline{\text{and}} & PP_{[+T.LOC]}(\mathbf{ev})[t] \\ \triangle & & \triangle \end{array}$$

- The passing down of **ev** to  $X'$  is relatively uncontroversial, given that sentences are taken in the DRT-system as representations of eventualities. The passing down of **ev** to the locating adverbial, which I advocate here (but does not take place in Kamp and Reyle 1993), embodies two relatively significant differences between their system and my revision.

The first difference, already alluded to before, is that I do not take the location time **t** as the referential argument of the temporal locating adverbial; rather, the referential arguments of locating phrases are the discourse entities they locate (i.e. **ev** here). This accords with Kamp and Reyle’s mentioned theory of predication, though not with their implementation in the analysis of time adverbials.

The second difference is basically technical, but of crucial importance, I believe, for a comprehensive treatment of temporal locating adverbials. It concerns the fact that, in my rule, the location condition (relating **ev** and **t**) is introduced when processing the locating adverbial (**ev** having to be “available”, in order to be correctly bound), and not (as in Kamp and Reyle’s rule of page 543) when processing  $S'$ . Arguments in favour of this option were presented in section 4.2.2.1, but the issue remains mainly technical, since it seems possible to do things either way (if the appropriate percolation-infiltration mechanisms are introduced). Note, however, that the expression “temporal *locating* adverbial” only acquires its full meaning when the location condition  $[R(\mathbf{ev}, t)]$  is made directly dependent on the adverbial (rather than directly dependent on the aktionsart features of  $S'$ , as in Kamp and Reyle’s rules): locating adverbials are the locators of **ev**! (of course, not necessarily the only ones, since tense, for example, can also have a locating role).

Still with regard to the topic of semantic computation, other rules have, with a greater or lesser degree of tentativeness and/or simplification, been put forward. Among them, I underline: (i) the set of DRS-construction rules 5–8, in chapter 7, concerning the definition of intervals via measuring or counting from anchor points, and (ii) the set of DRS-construction rules 10–12, in chapter 9, concerning the structures with full-scanning of location times.

In chapter 7, I sketched the formal analysis of a structure that, to my knowledge, has not been acknowledged in the semantic literature in its full extent. This structure involves the definition of intervals non-adjacent to an anchor point via an operation of *counting* (temporally ordered entities) from that point, and resorts to the same temporal operators as its counterpart involving time measurement (rather than counting):

$$(615) \quad \left\{ \begin{array}{l} \text{há três fins-de-semana} \\ \text{cf. há três horas} \end{array} \right\} \quad \left\{ \begin{array}{l} \text{three weekends ago} \\ \text{cf. three hours ago} \end{array} \right\}$$

In chapter 9, I sketched the formal analysis of a construction that I believe to have a special status (to my knowledge, not fully recognised in the semantic literature) among temporal constructions. I will return to this below.

### III. Interactions

Three types of interactions involving location by means of time adverbials were particularly focussed in this dissertation. The first concerns the role of **aktionsart**. The point of departure was the well-acknowledged contrast between telic and atelic eventualities (**ev**) with respect to adverbial temporal location, viz. that the former are, as a rule, included in the location time (**t**), whereas the latter often allow extension beyond one or the two boundaries of the location time, therefore imposing a less restrictive condition:

- (616) a.  $[\text{ev} \subseteq \text{t}] \rightarrow$  default location of telic eventualities  
 b.  $[\text{ev} \circ \text{t}] \rightarrow$  default location of atelic eventualities

These aktionsart-dependent conditions apply generally and appear to be independent from the temporal locating adverbials of the sentence.

(616) seems to be all we can tell from the aktionsart value of the sentence alone. However, the information about temporal location conveyed in sentences with time adverbials goes well beyond this. The need to consider this additional information, largely dependent on material internal to the locating adverbial (namely its heading operator), was a decisive factor for proposing that the location conditions be determined (i.e. inserted in the DRSs) only when processing the adverbial and not before that (cf. discussion above).

I focussed on two cases which illustrate the direct dependence of temporal location conditions on material internal to the adverbial:

1. Cases where the temporal locating operator “selects”, in combination with atelic descriptions, a more restrictive version of (616b), viz. (617) below. Among the operators with this property are English *until* and *from...to*, and Portuguese *desde* [*since*] and *de...a* [*from...to*].

$$(617) \quad [\text{t} \subseteq \text{ev}]$$

(strict) durative location

that is, the atelic eventuality occurs through the whole location time.

Remember that temporal adverbials headed by these operators (often termed *durative*) do not receive unanimous categorisation in the literature: they are regarded as normal

locating adverbials by e.g. Kamp and Reyle, as ambivalent measure-locating adverbials by e.g. Bennett and Partee 1978, or are undistinctively grouped in the same category as strict temporal measure adverbials, by e.g. Smith 1991 and Vlach 1993 (cf. subchapter 4.1). In this dissertation, I advocated the first position.

2. Cases where the temporal locating adverbial triggers an aktionsart shift and hence directly affects the applicable location conditions. Apart from structures where an intentional value is present (e.g. *O Paulo emprestou-me o livro até segunda-feira* / *Paulo lent me the book until Monday*), where the locating adverbials probably occur VP-internally, the only indisputably grammatical instances I found of these constructions involve a causal value (and a *desde*-phrase). The associated location conditions are as follows:

$$(618) \quad [\text{beg}(t) <_{\text{close}} \text{ev}] \wedge [\text{end}(t) \circ s] \text{ (where } [\text{ev} \supset \subset s])$$

*derived (semi-)durative location*

that is, the telic eventuality **ev** represented in the main clause is associated with a consequent state **s** (arguably by mere virtue of the combination main clause / locating adverbial), both eventualities being temporally located: the telic one closely after the lower bound of the location time, the atelic one “duratively” from there until the upper bound of the location time.

I also dedicated some attention to the impact of **causality** on adverbial temporal location. It must be stressed that causality differs from the location-affecting factors considered before in that it is not “main clause-internal” (like aktionsart values), nor “locating adverbial-internal” (like the facts inducing the location conditions (617) and (618)). Rather, it can only be computed at the level of the combination main clause / adverbial or, often, within a larger discourse context. I did not try to formalise this aspect of the semantic computation, since discourse relations are beyond the scope of this dissertation (cf. 4.2.3.3).

Taking into account the intrinsic temporal facet of causality, viz. that a caused event entirely follows (at least the beginning of) the causing eventuality, I concluded for the need to state a more flexible durative location condition, which encompasses the *strictly durative* case, where  $[\text{beg}(t) \circ \text{ev}]$ , and the *semi-durative* case, where  $[\text{beg}(t) <_{\text{close}} \text{ev}]$  (required by structures with causal links between located and locating eventualities):

$$(619) \quad \text{Paulo has been feeling sick} \begin{cases} \text{since noon} & \rightarrow [\text{beg}(t) \circ \text{ev}] \\ \text{since he took those pills} & \rightarrow [\text{beg}(t) <_{\text{close}} \text{ev}] \end{cases}$$

Furthermore, I noted a contrast between the “lower-bound temporal locating adverbials” (*desde* / *since*) and the “upper-bound temporal locating adverbials” (*até* / *until*) with respect to the issue at stake. In the latter case, the presence of causal connections between located and locating eventualities *does not* affect the adverbial location because the possible hiatus between cause and effect falls outside the location time **t**.

$$(620) \text{ Paulo felt sick } \left\{ \begin{array}{l} \text{until noon} \\ \text{until he took those pills} \end{array} \right. \begin{array}{l} \rightarrow [\text{end}(t) \circ \text{ev}] \\ \rightarrow [\text{end}(t) \circ \text{ev}] \end{array} \\ \text{(cf. } [\text{end}(t) <_{\text{close}} \text{end}(\text{ev})])$$

The third type of interaction I examined concerns (adverbial) temporal location and **quantification**. As said above, the constructions on which I focussed, involving full-scanning of the location times associated with the temporal adverbials, have not been given in the semantic literature the salience I think they deserve. The study of this construction constitutes possibly the most consequential and original contribution of this dissertation.

The “full-scanning construction” involves a special use of temporal “locating” adverbials in which the locating function is, as it were, subsidiary, their import lying essentially in the definition of a temporal frame for some quantificational operation: (a) counting eventualities, (b) determining the total amount of time consumed in a given (discontinuous) activity, (c) exhaustively enumerating relevant events, (d) comparing properties of objects, or (e) simply picking up (maximal) sums of entities (to be involved in verbal predication), just to give some examples. Normally, these quantificational operations are not temporally unbounded, but rather circumscribed in time (and relative to the span taken into account). Now, the temporal circumscription at stake is expressed par excellence via a time adverbial, as in the following sentences (which instantiate the operations (a)-(e) mentioned above, in that order):

$$(621) \begin{array}{ll} \text{a. Paulo (has) got married three times} & \\ \text{b. Paulo (has) worked for fifty hours} & \\ \text{c. Paulo (has) repaired the house, enlarged the garage,} & \\ \quad \text{paved the road, and raised a wall} & \\ \text{d. Paulo's most touching speech} & \\ \text{e. (all) Paulo's speeches / (all) weekends} \quad \dots & \end{array} \left. \vphantom{\begin{array}{l} \text{a. Paulo (has) got married three times} \\ \text{b. Paulo (has) worked for fifty hours} \\ \text{c. Paulo (has) repaired the house, enlarged the garage,} \\ \quad \text{paved the road, and raised a wall} \\ \text{d. Paulo's most touching speech} \\ \text{e. (all) Paulo's speeches / (all) weekends} \quad \dots \end{array}} \right\} \begin{array}{l} \text{since } X \\ \text{in } X \\ \emptyset_{\text{in}} \text{ before } X \\ \text{while } X \end{array}$$

(NB: of course, not all combinations are possible, depending on several syntactic or semantic restrictions)

Formally, the time adverbial sets the frame for quantification (in these constructions) by characterising a time discourse referent  $t$  which occurs in a sub-DRS under the scope of an abstraction operator:

$$(622) \quad \Pi = \Sigma \pi: \begin{array}{|c|} \hline \pi \\ \psi(\pi) \\ \pi \subseteq t \\ \dots \\ \hline \end{array}$$

This representation (where  $\psi$  represents properties predicated of  $\pi$ ) evinces the two concurrent roles of the adverbial: (i) specification of a temporal frame for defining  $\Pi$

(often the object of predication in the sentence), and (ii) temporal location of each  $\pi$  (and, by entailment, of  $\Pi$ ).

Accordingly, in a combination main clause / locating adverbial, for instance, where full-scanning location takes place, the temporal adverbial *contributes to define* the main clause (non-atomic) eventuality  $\mathbf{E}$ , given that inclusion in the frame set by the adverbial is a constitutive property of the subevents  $\epsilon$  making up  $\mathbf{E}$ :

$$(623) \quad \mathbf{E} = \Sigma \epsilon: \begin{array}{|c|} \hline \epsilon \\ \epsilon \subseteq \mathbf{t} \\ \epsilon: \dots \\ \dots \\ \hline \end{array}$$

Obviously, things are different for combinations main clause / locating adverbial with simple temporal inclusion, as (625) below, where the adverbial merely defines a frame for location.

The representations proposed are in accordance with the inferential properties exhibited by cardinal quantifiers in sequences like the following<sup>315</sup>:

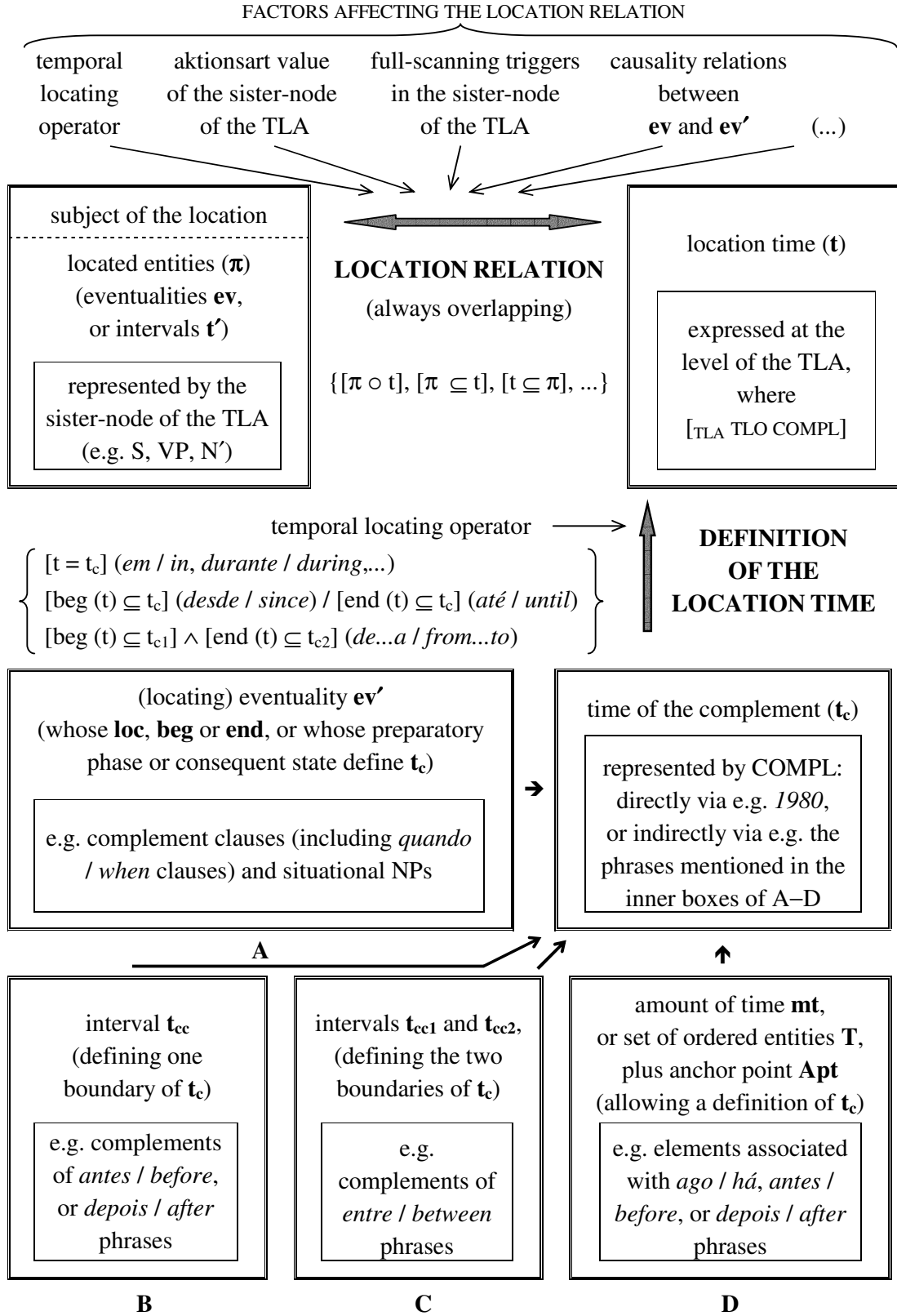
- (624) Paulo wrote three essays in June 1990. [“exactly three”]  
 $\neg/\rightarrow$  Paulo wrote three essays in 1990.
- vs. (625) Paulo offered this painting to three friends in June 1990. [“exactly three”,  
 $\rightarrow$  Paulo offered this painting to three friends in 1990. collective offer]

For most temporal adverbials, the difference between the simple temporal location and the full-scanning one is not easily perceivable. Interestingly, though, there are adverbials which occur in one of the contexts but not in the other, allowing a clearer demarcation of the full-scanning construction. The case I explored in more detail is that of Portuguese *desde*-adverbials, which, like their counterparts in other Romance languages, are only compatible: (i) in combination with event-descriptions, with the full-scanning location, and (ii) in combination with atelic descriptions, with the full-scanning location (operating on bounded occurrences of the atelic eventualities) and with the durative location (cf. Table 12, on page 304).

The overall picture of the system of adverbial temporal location, as described and characterised in this dissertation, is given in Figure 5 (where TLA and TLO stand for “temporal locating adverbial” and “temporal locating operator”, respectively):

<sup>315</sup> Note that the change of any condition (temporal or not) in a sub-DRS has similar consequences:

- (i) Paulo wrote three essays about *tense*. [“exactly three”]  
 $\neg/\rightarrow$  Paulo wrote three essays about *semantics*.



**Figure 5. Structuring the domain of adverbial temporal location**

This concludes my dissertation. Needless to say that many issues treated here still require further consideration. This can easily be perceived by the number of times that I used the expressions “side-step this issue”, “not take into account” or “leave for further research”. I hope to start this research soon, but at this point the time is come to put an end to it.





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