Chapter 4: Tense and aspect semantics

The main difficulty in writing a chapter on tense and aspect semantics is the selection of topics and authors to mention, providing a fair picture without becoming a sort of annotated list of references, nor a textbook in either semantics or tense and aspect. The purpose of this chapter is to lay the background necessary to understand the rest of the thesis, keeping to a minimum the description of several competing theories. It is not to be read as a general introduction or survey of the field, which can be found elsewhere (see e.g. Binnick, 1991).

The chapter is structured as follows: First, those problems which have been given most attention in the literature will be listed in Section 4.1, and divided into three categories, each of which is discussed in some detail in the next three sections. At the same time, the presentation gives an idea of the semantic tools available in the formal semantics literature and settles, for the purposes of this dissertation, some particular matters dealt herein.

4.1 A first survey of relevant issues

One can divide most issues in the literature on tense and aspect semantics into three categories. The list below is not meant to be exhaustive, only representative:

1. Definitional issues

What is aspect, the dichotomy aspect/Aktionsart

The relationship between aspect and tense

The discourse level and its importance/relevance to tense and aspect

What are semantic data

2. Descriptive/explanatory issues[1]

Ontology: times, intervals and/or events

Events and states

The meaning of the progressive

The meaning of the imperfective/perfective distinction

The interplay between aspect and nominal arguments

Anaphoric models of tense

3. Computational issues (in the sense of dealing with how to get the meaning right, not necessarily by means of a computer)

Compositionality

Aspect calculi (or aspect classification devices)

Relative advantages of formalisms, such as model theory, deductive systems,

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[1] I had contemplated separating matters of description from matters of explanation, but soon realized that there is no pure descriptive approach (a pure list of facts); rather, description is always made in connection with (an attempt at) explanation: facts are given as examples of an intended systematization, or generalization, which is already (part of) explanation.

dynamic logics, algebraic formalisms

In the following sections, I will briefly discuss some of the points above, with references to the relevant literature. Some issues will be taken up in more detail to make my position clear.

4.2 Issues of definition

The discussions in this chapter, it should be noted, are predominantly synchronic. For example, when I discuss aspect and Aktionsart I attempt to describe the current consensus (or current arguments), and not the historical development of such concepts. This is a conscious choice, for economy's sake, although I may deviate from it in occasional footnotes.

This does not mean, however, that I will not mention or discuss original and seminal works: I do whenever I find it relevant for the matter at hand, but not for historical reasons only.

4.2.1 Aspect, *vid* and Aktionsart

It has proved notoriously difficult to give the notion of aspect a definition which is generally accepted. It has, furthermore, become common practice in the tense and aspect literature to complain of the lack of standardization in this respect.

In my opinion, this stems from the fact that the two competing "schools" that deal with aspect are inspired by languages which are very different in this respect, namely the Slavic languages ("aspect" is the translation of the Russian term *vid*) and the Germanic languages, where the term aspect has arisen from the original German *Aktionsart* ('mode of action'), which has now more or less entered English.

In the literature currently published in English, the English term "aspect" is used for both kinds of phenomena,[2] even though some scholars (e.g. Bache (1982), Nakhimowsky (1988), Alonge (1994)) still insist on terminological clarification.

Now, the two kinds of aspect are known to be translationally related (cf. Gawron,´ ska's quotation in Section 2.2.4 above on how these two concepts have been related by some). However, to have a cover term for two kinds of different phenomena with a coarse translatability relation between them does not grant their identifiability (as I emphasized in the previous chapters). In fact, this dissertation will show that these two aspects of aspect (in their actualization in English and in Portuguese) are not equivalent.

Let me thus present the two concepts in detail: Aktionsart, or aspectual classification, is a property of verbs, verb phrases and sentences, and divides them into different temporal schemata with respect to their internal (temporal) constitution. So, for example, an "accomplishment"[3] is a verb, verb phrase, or sentence, which describes an action that takes time and has an inherent

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[2] Among the sources for this use in the formal literature are the two influential works by Mourelatos (1978/81) and Dowty (1979).

[3] I will use Vendler's (1957/67) terms throughout the present dissertation, as do most researchers on English aspect. Aktionsart classification will be discussed in Section 4.4.1 below, but the precise meanings I will assign to the terms for aspectual classes in each language will only be made clear in Chapters 5 and 6, when I discuss the tense and aspect system of each language in detail.

conclusion or goal (like *build a house*). This contrasts, for example, with an "activity", which refers to a situation that is extended in time but has no inherent endpoint (like *dance*), or with an "achievement" which is seen as the punctual attainment of some goal (or, alternatively, as some change in the world), like *recognize*. "States", like *resemble*, have no internal temporal constitution.

On the other hand, aspect in its strict sense (henceforth "perspectival aspect") concerns the temporal relationship between two different "objects": an event and an observer. Imperfective aspect places the observer temporally within the time of the event, while perfective aspect places him/her outside it.

Some obvious entailments are thus possible, which lead to the translation relations often noted (and taken, mistakenly, to denote identity of function): extendedness of a situation and imperfectiveness "go together" (the more extended an event, the more probable it is that one can be temporally within it), while perfectiveness and punctuality are related (if one is outside an event, one can "see" it as a point; conversely, if one has a punctual event, it is only to be expected that one is outside it). But these facts are merely plausibility assumptions; they are not definitional in either direction; nor do they entail any necessary translation rules.

One could thus suggest that English has Aktionsart, but does not express the kind of concepts relevant to perspectival aspect. This is what is implicitly involved in the recent and somehow dominant trend of seeing the progressive and the perfect as operators on events bringing about states, i.e., entities of a particular, and different, Aktionsart -- or, alternatively, as selecting or creating parts of events. This is explicit in Moensian treatments (Moens, 1987), surveyed in the next chapter, and at least implicit since Vlach (1981).

An alternative and common way of looking at these operators, however, provides a relational description: the English perfect places the observer <u>after</u> a given event occurred; the denotation of the progressive is the <u>interior</u> of the extended interval corresponding to the denotation of an event. These descriptions, in as much as they capture the meaning of these operators, show that the perspective of an observer regarding a given event (which I take definitory of perspectival aspect) is relevant for a language like English as well. (Even though, obviously, in a different way, in that the position of the observer must be conveyed in the Slavic languages but is generally optional in English.)

To illustrate the kind of linguistic examples involved, take the English progressive. It can be said to select the activity part of the complex situation referred to by *build a house* in *He was building a house*, or suggest that the observer's temporal point is placed during the building process. In *She looked out of the window. John was arriving*, the progressive, however, clearly signals a perspectivized reading, while in *The earth is turning around the sun* it strongly suggests the creation of an activity instead. Summing up, there is often a choice between explaining a given linguistic operator as changing Aktionsart, or defining perspective relative to a given situation. This is comparable to the wave and matter theories of light: For different cases alternative theories fare better.

To further substantiate my point, let me discuss one of the few precise definitions of aspect in the literature on English, the one by Lauri Carlson (1981): "I restrict the term "aspectual" to properties of sets of periods which essentially involve the concept of (initial, internal, final) subperiod. Likewise, I call an operation on sets of periods "aspectual" only if its values involve periods overlapping with periods it applies to." (Carlson, 1981:32). This definition is couched in terms of a model-theoretic interpretation of sentences (the bearers of aspect) as sets of time periods. Given this assumption, it is clear that it is a pure Aktionsart definition (aspect will bring changes to temporal profiles). Now, after having provided a characterization of the progressive in terms of subperiods, Carlson suggests, in order to solve a paradox associated with it, "an analysis of the intensional conditions of the progressive which construes (9) and (10) as true simultaneously only when seen from [...] different points of view" (Carlson, 1981:45). This I take to constitute independent confirmation for the claim that the progressive crucially requires the notion of the observer's perspective, i.e., it is a marker of perspectival aspect.

The problem of the two sides of aspect should probably be discussed the other way around as well. After showing that an "Aktionsart language" like English also had to some extent perspectival aspect, it should be mentioned that Aktionsart is important for Slavic languages as well; cf. e.g. Matveyeva (1985). Obviously, I will not be concerned with Slavic languages here, but for Portuguese it will be shown in Chapter 6 that Aktionsart is an important ingredient for defining the meaning of "perspectival aspect" constructs. Particularly, an imperfective or perfective aspect operator will mean different things when applied to members of different (Aktionsart) classes. What I hasten to add at this point, and as will be emphasized again in Chapter 6, is that Aktionsart, taken as inherent temporal properties of verbs (and applicable to sentences) is language dependent. Different languages do not classify the world according to the same criteria.

In this dissertation, I will be concerned with the two kinds of aspect, since I consider them both relevant to the analysis of the two languages at stake, Portuguese and English. But to separate the two concepts is not to deny their interrelationship in either of the two languages (and possibly in all languages which have the two sorts of phenomena). For, after all, Aktionsart classifications may depend precisely on (perspectival) aspect operators,[4] while the meaning of these last is, in turn, partially dependent on the Aktionsart of their arguments. This seemingly circular definition cannot, in my view, be avoided. Rather, it is a simple illustration of the structuralist claim that "Tout se tient": all pieces of a language system work together.

Finally, I note that a distinction between Aktionsart and aspect has sometimes been made at a purely formal level, namely, considering the former a covert category and the second a grammatical one. But this is, obviously, not a definition of either category, and, in fact, if the only difference between the two concepts were their formal realization there would be no point

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[4] Or, less strongly, on aspect operators for which there are alternative (or complementary) definitions as bearers of "perspectival" aspect, as is the case of the progressive in English.

in discussing two distinct concepts.

4.2.2 Aspect versus tense

Another problematic issue has been the delimitation of tense and aspect. This is relevant already at the formal level, when the two categories are marked morphologically in a similar way, as I believe is the case with Portuguese and the other Romance languages: both tense and aspect are conveyed inflectionally, while grammatical aspect in English is periphrastic and in Slavic derivational, and thus separated from tense, in the three cases conveyed by inflection. However, the real question, it seems to me, lies at the level of definition.

A common definition of the contrast between the two concepts (see e.g. Comrie (1976)) is to present tense as concerning localization *vis-à-vis* an external temporal axis, and aspect with respect to an internal one. (Generally, no distinction is made between Aktionsart and perspectival aspect, so "internal" can be read as concerning the kind of situation described -- Aktionsart -- or the particular situation described -- perspectival aspect.) Lyons (1977), however, puts the emphasis rather on the deictic character of tense as opposed to aspect; this issue will be taken up in Section 4.3.1 below.

This way, Imperfeito can be seen as both a tense and an aspect in that it expresses localization in relation to 'now', and it places the observer within some (context-dependent) situation. One might say that Portuguese in that respect is an 'inflecting' language,[5] where the suffixes convey both tense and aspect. This is in accord with the traditional name for this form, Pretérito Imperfeito do Indicativo ('preterite imperfect of the indicative'), classifying it as conveying information on tense proper -- past, aspect -- imperfective, and mood -- indicative.

There are, however, two remaining problems. One, most notably discussed in relation to the English perfect, is that it is hard to analyse the import of the two components separately (even when the two are morphologically separate, as happens with the English perfect: namely, the <u>present</u> perfect and the <u>past</u> perfect have been claimed to differ in more than simply temporal reference). Another relationship generally invoked between tense and aspect is the existence of different aspects only for some kinds of temporal reference. This seems to me, however, more a question of language needs ("language economy") than an essential relationship between the two phenomena.

The other problem with this definition is what is called by e.g. Comrie relative tense, cases "where the reference point for location of a situation in some point in time is given by the context, not necessarily the present moment" (Comrie, 1985:56), analogously to adverbials like *on the same day*, *on the day before*, *on the next day*. The notion of "external" time line is, obviously, of dubious interest in this context. It seems, rather, that it is the notion of ordering that is relevant to a definition of tense (absolute tense concerning ordering *vis-à-vis* an external axis, and relative tense concerning ordering *vis-à-vis* another, more "internal", axis). Even though

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[5] See Lyons (1968:187-92) for a tripartite classification of languages according to the way their morphology works: agglutinating, inflecting and isolating languages.

Comrie claims that only non-finite tenses in English are relative tenses in this language, an example like *If you do that, you will realize later that you <u>were</u> wrong* is a clear case where the past corresponds to a future situation which is prior to the realization "event". I will therefore take tense to indicate temporal order, as was also the path taken by L.Carlson (1981). What it is that is ordered will be discussed in the sections below.

This is also the place to discuss modality, and motivate its absence from the present text. Even though the domain of the attitudes of the speaker towards reality is often linguistically associated with the temporal system (most notably in the future tenses), it concerns, in my view, quite a separate subject matter, hence justifying the separation between studies on tense and aspect and those on modality. This is actually current practice in linguistics, notwithstanding the expression "TMA system" (tense-mood-aspect system), undoubtedly derived from the fact that the three categories were marked morphologically in the verb in Classical Greek and Latin (and, they are so, incidentally, in Portuguese as well). (Although they belong to the same morphological (sub)system, they do not necessarily pertain to the same semantic system. A useful analogy here is gender and number in the nominal domain.)

4.2.3 Aspect as choice

Another question that is often taken up in connection with aspect is the view of "aspect as choice"; see e.g. Smith (1983). Aspect, as seen above, is related to point of view, or perspective, and then one takes the (utterly unjustified, in my view) step of claiming that aspect is subjective, in the sense of 'a matter of choice'.

As Lindstedt (1985) argued, every bit of a linguistic utterance can be considered a question of choice: one might have chosen different lexical items, a different argument structure, to be truthful or not, and even to refrain from producing any utterance at all. But aspect does not correspond to "more" choice than any other linguistic feature.

In the formal literature, the argument of "aspect as choice" is often given to justify not making a particular ontological difference. According to Kamp & Reyle (1993:507), "the same bit of reality can be conceptualized either as event- or as state-like, depending on how we look at it", and Galton (1984:24) says that "the distinction between states and events is not a distinction inherent in what goes on, but rather a distinction between different ways we have of describing it". Also, on the (aspectual) distinction between the French imparfait and passé simple, Kamp states that "[the tense] depends not on the features of the event as such [for instance, its temporal duration] [...] but on the angle from which it is viewed in the context in which it is mentioned" (Kamp, 1979:401). And so, the authors argue for the absence of a distinction between states and events in the model structure they use to interpret natural language.

Such arguments are, in my opinion, ill-founded for a number of reasons: On the one hand, they seem to assume that, given intersubstitutability of two forms in one particular context, one can conclude that they are always intersubstitutable. On the contrary, Bache (1982:68ff), a scholar more concerned with descriptive adequacy, has noted that, in Slavic languages, freedom

of aspect choice (read: intersubstitutability) only occurs in connection with situations which are durative, atelic and non-stative (which is a small fraction of all possible situations).

On the other hand, the arguments quoted above also hinge on the assumption that the two sentences do not differ in truth conditions (or, alternatively, that the same situation is at stake). What seems to be crucially missing here is that one part of the situation described by the sentence, namely, the temporal position of the observer, is ignored. I claim, in fact, that the two situations are objectively different precisely with respect to that parameter (which, in addition, presents no problems to formalization).[6]

4.2.4 Semantic data

More generally, it is appropriate to consider the issue of what constitutes semantic data. Irrespective of being rendered in a formal framework, the vast majority of semantic data come in the form of what the researchers intuitively take the sentences to mean. It is tacitly expected that the readers share these assumptions. Now, matters become more complicated when different writers explicitly disagree on whether such and such a sentence can be construed in one particular way. This is particularly dramatic for a non-native speaker of English, who cannot trust his/her own intuitions on the matter.

Adding to the systematization proposed by Kent (1993), who divided behavioural tests into tests of "felicitousness" and "entailment", I will divide semantic data into the following categories (where the expression "particular sentence" can be replaced at least by "particular sequence of sentences"):

- Semantic grammaticality: judgements on whether a particular sentence means what it is purported to mean, or whether it becomes uninterpretable when cooccurring with X
- Entailment potential: the set of derivable sentences of (a reading of) a particular sentence
- Semantic tuning: judgements of meaning changes provoked by minimal changes to a particular sentence
- Markedness (relative to possible interpretations): judgements on what is the most natural interpretation of a particular sentence, and which others are forced
- Contrastive intuitions: the presentation of the rendering of (a reading of) a particular sentence in another language
- Contrastive facts: the presentation of actual translations of a particular sentence in another language
- Quantitative cooccurrences: observation of the markers with which (and to what extent) a particular marker cooccurs

Probably the only kind of data in need of some comment is the measure of markedness. I

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[6] In other words, in addition to the meaning suggested by the aforementioned scholars, I hold that, for languages expressing perspectival aspect, one has to account for an additional clause, of the sort "the observer is temporally placed inside the event" or its negation.

hold that this is more important than people realize, in that a refusal to take such judgements into account may drastically diminish the number of reliable semantic data. As L.Carlson (1981) noted in connection with aspectual classification, strained interpretations can almost always be found, but one generally has the ability to judge what the natural reading of a particular sentence is.

All these kinds of data require the researcher's judgement to some degree (note that even in the quantitative cooccurrence case what is being measured is the occurrence of a particular meaning of a particular marker). The advantage of the last two (i.e., of actual translations and of quantitative cooccurrences), ranging over real text, is that their production is independent of the intended result (the study of a particular semantic construction, for example), while texts produced to prove a point are biased, though not intentionally so.

Notwithstanding the complexities involved (and which were already discussed in Chapter 3), I believe that translation-based contrastive facts are very useful semantic data, even if the purpose is to study one single language. Additionally, they should be supplemented by monolingual cooccurrence studies, to avoid a bias from the other language. But, of course, the linguistic intuitions regarding all other kinds of data should never be disregarded, as was pointed out in Chapter 1.

In this connection, it is interesting to see what kinds of particular data have been presented in the literature on tense and aspect. On the one hand, it is common to present arguments concerning model entities like points or intervals of time taken to describe intuitively when a particular sentence is true. There have also been several studies based on contrastive data; some of them have been surveyed in Chapter 2. As to the issue of aspectual classification (Aktionsart), cooccurrence judgements of entailments and semantic grammaticality are common. Finally, a widely (if not the most) used kind of data in the tense and aspect literature concerns the temporal ordering of the sentences or clauses in discourse.

4.2.5 Semantics and/or discourse

And this leads to the last definitional issue I will take up here: Is tense and aspect a discourse phenomenon, as Hopper (1982) has suggested?[7] Or does the behaviour of tense and aspect in discourse stem from its meaning?

To be able to understand the question, the word "discourse" has itself to be defined. By "discourse" I mean here simply a sequence of not unrelated sentences or clauses. Some people seem to equate the word "discourse" with narrative discourse, as opposed to conversation, technical writing, and so on. While this is in fact the kind of discourse most studied in the literature, it is not necessary to restrict its scope in the present discussion.

It is undeniable that tense and aspect clues are relevant for discourse interpretation. This is acknowledged both by text linguists (see e.g. Enkvist (1981)) and by formal linguists whose

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[7] "I look at Aspect [...] suggesting a core function which is discourse-derived and in some sense universal" (Hopper, 1982:4).

concern is the formalization of discourse interpretation (see e.g. Kamp (1981b), Kamp & Rohrer (1983), Dowty (1986)). Tense and aspect clues are, nevertheless, also relevant for the interpretation of the sentence/clause they belong to, although this point is rarely made. The meaningful question is thus, in my opinion, whether there are functions performed by tense or aspect at the level of narrative, say, which cannot be ascribed to the combination of text type and the meanings of the tense and aspect devices.[8] ("Text type" and discourse type are here used interchangeably, meaning a sort of abstract linguistic context.)

In fact, it seems that by and large narrative (or, in general, text) organization is independent of tense and aspect markers, and that the meanings of these are rather employed to constrain the possible interpretations. As an example, consider the following discourses, taken from (a real text cited by) Sandström (1993:155), adapted from Webber (1988) and taken from Moens (1987:79), respectively:

(a) *Father went to the post office. He took the passports in his hand.*

(b) *John entered the flower shop. He took some roses, paid, and left.*

(c) *When Nikki Lauda won the race, the best technicians worked on his car.*

While they display no (overt) tense or aspect clues, the temporal relationship of the second clause regarding the first in each example is such that in (a) it is read as overlapping, in (b) as following, and in (c) it can be read as either. Particular tense and aspect markers in the second clause would constrain the interpretation of (c) as overlapping (the progressive) or preceding (the perfect). On the other hand, it is knowledge of typical facts in the world that directs us to the intended temporal interpretation of (a) and (b), which is, however, linguistically unconstrained. This can be appreciated by looking at (a') and (b'), which have as their most natural interpretation the inverse of the above:[9]

(a') *Father went to the post office. He took the parcel and left.*

(b') *John entered the flower shop. He took some roses in his hand.*

Alternatively, some researchers claim that the overall text organization itself conditions the sort of tense and aspect devices which are compatible with it, thus explaining different distributions of tense and aspect markers in different sections of a structured text, as Silva-Corvalán (1983) noted in her study of Spanish oral narratives. As a matter of fact, some have

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[8] Note that a positive answer to this question would still not make tense and aspect a pure discourse device. It would rather show that it was a linguistic system with independent import at two different levels (meaning and text interpretation).

[9] In fact, they have not, I am told by Mona Flognfeldt. They simply look weird, or, as she nicely put it, "not fully idiomatic". This demonstrates the danger of constructed examples (at least by a non-native) -- or, in a more positive vein, it also illustrates that a text (even one of only two or three clauses) has an internal coherence resulting from several factors. Thus, specifically in (b'), *enter* is too punctual to accept a description of the action of entering following it: much more idiomatic would, I suppose, be something like *John walked into the flower shop*. Then, the specific interpretation I had in mind, that of having picked some flowers on sale outside the shop and entering to pay them, seems to be in conflict with the common "script" that flowers to be bought are inside the shop; finally, the original verb *take* had deictic connotations that also seem to conflict with the normal way to describe that situation on English. However, I could not make any point on temporal ordering of two clauses if I had completely rewritten (b) as (b") *John walked into the flower shop. He carried some roses in his hand*! and this is why I kept the sentences as they are.

even suggested that the mere (textual) proximity of other paradigmatically related devices suffices to influence the function of a given tense and aspect device. Thus, analysing French passé simple usage in newspapers, Waugh & Monville-Burston (1986:872) claimed that:

it differentiates itself from its morphological (grammatical) context. When it occurs in the vicinity of Imparfaits for description, it takes on a punctual interpretation; used after passé composé for setting the scene, it narrates the events which took place; in a narrative predominantly in présent historique or passé composé, it may open the text, close it, supply interesting detail, or make a parenthetical remark. When a different tense is used to give the cause of an event, the transition to passé simple gives the consequence; and so forth. In other words, simple past contrasts first and foremost with the other past tenses (including other passé simples) which are used in the sentence or clause which precede or follow it; through this contrast, it establishes differences within the text itself.

In this dissertation, though, I shall leave these questions unresolved, namely, whether there is an independent import of tenses and aspects in relation to discourse, and/or whether a particular position in text or co-occurrence relations in text influence tense and aspect interpretation. I will be studying tense and aspect <u>in</u> discourse, but not <u>relative to</u> discourse. Even though I will occasionally note that tenses and/or aspects in a particular translation pair will produce different (sometimes even incompatible) constraints on the possible orderings conveyed by the two languages, tense and aspect inside the sentence will provide enough material to contrast.

4.3 Issues of description and explanation

Most points concerning particular descriptive issues are discussed in this dissertation in their appropriate places. In particular, in the empirical Part III, data on many specific phenomena of English and Portuguese tense and aspect are dealt with, while more general explanatory expositions will be offered in Chapters 5 and 6 of Part II. In this section, I will only be concerned with general issues.

4.3.1 Deixis, anaphoricity and autonomy

A subject which is inescapable in the study of tense is its relationship with the time of the utterance, something that has always been considered a part of deixis (the pointing to the situation in which the sentence is produced). Conversely, the issue of narration (which usually presupposes separation of what the utterance is "pointing to" and the utterance conditions) is the other side of this view of tenses. Perhaps less evidently, these two questions can be related to the one of perspective, which is yet another concept related to tense and aspect.

Let me consider first the deictic import of tenses. The speech act occurs at a particular time, commonly called the "speech time", which can be identified by the word *now*. Other definitional parameters of an utterance are its participants (pointed at by words like *I* and *you*) and the place where the utterance is uttered, which could be called the "speech location" and can be pointed to by *here*. Then, in general, a word or expression can be used deictically if it is intended to refer to something relative to the utterance setting. So, *he* can be accompanied by a nod (or a pointing gesture), and *this horse* or *that girl* can refer to an "object" present at the time of the utterance.

Noun phrases can be roughly divided into three kinds: (i) those which provide self-contained descriptions: autonomous; (ii) those which require contextual (utterance-specific, extratextual) information to be understood: deictic; and (iii) those which require contextual (text-specific, intratextual) information to be understood: anaphors. The last ones have received most attention from syntactically oriented linguists and language processing computer scientists alike.

In English, there is no formal difference between deictics and anaphors: *he*, as well as *this man*, can get its reference through a pointing gesture as well as through cross-identification with the preceding text. But there is a distinction between autonomous and anaphoric noun phrases, which is often marked through the choice between the indefinite and definite articles.[10]

Portuguese, in contrast to English, is a language which distinguishes between deictic and anaphoric devices, at least in some cases. The most conspicuous are place adverbials, namely opposing *aqui*, *aí*, and *ali*, deictic, to *cá* and *lá*, anaphoric -- incidentally, this is a distinction that is hard to master by non-native learners.[11] Note that English *here* corresponds to both *aqui* and *cá*, while *there* is used for *ali*, *aí*, and *lá*.

It should not be surprising, therefore, that Portuguese also distinguishes between deictic and anaphoric tenses.[12] This I take to be one implication of those who mention the "discours" level and the "histoire" level[13] (see Fonseca (1977), Lohse (1993) for Portuguese; and Smith (1980), Caenepeel (1989) for English): "discours" tenses are deictic; "histoire" ones are anaphoric.[14]

4.3.1.1 Tenses

Evidence for the existence of deictic tenses in Portuguese is provided by e.g. the Pretérito perfeito composto, which expresses a localization in time at an interval contiguous to the right with now. Imperfeito can be considered mainly an anaphoric tense, in that it presupposes a previously mentioned time (punctual and/or extended) against which its content should be evaluated. Perfeito, on the other hand, and in analogy with autonomous noun phrases, introduces a particular time.[15]

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[10] By this I do not want to claim that *the* in English is necessarily anaphoric, only that the opposition *a/the* sometimes is used for that purpose, as in *A man entered* vs. *The man entered.*

[11] This is my own analysis of these Portuguese place adverbials. For an overview of the traditional ways of presenting the subject, see Nilsson (1984).

[12] The view of tense in general as anaphoric will be discussed in Section 4.3.1.4 below. Here, I am arguing for these properties as attributes of specific tenses.

[13] This distinction, proposed by Benveniste (1966) for French, was motivated by the need to explain the opposition between French passé simple and passé composé. Romance linguists, as well as general linguists, have often considered it a universally relevant distinction. See for example Lyons (1977), who employs the terms "historical" and "experiential".

[14] Either anaphoricity or autonomy (at least, definitely non deixis) seems also be crucially involved in what Dahl (1984) calls "narrative tenses". Incidentally, this phenomenon casts doubt on the generality of Lyons's approach to tense (cited in Section 4.2.2 above) in requiring it to be a deictic category.

[15] This is obviously too rough a characterization of Imperfeito or Perfeito, which does not take into account the various functions of these devices (see Section 4.5 below for the several uses of tenses I consider). Here, I am just referring to the way they refer to times.

Other tenses are anaphoric and/or deictic in a more complex way. Some refer to a time which is different from the one they are linked anaphorically to, or, as Houweling puts it describing the Italian tenses, "identify a time other than the one that was identified by their antecedent" (Houweling, 1986:165). The past perfect is obviously the most typical case. To be felicitous, its context must supply a time (reference time) so that the past perfect refers to an event happening before that time or to a state holding at that time. This is illustrated by the two interpretations of *he had left at six*, "he" left at six o'clock or "he" having already left by six. Here, English does not formally mark the difference between anaphoric or autonomous.

The same is true of a main clause in Mais que perfeito: it may refer to a contextually salient time, but introduces a new (and previous) temporal point, cf. *Aqui estão as fotografias. Tinham caído para trás da estante.* ('Here are the photos. They had fallen behind the bookshelf'). The contextually salient time may be described through linguistic means by *quando as procuraste* ('when you looked for them'), or *quando as encontrei* ('when I found them')

Other tenses refer deictically to an intermediate time. For example, Futuro do conjuntivo can only be used to refer to a time in the future with respect to now (=speech time), i.e., the intermediate time (contrary to that of the past perfect or Mais que perfeito) cannot be used anaphorically.

As for English, *used to* also explicitly refers to now: *I used to drink a bottle of vodka a week* expresses something which can (most of the times) also be rendered by *I no longer drink a bottle of vodka a week*. (only the theme of the former sentence is "before", whereas of the latter, "now"). By contrast, consider the following (constructed) narrative *At the time, I drank seven bottles of beer a day. So, I kept my usual self when we had three beers in a row in the hot sun, but evidently he got disturbed.* Its first sentence does not convey that the "I" no longer drinks seven beers a day, even though such a belief would be compatible with the text, on purely pragmatic grounds (if "I" still did it, why not the simpler *I drink seven beers a day*?). In other words, the simple past does not refer to now, while *used to* does.

Used to, however, does not play an important role in the English tense and aspect system. Some uses of the present perfect, much more discussed, have also been described as referring to an extended now, e.g. *I've been in Boston for three days* has been analysed as either describing an interval up to now, or holding in an interval before now; see e.g. Abusch & Rooth (1990). In terms of deixis and anaphor, this could be rephrased as: the extended interval that is necessarily associated with the present perfect is sometimes deictically interpreted; at other times it is autonomously construed.

This analysis is also appropriate for present perfect sentences without *for*-adverbials, such as *I have written a novel*: When the underlying extended interval (which is possibly simultaneous with the result state) is interpreted deictically, one gets a present relevance connotation; when it is autonomously construed, it conveys mere existential quantification.

I hope thus to have shown how the trichotomy autonomy, deixis and anaphoricity is relevant to the description of tenses. It is for temporal adverbials, as noted by many researchers;

see e.g. Smith (1980), Kamp & Rohrer (1983) or Hinrichs (1986). Therefore, before I investigate the association of these three kinds of temporal identification with the temporal interpretation of narrative discourse, I will look at temporal adverbs in what concerns their contribution for temporal reference.

4.3.1.2 Temporal adverbials

Hinrichs (1986), drawing on Smith's (1980) proposal, suggests four kinds of (localization[16]) adverbials for English, while Kamp & Rohrer (1983:261f) also single out several different kinds of temporal adverbials for French, relative to the way they behave in discourse. Here, I will present my analysis of the Portuguese ones (the English adverbials happen to require just a subset of the classes).

1. Autonomous adverbials (Hinrichs' complete dates) define a particular time.

> Portuguese: *25 de Abril de 1974*, *Verão de 68*

> English: *June 14th 1886*, *1066 a.d.*

2. Deictic adverbials (K&R's group II) relate to the speech point. I.e., their meaning is a unique function of the utterance time.

> Portuguese: *hoje*, *ontem*, *amanhã*, *este ano*, *neste momento*, *o ano passado*, *o ano que vem*

> English: *today*, *tomorrow*, *this year*, *next year*, *last year*

3. Anaphoric adverbials (K&R's group IV, Hinrichs' dependents) relate to some contextually defined time.

> Portuguese: *passados dois dias*, *dois dias antes*, *dois dias depois*, *um ano mais tarde*, *nesse momento*, *naquele momento*, *então*, *no dia seguinte*

> English: *two days after*, *two days before*, *a year later*, *at that moment*, *after two days*

4. Perspective adverbials require an intermediate time to be understood (like the past perfect).

> a. this intermediate time is deictic.

> > Portuguese: *daqui a dois dias*

> b. the intermediate time is anaphoric.

> > Portuguese: *dali a dois dias*

> c. the intermediate time is contextually determined (Hinrichs' flexible anchoring, K&R's group III[17]), i.e., it can be either deictically or anaphorically construed.

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[16] Frequency and duration adverbials are outside this classification; see next section to some brief remarks on the subject.

[17] Kamp & Rohrer (1983) suggested a further category for French, containing *depuis deux jours* ('since two days ago') and *à partir de deux heures* ('since two o'clock'), but they provide no explanation of how to identify it. It appears that such adverbials describe intervals (extended periods) instead of simple points in time. One of the terminal points of the interval is the reference time, and the other is measured relative to it. Hence, they share properties with PPC and the English perfect. However, the reference time of the corresponding adverbials in English and in Portuguese is contextually determined like group 4c, and so I did not classify them separately.

Portuguese: *agora*, *há dois anos*, *desde as duas*

English: *two days ago*, *now*, *in two years, since 8 pm*

It is now easy to understand why in English there is no need for a subdistinction in group 4: The adverbials which require such a distinction in Portuguese are rendered by an expression which is unspecified in that respect, *in two days*, even though it can be specified as *in two days from now* vs. *in two days from then*.

An interesting remark concerns the word *now*. Contrary to expectation, it is not purely deictic, i.e., it does not refer directly to now (the time of the utterance). Rather, it is contextually determined whether *now* refers to now or whether it refers to some other current time. In other words, its interpretation depends on an intermediate time point which is contextually determined, but -- only when it occurs in sentences describing states. Interestingly, the same happens with Portuguese *agora*. The interpretation of *now* is still a matter of debate. Kamp & Reyle (1993) and Sandström (1993) explain this property of *now* respectively as a property of the English simple past and as a property of narrative discourse. As is perhaps clear from my preceding sentence, I prefer to assign such behaviour to *now* itself.

I claim, in fact, that *agora* has two distinct interpretations, depending on its occurrence with events and states, respectively:

• one deictic, meaning immediately before or immediately after the speech event, depending on the tense: *fiz isto agora* ('I did it now') or *vou sair agora* ('I'm leaving now')

• another, as described above, of the perspective kind, which can be construed relative to the utterance event or to the narrative now, cf. *estou pronta agora* ('I'm ready now') or *agora estava pronta* ('now she was ready').

Summing up, as far as temporal reference is concerned, adverbials, like pronouns or tenses, can be seen to have different mechanisms of interpretation. Briefly, I survey some linguistic properties that lend support to the analysis suggested above:

1. The rules of indirect speech, on the one hand, convert deictic adverbials to anaphoric ones; on the other hand, they leave contextually determined perspective and autonomous ones unchanged.

2. Adverbials and tenses in the same clause cannot specify disjoint intervals, and thus *yesterday* and the present perfect cannot cooccur, nor *ontem* ('yesterday') and the PPC. Still more obviously, two adverbials corresponding to mutually exclusive times cannot occur, like *amanhã* ('tomorrow') and *dali a dois dias* ('in two days from then'), or *tomorrow* and *the next day*. Note, moreover, that adverbials of different kinds cannot in general co-occur, even if their intended reference is not mutually exclusive: cf. **next year in five months*, **a year later in 1956*. (Such combinations seem only acceptable as rephrasings in actual speech, or as specifications acting as further precisions, as in *A year later, in 1956*).

3. The use of deictic adverbials in discourse (anaphoric contexts) unambiguously marks

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I note, furthermore, that their possible distinct behaviour in French may constitute something internal to the French system, which, it should be mentioned, has <u>three</u> tenses corresponding to the English simple past.

free indirect speech, i.e., the perspective of one character is conveyed. *A Maria parou. Ontem tinha ido à escola, mas hoje não lhe apetecia.* ('Mary stopped. Yesterday she had been to school, but today she didn't feel like it.') In English, this is conveyed by the breaking of the "rule" which says that (past) deictic adverbials are not allowed with the perfect.

4.3.1.3 The interaction between temporal adverbials and tense

One interesting question is the relative weight that should be given to temporal adverbials and tense in defining temporal localization. There are three main positions in the literature:

1. Temporal adverbials are ways of specifying more precisely the temporal reference defined by tense, and are, in general, entities of dubious theoretical import (barring cases like *since*, *until*, and *now*). This position I take to be (at least) the initial standpoint of temporal logic accounts of natural language; see Dowty (1982) for problems with such a position.

2. Tense and temporal adverbs jointly specify temporal reference, as is advocated by Smith (1980), who claims that "the semantic unit for temporal reference [...] has a temporal expression that is optional syntactically" (Smith, 1980:356).

3. Temporal reference is completely specified by temporal adverbials, tenses just furnish interpretation clues to identify the relevant (and sometimes simply understood) temporal adverbials in discourse. This position was recently put forward in Vlach (1993).

Even though the latter standpoint has some appeal, I believe it is not such a radical position as meets the eye. In fact, Vlach's temporal adverbials share many similarities with the reference times which are associated with tenses and adverbials in previous accounts. Vlach is at pains to claim that reference times should be dispensed with,[18] but his temporal adverbials express a relationship between times and eventualities. This relationship (which is overtly marked in English in prepositional adverbs: the difference between *at*, *in* and *for*) is promoted to a semantic distinction in relating an eventuality to a time (corresponding to Vlach's At, In and For predicates), and is an essential part of the meaning of temporal adverbials in Vlach's proposal. In my opinion, it is more naturally conceived as belonging to the <u>interaction</u> of aspectual class and temporal adverbial; I will return to this issue in Chapter 7.

What I believe to be an important contribution of Vlach's (1993) paper is his contention that localization adverbials should not be treated independently of duration and frequency adverbials. In particular, he notes that one and the same adverbial in English (e.g., *in 1976*) corresponds to several different semantic relations as far as temporal localization is concerned, depending on the particular kind of eventuality at stake. Even though one may disagree with the specific details of his treatment (and particularly with the role he attributes to the adverbials proper), this is a relevant observation that any theory of temporal reference must account for.

4.3.1.4 Narrative discourse

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[18] I consider his particular critique of Reichenbach's (1947) system misguided, but this is not relevant for the point at hand.

Let us now go back to the interpretation of tenses in narrative, and see how the concepts of deixis, anaphora and autonomy can be made to bear on the issue. As stated in Chapter 1 and Section 4.2.6 already, I will not be especially concerned with the issue of narrative text versus other text types in this dissertation. Since so many formulations of tense depend on how it is employed in narrative, however, any possible theory must provide a way to account for it.

Narrative presupposes the setting of an imaginary time line. In narrative, time goes by, not isomorphically with clock time, but the granularity depends on the author: The temporal location of two consecutive sentences (in a narrative text) may differ in several years, a couple of minutes, or not at all. It is the events (basically, the sentences described by autonomous temporal devices) that advance time (provided one is able to infer some consequentiality or response relation between them). If purely anaphoric tenses are employed, they get their reference from the previously introduced time. But at each point of the narrative there is an identifiable "now" (which bears no relation with the real now -- except possibly for the narrative end; see below). This can best be appreciated by noting the use the characters make of their language: direct speech in a narrative is identical to "real" direct speech, i.e., the speakers talk about perfectly identified "I"'s and "now"'s, although possibly unreal. While characters more often than not maintain identity, two different "now"'s, on the contrary, generally refer to different temporal locations in the narrative time line, as they do in general conversation. (The main difference between narrative time and ordinary time is that the first is discrete -- and manipulable at will; while the second is continuous -- and inescapable).

Except for rendering the characters' speech, there are not many other reasons why one should want to refer to "now" in a narrative, given that the place in the narrative, together with the kind of tense, describes the putative temporal localization. This explains why deictic tenses are not used in narratives: the present perfect in English, the PPC and the Futuro do conjuntivo in Portuguese, as well as the present and Presente in the progressive form, are known to be employed almost only in non-narrative contexts. This is because narrative presupposes sequence, and at most the end of the narrative can occur at now.

But let me discuss in some more detail the question of indirect speech, i.e., the indirect narration of speech, where the reference to "now" is transformed to anaphoric reference to the time of the (narrative) speech event. A (speech) event is thus introduced, and temporal deictics are replaced by their anaphoric counterparts. If an event had been mentioned/introduced as complete in the direct speech, it must be placed in relative terms as prior to the speech event: this explains why the pluperfect has to be used for the translation of the description of a past event. By contrast, if a present stative sentence was uttered (and supposed to hold at the narrative now), it will be rephrased relatively to the speech event, using an anaphoric tense (Imperfeito in Portuguese; simple past in English because simple past does double duty as anaphoric and autonomous tense). Cases of a past property are more delicate, as the possibility of maintaining the original tense demonstrates; cf. *he said Mark had been ill/he said Mark was ill*. In Portuguese, Imperfeito must be maintained for permanent properties; cf. *O João era meu amigo*

('John was a friend of mine') rendered as *Ele disse que o João era seu amigo* ('He said John was friend of his'). Basically, the choice is related to whether the direct speech sentence refers to an individual time (which can then be turned into past of the past), or to a past property, without reference to now, and which is then kept as a past property.

Indirect speech (or, in general, the phenomenon known as sequence of tenses) is a case where a semantic explanation, in my view, fares considerably better than syntactically-oriented approaches, as comparison with Comrie's rule demonstrates: "a verb in a non-past tense must be replaced by the corresponding past tense (subject to the option of not doing so when the situation referred to by the subordinate verb has continuing validity)" (Comrie, 1985:116). A similar semantic rendering of this phenomenon (as far as English is concerned) is put forward in Sandström (1993): Starting from interpretive data regarding formally similar sentences in embedded contexts,[19] she notes the difference between the interpretation of stative and eventive *that*-clauses in the simple past regarding temporal precedence versus overlap with respect to the main (matrix) clause. Sandström suggests that the simple past in stative clauses is interpreted as co-temporal with the time defined by the matrix clause, while an event clause, being an argument to the matrix clause, requires that the event has to exist to be felicitously used. Therefore, the event at stake must have occurred before the time defined by the matrix clause. Even though I addressed, instead, the competence rules necessary to produce the specific case of speech matrix verbs (the rules of indirect speech), the crucial semantic concepts involved are clearly the same.

The most interesting subject that has been related to temporal deixis and anaphora -- and the last one I will address -- is perspective. Perspective, i.e., the signalling that a particular piece of text is to be read as subjective, can be formally marked by the introduction of deictic devices in an anaphoric context, as was already mentioned in the last section. (In addition to expressive devices, such as evaluative words and punctuation; see Caenepeel (1989). Here, I am exclusively concerned with phenomena related to tense and aspect.)

Caenepeel (1989) has claimed that perspective in narrative is intrinsically related to aspectual class in English: While event sentences advance the plot and are, so to speak, independent of the observer (because they introduce their own temporal referent), state sentences require, for their concrete positioning in the narrative, that the reader imagines (or recreates) a speech, perception or intellectual verb, the introduction of which would allow a definite anchoring point: she thought that; she said that; she saw that, etc; cf. Sandström (1993:170-2):

in interpreting a state sentence as perspectivized, a reader must posit an evaluation event, of which the state sentence is the proposition evaluated. That event has a temporal location like any other event -- the time it took to perceive, contemplate, or assert the fact in question -- but it also has a point of evaluation associated with it, which only evaluation events have, i.e., events which consist in taking an attitude to a proposition. [...]

An interesting property of perspectivized propositions is that, strictly speaking, they cannot be modelled as "holding" at any time in the narrative world; their relation to the narrative timeline does not concern truth-intervals, [...] it is not rarely the case that characters' thoughts and perception are mistaken, and that this is clear, or becomes clear, to the reader.

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[19] Specifically, the sentences *Jamie learned that Santa Claus lived in Lapland* and *Dora heard that Anna got married* (Sandström, 1993:99).

Now, contrary to Caenepeel,[20] I suggest that <u>only</u> when there are no cohesive clues between the event sentence and the following state sentence must one posit such an evaluation event; cf. the following example, where in my opinion, no perspective is involved: *Kate entered the restaurant. It was located right in front of her office, but she had never been inside before.* By contrast, for the next example to be coherently understood, a perspective reading is required: *Kate entered the restaurant. John was so cute!* Finally, only the third clause of the next examples permits a choice between non-perspectivated and perspectivated readings, respectively:

Kate entered the restaurant. John was waiting, but she didn't see him.

she had to hurry.

In other words, a stative sentence in English may refer anaphorically to a previous one (or to a previous entity introduced by a previous one) independently of tense, or it may describe imperfective perspectival aspect, leaving the observer sometimes undecided.

But the driving engine of narrative interpretation is the reader's assumption of narrative coherence, and <u>not</u> the identification of tenses with anaphora. For a state sentence to make sense in a narrative, it does not need to be interpreted (or construed) as referring particularly to the current now of the narrative (something which is actually even precluded when the state is habitual: what does it mean to say that a habitual state is true at a particular moment?).

In any case, the kind of situation: state or event, is relevant for narrative interpretation, as Caenepeel suggested. Since the simple past in English is neutral regarding Aktionsart, the aspectual class of the tenseless sentence is maintained.[21] If the progressive is added, on the other hand, perspective is conveyed, not necessarily because the progressive is stative, but because it is context dependent: it expresses imperfective perspectival aspect. (As Nakhimowsky (1988) has noted, English has imperfective, but not perfective aspect.)

In Portuguese, it has often been noted that Imperfeito signals perspective; cf. e.g. Sten (1973) or Cunha & Cintra (1987), who emphasize its use in free indirect speech.[22] Note again that, if temporal anaphora were the narrative "inference engine", any Imperfeito following a previously introduced temporal referent (an event sentence) would be felicitous. However, in some cases the reader is forced to imagine/construe a perception or intellectual event, in order to have a coherent piece of text.

Let me note that in Portuguese it is possible to identify (or use) perspective more clearly because past tenses themselves contribute to defining the kind of entity referred to by the

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[20] Sandström (1993), even though separating in her exposition states describing "facts" (new facts resulting from the last introduced event; facts concerning new referents; facts directly involved in interpreting events) from perspectivized propositions, remains somewhat equivocal about the relationship between the two.

[21] This explains, I believe, why Sandström claims, dealing with English, that in narratives "tense per se does not matter, only tense maintenance versus tense switching does" (Sandström, 1993:95) and why Couper-Kuhlen states that "for the organization of temporal relations in narration the contribution of the Past tense (as opposed to some other tense) is minimal" (Couper-Kuhlen, 1987:24).

[22] Strictly speaking, it should be noted that free indirect speech is not a constitutive property of narrative. Rather, it is a modern though widespread literary artifact, introduced around the 19th century in Portuguese, as noted by Cunha & Cintra (1987).

sentence, and, in this way, it is possible to achieve perspectival effects by tense mechanisms only:

Consider the following example, where I believe the corresponding perspectivized event sentence in English would require at least unusual punctuation like exclamation marks: *Ela estremeceu. O João passava por ela sem a ver.* ('She shivered. John went by! Without noticing her.').[23] The import of tense is even more conspicuous with state sentences in Portuguese, as the following minimal pair shows:

*As pessoas riram-se. Foi*Perfeito *muito divertido.* ('People laughed. [The whole performance] was funny.')

*As pessoas riram-se. Era*Imperfeito *muito divertido.* ('People laughed. How funny!')

In the first sentence, what is expressed is an evaluation of a complete previously mentioned event. In the second sentence, people's perspective is described (as an explanation why they laughed).

4.3.1.5 Tense as anaphora and reference time

It is a widespread claim that tense is anaphoric.[24] There is, however, in my opinion, a lot of terminological confusion on this matter, which is related to another especially unclear family of entities, inspired by Reichenbach's (1947) concept of reference time.

In the preceding sections, four kinds of phenomena have been mentioned which were in one way or another related to the concept suggested by Reichenbach, namely: 1) the meaning of the present, and past, perfects (the original motivation); 2) perspective adverbials; 3) narrative interpretation (including temporal relations between tensed clauses and between a temporal adverbial and the rest of the clause); 4) perspective in general. In addition, the distinction between perfective and imperfective aspect was also cast in such terms by Garey (1957).

Instead of trying to find a uniform concept underlying all these suggestions in the literature -- a probably impossible task, I will instead specify clearly my approach to each of these matters.

Basically, and as demonstrated above, I subscribe to the analysis of both perfects and perspective adverbials in terms of an additional time -- and I do not see any reason not to call it "reference time".

I believe, on the other hand, that the use of the same term for narrative interpretation purposes, perspective, or aspect, is deeply misguided. For one thing, because they simply are different matters, as has also been argued by Kamp & Reyle (1993:594). They noted that, given any sequence of past perfect clauses denoting events, Reichenbach's reference time would be kept constant while the other "reference time", for narrative interpretation, would have to

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[23] If a more literal translation were chosen, like *John was passing by her without noticing he*r, I believe the perspective would not be strictly unambiguously conveyed in English.

[24] According to Dowty (1982:29), Kiparsky, as early as 1968, had suggested that tense should be considered an agreement marker for a time adverb. However, the origin of this idea is attributed to McCawley (1971), and was especially developed by Partee (1973), with which it is mainly associated. Later on, she reformulates it in Partee (1984).

advance. Kamp & Reyle, however, maintained the two concepts, suitably renamed.

I will instead claim that the "reference time" concepts invoked for narrative, perspective or aspect do not stand up to close scrutiny. So I will dispense with them all.

Let me begin by pointing out that the notions involved in these issues can be opposed to those relevant for the first two cases by a difference in kind. In fact, the first two cases concern a concept that is both referential and is "felt" at the level of the constituent purported to have it. (I.e., one "feels" the reference time of a clause in the perfect, one "feels" the reference time of a perspective adverbial.) By contrast, the other notions are relational: the purpose of reference time in discourse (as proposed for example by Hinrichs (1986)) is the interpretation of the next sentence in a sequence; its invocation for explaining imperfective versus perfective aspect requires explicit comparison between two situations, either the two aspect forms of the same situation, or two different events. The two kinds of "reference time" are thus different in empirical motivation.

If one looks closely at the justification provided by the different authors who use it, one sees that it is either very thin, or, at least, rests on questionable assumptions. I substantiate this claim again using as examples Hinrichs (1986) and Kamp & Reyle (1993). First, the reason why Hinrichs uses reference times hinges on 1) his consideration of states as members of the event structure, 2) his definition of instants as created/defined from events. As I shall show presently, neither assumption is uncontroversial (and I will argue against both below). As to Kamp & Reyle, they hardly motivate the need for a reference point,[25] apart from the general claim that "the interpretation of tenses often has an anaphoric aspect: the next tense refers to the same time as the one preceding it, or else refers to some time in the vicinity of that time" (Kamp & Reyle, 1993:497).

Now, and as described in the previous section, I believe that anaphoric effects are not what makes up a narrative. There is no anaphoric reference between events as claimed by Partee (1984), but never really substantiated in further work.[26] Furthermore, I believe it is evident today that it is not through positing automatic update of reference points dependent on formal properties of a sentence that narrative progression can be computationally modelled, and even less understood (even if, instead of times, one deals with temporal adverbials instead, as suggested by Vlach (1993)). In fact, counterexamples to such a model are uninterestingly frequent in the literature, and have fostered an alternative model of anaphoric reference that dispenses with reference times but introduces the consequent states of (resultative) events as anaphoric antecedents. This suggestion, first presented by Moens (1987), and later applied for French as well (cf. e.g. Molendijk (1994)), will be discussed in Chapter 5.

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[25] "Reference point" is their name for the kind of reference time (that they claim) necessary for narrative interpretation.

[26] Neither applied on (large amounts of) real text. To my knowledge, all work in DRT - broadly speaking - just tackles very short stories, not more than five sentences long; cf. Kamp (1981b), Kamp & Rohrer (1983), Partee (1984), Hinrichs (1986), Eberle (1988), Webber (1988), Eberle & Kasper (1989), etc.

Still, I believe that the fact that event sentences in narrative are felt to advance the plot has been much better explained by those who enrich discourse interpretation with concepts like consequentiality and response: cohesion, in one word. Even though I cannot motivate this claim at length here, I refer the reader to Sandström (1993) for a detailed survey of this issue and strong arguments for this position.

As regards the expression of the perfective/imperfective distinction by postulating that the event time is contained in the reference time (R) and vice versa, such an analysis fails to account for 1) the position of the observer, as suggested above; 2) the fact, discussed below, that imperfective aspect is often associated with states and perfective with events, which I will claim are different entities. As a further, internal, objection against this analysis, I note that, while the notion of containment is intuitively linked with imperfective aspect, the inverse notion, claimed to describe perfective aspect, is by no means evident. I do not think one needs the notion of a larger interval R to understand perfective aspect.

Finally, perspective in general has been described as associated with constraints on the location of reference points with respect to the time of the event. In particular, Caenepeel (1989) suggests a complicated model where to each aspectual class are assigned a contingency structure (basically, Aktionsart) and a deictic centre (roughly, a relationship between Reichenbach's E and R). I refer to Sandström (1993) where this approach is criticized in detail. Sandström proposed that only states are anaphoric, and that their use in perspectivized sentences originates, as described above, from the lack of (enough) cohesion clues. My view, sketched above, dispenses totally with the concept of anaphoricity for states.

 The specific kind of perspective associated with the perfective/imperfective distinction, on the other hand, is a consequence of the definition of perspectival aspect: since an observer is at stake, it makes sense to ask who is the observer; this has, in fact, been acknowledged by Kamp & Rohrer (1983), Caenepeel (1989) and Sandström (1993) as a literary artifact of modern prose.

Summing up, the present fairly large section (Section 4.3.1) has argued for the following views:

Tenses and time adverbials may refer in three different ways (autonomously, deictically, or anaphorically). This kind of reference is a property of a tense, even though tenses are often vague with respect to some of these distinctions. It is thus not tense *per se* that is anaphoric.

Tenses and adverbials can refer to more than one temporal location. The notion of reference time should be narrowly conceived, as Reichenbach proposed it, to account for the meaning of some tenses and adverbs, as one of these temporal locations. (Additional constraints on these temporal locations, inherent in the meaning of particular tenses, interact with the Aktionsart of the arguments tenses apply to. Aspect changes can therefore be brought about by the application of tenses which have some requirements, for example, addition of iteration, or bounds.)

On the other hand, grammatical aspects may add information on an observer relative to an event. This information is locative, therefore in a way stative.

Discourse interpretation is done according to semantic clues, i.e., concerns what the sentences refer to. Tenses and/or adverbials are important only in as much as they provide relevant information as to what a clause refers to. (In other words, only their referential import matters.) Events and states follow in narrative due to our expectation of a coherent story, and not because this is explicitly stated through linguistic means.

4.3.2 Ontology

It used to be common practice to discuss temporal reference, i.e., what sentences in natural language refer to when they describe situations developing in time, or what times can be associated with natural language expressions, by discussing the relative merits of time points, time intervals, and events. Today, it has become fashionable to have combinations of those, for several distinct reasons.

In addition to the relatively uninteresting issue of the mathematically possible interdefinability of these concepts (see Kamp & Reyle (1993) for a short demonstration; van Benthem (1983) for further discussion), one specially relevant argument for using both events and times was put forward by Herweg. Herweg (1991a) noted that natural language seemed to make an irreducible ontological difference between two kinds of entities: states and events, and that, furthermore, two distinct research traditions could be identified, privileging (or geared to) precisely one of these entities. In particular, he noted that the school using times (points or intervals) was predominantly concerned with sentences describing states, while that using (formal) events was mainly worried about the formalization of sentences denoting events; cf. Herweg (1991a:363f):

Perfective sentences express propositions about [...] events [...]. Imperfective sentences express propositions about states [...].
    Theories of the imperfective paradigm [...] follow the tradition of classical Tense Logic [...]. Their basic picture is that sentences express that a proposition is true or not at a given time [...]. The proposition is intended to represent the event or state the sentence is about. [...]
    Theories of the perfective paradigm [...] follow the Davidsonian tradition of event-based semantics [...]. Their basic picture is that sentences express the occurrences of events in time.

As can be seen, Herweg identifies imperfective aspect with states and perfective aspect with events, which, as already noted in Section 4.2.1.1, is wrong, but that is immaterial with respect to the point at hand. What is relevant is his association of an ontology based on times for states and another event-based for events. As it is, I only agree with half of his claim, namely, as far as events are concerned. I start thus with a discussion of the concept of events, and contrast them with my own view of states. The purpose of this section (and of Section 4.3.4 below) will be to clarify what constitutes, in my opinion, the ontological import of tense and of (the two kinds of) aspect.

4.3.2.1 Events

The use of the entity "events" in natural language semantics originated with Davidson's (1967) influential paper, which claimed that the logical form of an action sentence (and, in fact,

any eventive sentence) such as *John buttered the toast in the bathroom with a knife at midnight* should be rendered in logic as making reference to an event argument: Ee (Butter (e, john, toast) & In (e, bathroom) & With (e, knife) & At (e, midnight)), in contradistinction to non-events, which would not require such an extra argument.

Davidson's proposal had the following desirable properties: it explained linguistic properties such as nominalizations as well as pronominal reference to events; and it provided automatic deducibility from e.g. *John buttered the toast in the bathroom* to *John buttered the toast*, i.e. from adverbial modification to its absence. From a philosophical point of view, it furnished a basis for formal treatments of excuses (based on non-trivial event identification) and of explanations (based on the concept of different descriptions of the same event).

Later, linguists favourable to his event-based treatment have added some arguments for it, noting, for example, that there are linguistic expressions, such as *after* or *before*, which require a description of an event following it, either in nominal or verbal form; cf. *after the destruction*, or *after the crusaders destroyed the village*. Other separate reasons for assuming events mentioned in the literature have been: Krifka's (1990) so-called event-related readings, namely, sentences which seem to involve quantification over events and not individuals, like *Four thousand ships passed through the lock*; and Moltmann's (1990) claim that the concept of part-structure for events was essential to make sense of adverbs like *completely* or *partly*.

Contrary to what event-minded linguists usually state, however, Davidson contended that an event sentence did not refer directly to an event, but rather to an infinite number of possible events. The relation between one individual event and the denotation of a particular sentence was in fact put this way: "if (7) [Amundsen flew to the North Pole in May 1926] is true, then there is an event that makes it true" (Davidson, 1967:91). Later on, this has been discussed as the distinction between event types and event tokens.

Obviously, Davidson was not particularly worried about temporal reference (in fact, it seems that he was simply not concerned with it). However, it is relevant to note that event sentences, in contradistinction to non-event sentences, have special temporal properties as well:

Events (or event tokens) come with a unique and definite temporal location (and spatial, as well). By contrast, of a sentence like *he is very clever* the questions *when?* or *where?* can only be uttered ironically (i.e., to suggest that he is not). The same, furthermore, applies to habits, dispositions and attitudes, such as *he smokes*, *he believes in God*, *he runs a restaurant*, *he works for IBM*.

I.e., one <u>can</u> assign a particular time or place to these latter non-events: *he smokes in bed / at night*, *he believes in God when in China / in the summer*, *he ran a restaurant when he was in India / from 1978 to 1990*, *he works for IBM when he is in the States / now* and even *he is clever when he drinks* or *he is clever at work (but he is so stupid when it comes to social matters!)*, but does not need to do so. However, events intrinsically correspond to a particular time. One may relate this time to the times of other events or states, but one cannot stretch or change the time associated with the event. (For example, *he built the house for two days* is unacceptable in

English, as *he built the house* has its own internal time, whereas if one utters *he was building the house for two days*, one is most probably referring to an unsuccessful attempt at an event.)

Note, in addition, that two "similar" events at different times are necessarily disjoint events: any destruction of a house on the 25th December 1995 is necessarily disjoint from a destruction on December 26th. Non-events, on the other hand, do not have temporal individuation criteria: a person who is clever on the 25th December will probably be clever the next day as well. (This is, incidentally, why time is constructed out of <u>events</u> in e.g. Kamp (1979) or van Benthem (1983).)

Another way in which events seem to be rather distinct from states is in the much more restricted range of possible interpretations they allow. To see this, note that the sentence *John was my friend*, in addition to the possible understanding that "John is no longer my friend", allows for the interpretation that "John no longer exists". Neither is required for the sentence to be understood, as is clear in *When my mother uttered his name, I sighed with relief. <u>John was my friend</u>, and the thought that it would be with him that I would share the room made my fears disappear*. But note that, if one event sentence were at stake -- take for example *John opened the door* -- even though it could be used in the above context as well, it could not by any means imply either that "John no longer opens the door" nor that "John is dead". *John opened the door* is tied to a particular time (and place), because it reports an event.

Related evidence has been described in Section 4.3.1 above, that is, evidence which has been taken as primary by most tense and aspect researchers: the different behaviour of states and events in discourse. The way I express it, this is equivalent to saying that events behave like autonomous entities in time, while states do not.

It thus seems that, no matter how irrelevant the interesting questions of what excuses and/or explanations may be, the concept of event is inescapable for the study of temporal reference in English.

4.3.2.2 States

One of the most cogent arguments for the difference between events and states is the need to distinguish between event types and events. Such a distinction is required to explain why the concept of e.g. *build a house* involves a given temporal profile, while we can use it (most notably, in a sentence with the progressive) without implying that it was wholly actualized. Note that such a problem does not arise with states or activities.

This has led people to resort to more complicated machinery to handle events, from branching time to event ontologies. By contrast, many formal semantic treatments of states keep a relatively simple model for states, namely, maintaining that a (stative) proposition is modelled by the set of times at which it is true. The obvious conclusion has been that events are more complex than states. Contrary to this position, my aim in this section is to argue that current treatments of states are grossly inadequate, independently of the arguments concerning the complexity involved in a proper treatment of events.

My claim will be justified, I hope, by two distinct kinds of reasoning. The first is aimed at explaining <u>why</u> states have been treated as denoting the set of times at which they are true. I suggest that this stems from the fact that states do not have in their inherent meaning any reference to time (unlike events), and, so, there are no complications whatsoever in mapping them into time -- in other words, in classifying them through the help of a temporal homomorphism. However, this does not elucidate in any way what states are, nor how they behave in time. In a way, such formalization totally misses the point from an ontological point of view. Relevant, in this connection, is also Herweg's (1991a) remark that the existence of events with temporal properties has been confused with the issue of assessing the truth of propositions about those events. By contrast, and since events have a closer relation with time, their behaviour in time is bound to be both more complex and more illuminating about what events really are.

The second line of reasoning I follow is to note that many different entities (described by sentences in a natural language) have been mixed under the label of states. I will claim that the adequate treatment of these entities is as necessary as that of events for elucidating the tense and aspect system (at least of Portuguese). The burden of the proof will thus be left for Chapter 6 where the Portuguese tense and aspect system is presented in detail, and, to some extent, to Chapter 7 where the attempt of rendering them in English, induced by translation into Portuguese, is presented. Whether such distinctions are relevant to English alone as well will be something on which I will not take a stand. As will appear from the survey in Chapter 6, some people have suggested similar distinctions for English, but, in any case, their relative importance in English is much lower than in Portuguese. I will next briefly present some of these entities.

One case in point is habituality. Habitual states and the times at which they are true is a matter of little consensus, and an attempt to define habitual states based on an explicit description of the times they refer to is surely doomed to fail.

Because habituality is a rather peripheral phenomenon in English, however, and because English is the most studied language as far as the formalization of tense and aspect is concerned, most researchers into tense and aspect have been able to proceed by explicitly discarding habituals (or even ignoring them altogether). This situation in the research community is thus another form of language-dependence. If Portuguese were the language most often chosen for formalization, the connection between tense and genericity would have been one of the hottest matters, whereas kind individuals would constitute a footnote in particularly thorough works.[27]

Since, on the other hand, English is a language which uses nominals to express generics, the work on genericity has provided some relevant data, although the work in the two domains is very rarely related. The untranslatability of (habitual) states into times has, in fact, already been shown in works devoted to genericity, in the fact that states can imply several kinds of

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[27] If other languages were at stake, yet more, or different, distinctions in the realm of states might be necessary. Cf. e.g. Mønnesland (1984) for habituality in Slavic languages, or Antona & Tsujii (1993) for related distinctions in modern Greek.

quantification: see Carlson (1977), Krifka et al. (1992, 1995).[28] *I smoke* is different from *I jump 3 meters*: one must perform many smoking occasions but only jump once, while *I am tall* definitely implies universal quantification over times. This shows that time is not the relevant unifying factor in a state, even though the two concepts can be related to one another.

Another question which will be discussed in detail in Chapter 6 concerns the difference between temporary and permanent states, or what would probably be better called a fundamental distinction between properties and states proper. The difference between a property and a state can be expressed as follows: The first are atemporal, while the second can be described as a function of time for a particular entity, i.e., they do not introduce times, but are dependent on times for their interpretation.

The reference of temporary states (or states proper) must thus be sought in connection with the entities which provide uniqueness in time, namely events, autonomous dates, or the utterance event. So, *I'm tired* is uniquely understood because it is uttered in conjunction with the utterance event,[29] while *I was tired* will be understood as referring to different moments depending on the context. On the other hand, properties are not understood to happen in time, it is not relevant in general to associate them with a particular time. The fact that they, too, are referred to (or written about) in time is dependent on their relevance to a particular situation, or to the understanding of a particular narrative. This has been shown to be the case for the interpretation of English narratives by Caenepeel (1989) and Sandström (1993) (even though they did not draw this particular conclusion). It is thus interesting to note that the distinction between properties and states seems to be covert in English.

A more detailed discussion of these entities will appear in Chapter 6. Before I spell out what I believe are the appropriate ontological commitments for the task at hand (i.e., to describe the tense and aspect system in the two languages), I will survey the issue of the interaction of matters of tense and aspect with the nominal domain. I shall do it at this point because the actual different positions taken in the literature will be seen to be crucially related to ontological matters; furthermore, their discussion will invoke the description of concrete issues rather than purely abstract notions.

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[28] Krifka et al. (1995) relate stativity and genericity to a higher degree than Krifka et al. (1992), and it would have been relevant to discuss their paper in some detail here. However, I only had access to the book at the time of revising the present text, and thus only knowledge of Krifka et al. (1992) -- a thorough revision of which is Santos & Viol (1993) -- was in fact involved in the above discussion.

[29] Jan Engh has called my attention to such an utterance produced by a president asked whether he intends to run for another period in office. Obviously, *I am tired* would not be referring particularly to the time identified by the utterance event, but would instead mean something like *at this moment of my life*, which is vaguely conceptualized by the speaker as this last year, or this last month, or even this last presidency. The fact that the word *tired* means something different when relative to such large temporal periods is something generally the case, given the vagueness of lexical items. Since *be tired* is a temporary state, its period associated is interpreted with the help of the utterance event, but is not necessarily restricted to it.

If that same president uttered the formally similar sentence *I am honest*, on the other hand, my claim is that we would not need the utterance event, nor an understood adverbial like *at this moment of my life*, to make sense of his assertion. (In fact, we could even bring to the issue events in a remote past to contradict his statement, like his having stolen something in 1965, while for him to be tired remote past facts would be irrelevant.)

4.3.3 Relationship with the nominal domain

The relationship with other linguistic and conceptual domains is not, in the case of tense and aspect, something which can be left out in any description. Rather, the relationship with the nominal domain (or the object domain, depending whether the emphasis is put on the linguistic or the semantic side), has been one of the major sources of insights and new proposals regarding tense and aspect.

Two other domains that could be related as well, the analogy with the spatial domain, and the influence of the temporal domain in more abstract fields reflecting speaker attitudes (politeness, evidentiality, etc.), are, on the other hand, more marginal, and will be left out in the present text.[30]

4.3.3.1 Three kinds of motivation

There are three different kinds of reasons why the nominal and verbal domains have been related, and, more particularly, which appear to indicate that similar analyses should be given for the two domains:

1. The abstract approach. Assuming that what is referred to by the nominal domain (let us call it objects) and what is referred to by the verbal domain (let us call it events) constitute separate domains, their structure can be compared. If one hypothesizes that structuring strategies are independent of the domain, then it is plausible that natural language uses the same strategies in different domains.

Or, with a psychological colouring, one may defend the idea that knowledge acquisition is mainly done through analogy, and this is why the child (or the language user), building on knowledge of the more basic objects, belonging to the primary domain, attempts to use its structure to understand (acquire knowledge of) more complex domains. In any case, even if this is irrelevant for the language user, it is certainly of value for the scientist, or linguist, who through analogical reasoning may discover properties or propose new hypotheses.

A methodological parallel in linguistic research in the two domains is the choice of grammatical items as a productive testbed for theories about the domains. And thus determiners have been extensively studied in generalized quantifier theory (see Barwise & Cooper (1981)), while aspectualizers (i.e., verbs that take other verbs as objects and have a specific temporal or aspectual interpretation) have also received considerable attention: see for example Freed (1979) or ter Meulen (1995).

2. The practical approach. The nominal and verbal domains are intimately related in natural language. An (independent) proposition or sentence (almost) always includes at least a noun (phrase) and a verb (phrase). Conversely, from the semantic point of view, events contain objects (the participants), properties are predicated of objects. It is thus almost impossible to define or

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[30] See for example Lyons (1977) on the first subject, and Fleischmann (1989) for the second. An interesting discussion of the integrated use of space and time in language in a formal framework can be found in Crow (1990).

explicate an event without presupposing or making reference to its would-be participants. In particular, it is well-known that properties of the nominal domain influence verbal aspect (a claim first substantiated in detail in Verkuyl (1972)).[31] On the other hand, it has also been acknowledged, even though not as widely, that properties of the verbal domain influence nominal interpretation -- see G.Carlson (1977) for evidence for this claim.

This close relationship has not been used as an argument proper for postulating similar operations and/or concepts in the two domains, but, indirectly, such a treatment would have undeniable advantages, since it would be much simpler to interpret the interaction. Rather, one should say that this approach emphasizes a practical problem which, if successfully handled with the hypothesis of structural isomorphism, would lead to strong confirmation of such a theory.

3. The typological/universal approach. Languages are not structured evenly as regards the distinctions that are encoded in them. It is a basic fact that some languages have complicated morphology (with the respective semantic complexity) in the nominal domain, while they may have a simple verbal system; other languages in turn have a complex verbal system and (but not necessarily) a simpler nominal domain.

If one assumes identity of meaning conveyed by any two languages -- something I have strongly argued against in the previous chapters --, one must conclude that what is conveyed in one language through one domain must be conveyed in the other through the other domain. This will imply that, at least to some extent, the meaning conveyed by the two domains must overlap. This, I believe, is an argument that is not sound, not only because of the assumption of meaning preservation, but also because the definition of what is the nominal or verbal domain in language is language-dependent (a good example is the Russian verb corresponding to 'be white').

Summing up, the three kinds of arguments have different validity, and have, in my opinion, led to results of a different status altogether. While the first has undeniably provided thought-provoking hypotheses and advanced the study of temporal matters in general, I am clearly more reserved towards studies based on the third approach.

4.3.3.2 Actual proposals

Two different ways of approaching the temporal domain inspired by the nominal domain must be mentioned.

The first is the mechanism of reference itself, of which the discussion in Section 4.3.1 above is an example. It should be emphasized that the very idea of <u>reference</u> to times is inspired by the more obvious reference to objects. The view of tense as anaphoric, even though countenanced in the previous section, has inspired wide research, which cannot but be

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[31] I note that there is a subtle question here, having to do with the fuzziness of the term "verbal", which is often used interchangeably with "sentential". It is general practice to attribute direct denotations to sentences, and to nouns and noun phrases. Verb and/or verb phrase denotations are generally indirectly attributed as the "difference" between the two. Hence the common use of "verbal" aspect for sentential aspect, and the same happens for tense. One might, in fact, contend that one should provide independent denotations to verbs and to sentences, i.e., a verb should be considered other than the skeleton of a sentence. This is in fact how things work in situation semantics; cf. Barwise and Perry (1983). Enç (1986), on the other hand, argues for a non-sentential analysis of tense, strictly verbal.

acknowledged as a positive consequence.

This example involves a parallel in the way linguistic mechanisms work. The second form of building on the knowledge of the nominal domain, detailed in the present subsection, is concerned with a possible parallel in the reference of the two domains.

On closer inspection, it turns out that such a parallel has been conceived in several different ways: there have been several forms of stating a basic parallel between the denotations of sentences and the denotations of noun phrases, and consequently exploring its consequences, involving different assumptions and the intention of explaining different phenomena. I will discuss the work by Lauri Carlson (1981), Bach (1986) and Krifka (1989,1991). The reason why I dwell in detail on these matters is because they are crucially related to ontological matters, and, furthermore, to aspect calculi, which will be one of the central issues in describing tense and aspect in the present dissertation.

L.Carlson (1981)

I start by discussing L.Carlson's (1981) application of the abstract concept of partitivity to verbal aspect. Carlson suggested that the interpretation of sentences in time was structured similarly to the interpretation of nouns in space: Countable nouns can be individuated in space, as eventive sentences can be individuated in time. By contrast, non-countable objects have to be measured in space, activity sentences have to be measured in time. Natural language uses entities for which a natural formulation will obey partitivity in the object domain, and others obeying partitivity in the time domain.

Carlson then looks at differences in aspect associated with quantified noun phrases, and argues that they can be interpreted simply by general principles of quantifier interpretation plus partial ordering in the rules, in a game-theoretical semantics. Even though he is able to tackle cases of remarkable delicacy, which are hardly ever taken up by formal semantic theories, it is interesting to note that, in his examples, interpretation of the verbal argument is never called into play. Rather, everything hinges on his analysis of durative temporal adverbials, incidentally even sharing formal features of noun phrases (*all the time*). He claims that the different interpretations arise out of interaction between ordering constraints for the diverse quantifiers, and suggests that partitive quantifiers give way to non-partitive in the order of application. While his system is undoubtedly the most elegant (and powerful) in the literature in accounting for the interaction of quantification and aspect, nowhere does it require a full analogy between verb/sentence denotations and those of noun/noun phrase denotations: a much simpler analogy, between the denotation of temporal adverbials and objects, is enough.

Bach (1986)

Let me turn now to Bach's (1986) proposal, which was directly inspired by Link's (1983) proposal of treating the denotation of plural and mass terms and the matter that constitutes them as ontologically distinct entities, linked by a homomorphism from the domain of objects to

matter (a more precise rendering will be given below). Bach suggests that events are "analogous to the singular and plural individuals and bounded processes ('bits of process') analogous to the portions of matter that make up the 'material extensions' of those individuals" (Bach, 1986:8).

Formally, the model for natural language sentences proposed by Bach corresponds to a set of elements (representing tenseless clauses) called eventualities, in which a sum operation is defined, thus forming a lattice structure. For a subset of those elements, namely those of the process kind, <u>another</u> sum operation is defined and thus they form another lattice as well. A homomorphism from the first structure to the second is posited whose intended meaning is that it puts in correspondence the parts of processes that constitute the eventualities (for processes, they are mapped onto themselves, i.e., the homomorphism is the identity function in the process subset).

Bach noted the following pieces of evidence for this model of sentence denotation: (i) plural events such as those joined by coordination are straightforwardly modelled as the sum of the two coordinated events; (ii) the situation when two distinct events may share parts can be captured as containment relative to their material parts (for example, the process corresponding to *John erected the scaffold* may be materially contained in the process corresponding to *John built the house*); (iii) two events may be different even though processually equivalent (*Jones killed the inhabitants of the village* and *Jones poured poison in the water tank*); (iv) while there is only one way to go from an event to its material part (through the homomorphism function), there are many ways one can go from a process into an event: the event chosen may correspond to the beginning of the process, to one bounded portion of it, etc. -- formally, any event which has that process as part would qualify, i.e., any event belonging to the set $\{e|h(e,p)\}$.

But Bach also notes that "it is exceedingly difficult to find English expressions which correspond to these 'pure processes' [to which event types correspond]" [(Bach, 1986:9), and ends by suggesting that material in itself has no properties, i.e., it is not referred to by natural language. In other words, he claims that whenever we speak of processes (or of stuff) we individuate them.

Bach (1986) was mainly a discussion paper, whose purpose was, furthermore, also to use temporal insights in the analysis of the nominal domain, and so, Bach is content with raising some interesting questions and suggesting topics for further research. The work by Krifka, which I describe next, can be seen as a thorough application of Bach's insights to particular linguistic problems. Let me note, however, a fundamental weakness of Bach's suggestion, namely, the fact that it applies only to some kinds of eventualities: events and processes. In other words, a homomorphism between states (and I would claim achievements, as well) and portions of processes that make them up simply does not make sense. Incidentally, this is true for the nominal domain as well: abstract nouns like *happiness* or kind names have never been claimed to be modelled in Link's system.

Strangely enough, Bach himself suggests that consideration of such matters should be necessary for solving some puzzles in the nominal domain, thus suggesting an improvement of

Link's account. However, he fails to link this observation to his own model of sentence denotation. Rather, he says rather misleadingly that "tenseless clauses in English are to be interpreted as denoting sets of eventualities, i.e., <u>members of the domain E$_e$</u>" (Bach, 1986:9, my emphasis). This equivocal character of Bach's proposal persisted in many subsequent approaches; see Sandström (1993) for an historical survey. I will return to this issue after presenting the essence of Krifka's work.

Krifka (1991)

Krifka (1991) proposes a complex algebraic formulation, where individual events as well as individual objects form lattices as suggested by Bach and Link. Mass terms, as well as activities, obey different constraints than countable objects and events do. Events and activities are related to another entity domain, that of times, which also form a lattice. As expected, there is a homomorphism from eventualities to times. Krifka also mentions that a similar homomorphic connection could be defined from objects into a space domain, but argues that the simple concepts of cumulativity versus quantization are enough.[32]

Krifka's (1991) main concern is to formalize the impact of nominal arguments on the temporal constitution of verbal predicates; in other words, to explain how the structure or properties of the nominal domain influence the final aspect (or event classification), and he does so by indexing a set of properties of thematic roles (i.e., agent, patient, instrument, etc.), the assumption being that different thematic roles have a different influence. The properties are particular to thematic roles of individual verbs, and the following list is invoked: (i) summativity (two objects in the same role to two events can be described as the sum of the two objects in that role to the sum event); (ii) uniqueness of event (Can an event with the same participants be repeated?); (iii) uniqueness of object (Can more than one object stand in that role in one event?); (iv) mapping to objects: parts of an event have corresponding parts of the object related by the thematic role; (v) mapping to events: parts of an object are related to corresponding parts of the event.

In order to compute the (possible) referential properties of a sentence, the basic aspectual character of the verb (quantized vs. cumulative) plus the above properties for each of its thematic roles plus the properties quantized vs. cumulative of each argument must be taken into account. Krifka gives the example of the verb *read* with the object *letter* in the patient thematic role. He assumes that *read*, relative to the patient role, is a cumulative predicate (i.e. two readings add to another reading) and that the patient role of *read* has the following properties: summative (read one book plus read another book equals read two books); uniqueness of objects (when one reads a book one does not read something else as well); mapping to objects and to events (reading is isomorphic to the parts of the book read and vice-versa); non-uniqueness of events (one can read

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[32] A cumulative object, in Krifka's system, is an object (event or thing) which obeys the following rule: for all P (CUM (P) <=> for all x,y P(x) & P(y) => P(x join y)). The corresponding rule for a quantized object is: for all P (QUA (P) <=> for all x,y P(x) & P(y) => not (y is a proper part of x)).

the same book more than once). From these properties it follows that if the argument in the patient role of *read* is cumulative (as in *read letters*) the result is also cumulative. By contrast, if the argument has singular reference (as in *read the letter*), the result is quantized if both iterative and partitive readings are excluded. (Iterative readings, incidentally, are automatically excluded if uniqueness of events is the case, as in *write* instead of *read*). Finally, if the argument is quantized and the iterative interpretation excluded, then the result is quantized as well, like *read a letter*.

My impression is that this heavy machinery is not necessary, especially because Krifka states that "the properties we have discussed so far are not "hard-wired" in the thematic relations, but follow from other knowledge sources [...] the normal way of eating enforces the graduality properties [uniqueness of objects, mapping to objects and to events]" (Krifka, 1991:12).

In fact, an interesting comment can be made about Krifka's (and Verkuyl's (1972)) approach: Their system treats NPs are arguments to VPs, and thus they are devoted to explain how the import of the arguments must go through to the VP. This is not the only way to go, and probably not the best way as far as simplicity is concerned: For one, generalized quantifier theory, which deals precisely with quantified NPs, uses the opposite assumption: VPs are arguments to NPs, which logically are represented as quantifiers (see Barwise & Cooper, 1981). I.e., instead of having, for example, a representation of *Men came* as **come (sum of (man))**, one would have **sum of (man) (come)**, and thus no need for more percolating. This seems to be also what L.Carlson actually does with his game-theoretical approach, although he does not rely on the notion of scope (which may, in fact, be unnecessary). In other words, Carlson's system treats nominal and verbal quantification outside the VP.

The impression of overkill that Krifka's system inspires derives not only from direct comparison with L.Carlson's system, which seems to handle the same phenomena with considerably fewer ontological commitments, but also from proposal internal details. First of all, I suspect that the properties attributed to the thematic roles are not independent of the basic classification of the verb, neither independent from each other: For example, how is *read* classified as cumulative without precisely the information that is scattered among the properties of its PATient role? Also, it seems to me that uniqueness of events, for example, implies that of objects, which seems to indicate that the classification scheme is not optimized. Furthermore, not only are thematic roles a fairly fuzzy concept, which would advise leaving them out of a semantically precise formulation, but their representation as relations between an event and an object obeying some properties seems to be highly underspecified. In particular, if Krifka took pains to discriminate among thematic roles, one would expect that cases with more than one thematic role were discussed and their interaction shown.

Finally, and since this subject is related to the main concerns of the present dissertation, I should note that Krifka, in the same paper, also claims to solve two translation puzzles with his formulation. One, that partitive marking in noun phrases and progressive marking in verb phrases are equivalent (when defined). Two, that aspect marking in Slavic languages implies definiteness

of the verb's argument noun phrases in some cases. At first sight, this seems an impressive achievement. But, on closer scrutiny, one sees that Krifka has started by stating that these phenomena were equivalent in the first place, and then shown that this can be derived in his system. Now, if one takes the view that these phenomena are <u>not</u> equivalent, this turns out to be, not an asset, but rather a weakness of Krifka's approach.

Eberle (1990)

Eberle (1990) is a concrete detailed specification of sorts for natural language processing which can be seen as a particularization of both Bach's and Krifka's ideas. Eberle differs from them, however, in two respects worth mentioning: First, he considers mass and count as disjoint sorts. In particular, mass and count eventualities are disjoint, even though related by a substantialization function. In the eventuality domain, he suggests as motivation for this separation the possibility in English of statements like *he enjoyed the running but not the run*. I.e., he claims that linguistic expressions like the verb *run* can belong to two disjoint subsorts, M-RUN and C-RUN. The sort of an expression is dynamically computed, i.e., an expression involving *run* is not necessarily a mass or count eventuality.

Then, and as regards the ontological status of states, already discussed above, he claims that states should be considered eventualities on a par with events, based on an argument credited to Bäuerle, namely, that states in contexts like *since*-clauses do not behave like propositions, because the negation of the state would not be felicitous in that context.[33] This argument is very interesting because the corresponding sentences in Portuguese would indeed be felicitous, cf. *Desde que não trabalho para a Bosch, vivo descansada* ('Since (temporally interpreted) I do not work for Bosch, I live in peace').

Nevertheless, I do not even accept this argument as valid for English. Rather, in Chapter 7, I will argue at length for a different aspectual character of verbs traditionally considered stative in English. From my proposal it follows that such expressions (which I call "acquisitions") denote an inceptive event in some contexts (*since*-clauses are obviously one of those), and therefore the argument that the negation of such sentences is not a state does not entail in any way that states proper should be treated as events.

4.3.3.3 Discussion

Before attempting to draw some conclusions, let me analyse here two other models still, which are detailed enough but do not depend (at least so it seems) on the assumption that the structure of the two domains is the same: Hoepelmann & Rohrer's analysis of the French past tenses, and Hintikka's analysis of English tenses.

Hoepelmann & Rohrer (1980)

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[33] The original argument (see Eberle, 1990:213) was given for German, incidentally: *Seit ich bei Bosch arbeite, wohne ich in Degerloch*, but * *Seit ich nicht bei Bosch arbeite, wohne ich in Degerloch*. The (rather poor, in my opinion) translation into English is claimed to have the same properties: *Since I have been working at Bosch, I have been living in Degerloch.*

Hoepelmann & Rohrer (1980) are probably the first to have provided an explicit account in formal terms (specifically in Montague grammar) of the parallelism between mass, plural and kind terms in English and the difference between the French tenses imparfait and passé simple. Their approach is basically the introduction of type-changing operators without overt marking as regards English noun phrases. As to French tenses (whose treatment is much less detailed), they interpret abstract verbs as properties over intervals, infinitive forms of verbs as individual concepts (i.e., as a term, in analogy with the need to interpret *water* as a concept in *Water is indispensable*) and the import of tenses as a further operator (analogous to the one required for referring to actual quantities of water) obeying different meaning postulates.

Even though their treatment is fairly sketchy, and they introduce a strange entity which they call a "protoverb" without overt linguistic motivation, their proposal has, in my opinion, a remarkable property because, contrary to all treatments surveyed above, it makes explicit use of kinds in the nominal domain and of individual concepts (corresponding to infinitives) in the verbal domain. In the next section, I will claim that some verbal expressions can be viewed as individual entities. Hoepelmann & Rohrer's proposal, however, is hindered by an extremely compact presentation, which fails to motivate the reasons for such a step (actually, the only linguistic evidence they provide concerns the more trivial mass-count parallels).

Hintikka (1982)

Hintikka's (1982) paper, on the other hand, provides an extremely clear presentation of his analysis of tense in game-theoretical semantics, which hinges upon an identification of the mechanisms involved in the processing (or interpretation) of tense and nominal quantifiers. He is able to explain the interaction of the two resorting to different orderings, as well as formulate conveniently the interaction of tenses and adverbials (negation, and frequency quantifiers). Differently from L.Carlson's proposal in that he does not make a parallel between nominal reference and temporal reference, he simply states that "expressions that [..] quantify over time can be treated in game-theoretical semantics in analogy to their non-temporal relatives" (Hintikka, 1980:8). Some of the expressions related are *always - all*, *sometimes - some*, *often - many*, *ever - any*.

From the analysis of these and the previous works, I believe it is justified to assert that:

1. It is not necessarily the case that one has to treat quantifications of NPs as prior to (as embedded in) a sentence before deciding on the aspectual properties of a sentence. Rather, one can separate the aspectual import of quantification from the composition of the aspects in a sentence.

2. In addition, it is not even necessary to refer to events (to their internal structure, that is) to model the interaction with the nominal domain: the simpler concept of reference to times seems to be sufficient.

From a practical point of view, this justifies the treatment of aspectual characterization I will provide in the present dissertation, leaving quantification to be treated afterwards.

In fact, my belief is that quantification is a (linguistic) operation radically distinct from qualification / classification in terms of kinds of situations. Even though its result can undeniably influence the aspectual properties of a final sentence, it does not obviously exhaust itself in the aspectual composition mechanism. Furthermore, I believe that the internal constituency relevant to aspectual composition proper is no longer available after quantification has applied. For example, the internal constituency of objects is no longer relevant as soon as they are turned into more complex entities, as the behaviour of kind names, or of plural nouns read collectively, shows.

Consequently, I do not believe in the common assumption that intra-sentential and inter-sentential[34] matters should have an integrated analysis. The obviously formal distinction between linguistic mechanisms inside and outside the sentence is plausibly reflected in some distinction in their meaning as well. In other words, the "glue" inside the sentence and that making up a text are plausibly different.

Denying such a difference gives rise to such complex treatments as Krifka's, which may, in the end, still be proven empirically inadequate, if they do not allow the existence of mechanisms without intra-sentential motivation.

4.3.4 States and properties as individuals

Returning now to ontological matters, it is time to make my last claim. After the discussion of the preceding sections, let me summarize here the most important points regarding ontology that were expressed there:

1. States and events are different entities in the world as viewed by natural language, which cannot be subsumed under a common (non-trivial) sort.

2. In the realm of "states", states proper and properties are different and fairly complex.

3. The concept of time as distinct from states or events is relevant to interpreting natural language.

4. Intra-sentential matters (the internal constituency of a sentence) and inter-sentential matters (how sentences behave externally, and what a sentence refers to) are different subjects, involving different concepts.

Now , I want to argue for:

5. One must consider states and properties full individuals, given that natural language(s) (at least English and Portuguese) allow us to refer to them as well, both through predication and through pronominal reference.

In fact, one can attribute properties to an event, a state, or a property, cf. *To build a house is wonderful*, attributing a property to an event (type), *To be on the beach is comforting*, attributing a property to a state, or *To be a teacher is difficult*, stating a property of a property.

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[34] I do not particularly like the word "intersentential" here, because it emphasizes the relationship with other sentences rather than the denotation of the sentence itself, which I also want to cover with this term. However, the words "extrasentential" or "outersentential" do not seem to be reasonable alternatives.

See Chierchia (1982) for further evidence on this point.

In addition, the following are well-formed discourses, referring by means of an anaphoric pronoun to a property:

(i) *I was a teacher. <u>This</u> bothered me. I had always seen myself in the role of a successful businessman.*

(ii) *He was ill, and <u>that</u> made him deeply unhappy.*

(iii) *She is a woman, but she doesn't like <u>it</u>.* (*it* referring to *being a woman*)

Let me take up two issues related to these assumptions:

The first is the reinterpretation of states as events and vice versa: After all, it is one of the most conspicuous issues in verbal aspect (and also in the mass-count parallelism). A possible objection might thus be that I fail to provide an explanation for this fact.

This argument, however, is fallacious, and calls for crucial disentangling: one thing is <u>linguistic expressions</u> that can be reinterpreted. The other thing is entities of the model, which I claim are distinct entities. In other words, states are not reinterpreted as events nor vice versa. It is linguistic expressions (that should be called for example "statives" and "eventives") that are systematically made to denote different things, different kinds of entities (with a well-defined relation between them).

I will in fact suggest that there are three kinds of entities denoted by the languages I am concerned with here, and that there are systematic ways to link a situation described by a tenseless sentence to each of them. For example, one can assign a specific time to a state, or add bounds to it, in which case the resulting "thing" is (at least in some ways) an event since it comes with a definite temporal profile; or one can abstract the temporal dependency of an event and create a property; or one can detach the time interval of an extended event and use it to identify a dangling state.

What makes each of these kinds of situations true or false in the world is a different matter, a matter about which I will have very little to say. Apart from the trivial reason that this is often impossible to determine, a more relevant reason for my omission is my present concern, namely, the analysis of translation. In fact, as argued by Gawron,´ska (1993), matters of truth are generally irrelevant for translation. And, as my discussion in Chapter 3 indicates, it seems to be enough to compare what the texts explicitly describe rather than the purported real situation they relate to.[35]

A second comment should be made. A quick reader might formulate the following objection: The majority of the current approaches to tense and aspect use states, events and times (or some subselection of these three). Why bother to defend what is common practice, after all?

I note that, even though most researchers use many entities as well, I claim that they do it

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[35] Miguel Filgueiras, in a round table on machine translation in December 1990, has provocatively argued that MT, contrary to other NLP tasks which require proper treatment of meaning (or relationship with the outside world), is mere symbolic manipulation. To some extent -- to the extent that one associates the idea of meaning with truth, I recognize that he is right.

for the wrong reasons (or they acknowledge they have no reasons). Summarizing my remarks scattered in the discussion above, Hinrichs considers states and events as subsorts of the same thing; Eberle considers states to be events; and Bach and Krifka, even if they do not, remain silent about states. Most event-based approaches use times as well (because of temporal adverbials), but they generally consider a homomorphism from events to times. More complex proposals of the interaction of the two domains are those of Blackburn et al. (1993) and Vlach (1993), who however merge states with events.

On the other hand, Herweg (1991a, 1991b) makes the most of the irreducible distinction between states and events, but interprets states as times, and so from one point of view his proposal can be reclassified as containing several non-trivial operations between the two domains of events and times (like Blackburn et al.'s). In fact, I believe that when Herweg talks about states, he is talking about processes (he says, actually, that these are roughly the same thing). It is processes that are homogeneous, distributive and cumulative (although imperfectly).

Sandström (1993) also finds fault with Herweg's conflation of events and processes, but she takes Herweg's formalization whole-heartedly as far as states are concerned, adding a different lattice-theoretic structure for processes. She claims, rightly, in my opinion, that processes in English are interpreted as taking time, and how much time is chronometrized by the narrative itself. Her taking up Herweg's proposal concerning states is, in my opinion, a result of her desire to model states as anaphoric, and so the temporal argument attributed by Herweg to states comes in handy. As stated above, I believe that the interpretation of states in narrative does not require temporal anaphora, and temporal co-referentiality (when it happens at all -- for temporary states, that is) is inferred rather due to a coherence principle than following from a grammatical requirement. Furthermore, the formalization of (permanent) states should not require a temporal argument at all.

By way of conclusion, Herweg does not provide a correct formalization of states, either. What he does is deal adequately with events and processes, but he mistakenly takes the latter for states.

4.4 Issues of computation

Obviously, issues of computation are essentially related to explanation and definition issues, in that some standpoints taken at these previous phases may entail particular computational models (or, the other way around, some discussions at the descriptive/explanatory level will be fostered by some kinds of models and not others). This was clear at least in my discussion of ontology and the computation of the import of the nominal domain.

Still, I assume (simplistically) for the sake of presentation that one can have a standpoint on the issues above before considering the matter of explicating the meaning of tense and aspect.

4.4.1 Classification

Adapting Wieringa's (1990) discussion of the purposes of classification in conceptual

models, I note that a classification of linguistic expressions can be made at least for the following purposes:

- to formulate laws that are obeyed by the members of the classes (i.e., to describe linguistic behaviour)

- to allow communication among specialists (linguists, language learners) -- i.e., to be able to abbreviate properties and behaviour for shared names.

- to represent evolutionary relations between classes. This is the subject of historical linguistics, obviously outside the scope of the present thesis. I note, nevertheless, that it may help to explain in terms of a diachronic process why members of some class do not share properties.

- to store and retrieve information on the classified objects -- this is relevant for lexicon organization and/or corpus browsing. In other words, for NLP applications.

4.4.1.1 Classification of what?

The problem of a linguistic classification is that it is often not clear whether we are classifying linguistic items according to their properties in the language system (which I would call a purely linguistic classification), or whether we are classifying items according to the properties of what they are purported to denote (which I would call a semantic classification), or even if we are classifying linguistic expressions according to the relation between linguistic form and content.

This distinction is often blurred because the second kind of classification can only be made through natural language, our "knowledge representation language", and thus the first and the second classifications may appear to be identical (because they may appeal to the same tests).

The distinction is thus even the more relevant, for failure to distinguish it may lead to fallacies like the one of aspect as choice or misconceptions such as transforming an event into a state, as described above.

In the literature, Aktionsart classification generally fails to make this clear, even though people are generally at pains to indicate that the description is one of linguistic expressions and not of situations in the world. This should be obvious in the scope of the present dissertation. How the world is is not in the least my concern. What is of interest is rather how each natural language represents the world.

L.Carlson's (1981) discussion is one of the few which clearly separates the several issues involved. He proposes a classification of linguistic expressions according to the kind of situations they refer to: a semantic classification. Then he suggests a number of linguistic tests as evidence for the soundness of such a classification.

By contrast, Vendler's (1967) original proposal was aimed at discovering what semantic distinctions are made by English on the basis of linguistic data (inferential relations, grammatical judgements concerning co-occurrence). This will be further discussed in Section 6.1. Kenny, on the other hand, seemed to take three fundamental abstract concepts as his point of departure, those of action, emotion, and will, and looked for linguistic correlates. His aim is essentially

philosophical, while Carlson's is essentially linguistic.

If one views the process of classification from the linguistic end, then one can meaningfully ask the question what kind of linguistic expressions should be classified as having Aktionsart. And people have discussed whether it is the verb, the verb phrase, or the sentence.

Now, this question is intimately related to the problem of which syntactic elements have meaning. If only sentences have meaning, then a classification of Aktionsart, taking into account the kinds of things purportedly described, can only be attributed to sentences. Necessarily, then, Aktionsart is a property of sentences. This seems to be the dominant view in the literature today. For example, Moens (1987) identifies as the meaning of each aspectual class a semantic construct (a denotation for a sentence), and L.Carlson (1981) models (the semantic counterpart of) the aspectual calculus in terms of the aspect of basic sentences (i.e., without quantifiers).

But, if smaller pieces than sentences are granted "meaninghood", then it makes sense to suggest, as I do, that Aktionsart is a property of verbs, verb phrases, and sentences, and that an aspect calculus is nothing but a precise formulation of the relationship between the aspect of a sentence and that of its components. If one is interested primarily in comparing sentence to sentence translation, or analyse sentence internal operators, like the progressive, the perfect and temporal adverbials, as I am in the present thesis, it pays to look at the intra-sentential level in more detail (cf. also my discussion of the translationally related relation in Section 3.3).

Let me thus take up other arguments provided in the literature against the claim that verbs are aspect bearers. One (circular) reason for saying that aspect is a property of sentences is that verb aspect and sentence aspect can differ (as generally put, subjects may influence the aspectual character of a sentence). I note, at once, that for this remark actually to make sense it presupposes that verb aspect be recognized in the first place. On the other hand, it is not unusual that, if a verb carries a given property, the sentence where it occurs may be classified according to such a property as well (even though, during the process of sentence building, its value may change).[36]

In addition, such an argument hinges on the assumption that no two categories can share the same feature (and thus, the sentence having it, verbs could not). Perspectival aspect, being marked morphologically in the verb, was never subject to such controversies. However, there is an interaction of other factors with derivational aspect morphology as complicated as e.g. in English for each particular sentence. (See Lindstedt's (1984) proposal of nested aspects.)

Finally, some mention Vendler's own use of verb phrases like *build a house* as an argument for the claim that Vendler himself had verb phrases in mind. I find this argument even less acceptable than the ones above. As contended in Santos (1991b), the fact that *build* is transitive makes it hard to exemplify with sentences with no object. No one has ever claimed that other objects of *build* would imply a different verb classification -- i.e., that the meaning of *house* was

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[36] Transitivity is a good example. A transitive verb does not necessarily occur in a transitive sentence, nor do transitive sentences only contain transitive verbs, as in *It rained cats and dogs*. Even the information on past, present and future, which supposedly comes solely from the tense in a given sentence, can depend on the context, as in *If you do that, you will realize later that you were wrong* (the last 'past' referring to some time in the future).

relevant in any respect, but only that the morphological marking on the object (whatever object) would, in case it meant pluralization, for example. This makes it appropriate, in my view, to see the aspect as being a property of *build* and not of *build a house*, even though, of course, one can assign some aspect to *build a house*, namely the same as that of *build*.

The only argument against aspect being a property of verbs remains, therefore, the position that only sentences have meaning. I will assume that this is not true, or, less controversially, that there is some meaning that verbs have and which is relevant precisely for computing the aspect of a sentence.

I conclude also that, depending on which end (language expressions or world situations) one starts with, an aspectual classification will result in different classes, even though, again, some weak relation should hold between the two sets of classes. In the present dissertation, I defend a classification of the <u>relationship</u> between linguistic expressions and kinds of entities, a move which will require special consideration of the pervasive case of relations which are not univocal, i.e., of cases of linguistic expressions which have more than one (distinct) referent: vagueness.

I do not want to argue that this is the best way to do aspectual classification, but only that it is a possible, and fruitful, one.

I believe, nevertheless, that a consequence of the previous discussion is that classifications with a clear semantic bias are not necessarily better than those with a linguistic starting point. Rather, for many purposes they may even be less appropriate, because they will require working with representations of meanings rather then with linguistic expressions themselves.

4.4.1.2 Classification how?

In addition to what is classified, a crucial question is how classification is carried out. I.e., apart from attributing one (or more) label(s) to each element, what else is presupposed?

Carlson (1993) notes that a classification does not need to be

- exhaustive
- pairwise disjoint
- unique up to identity

while Taylor (1989) has made the point that linguistic categorization is generally prototypical.

This appears to be the rationale behind Verkuyl's (1989) critique of Aktionsart classifications, pointing out the multiple senses that Aktionsart names have acquired for different authors. The morale seems to be that a classification scheme is more than a set of labels: it includes several other assumptions that must be spelled out in detail.

Note that I will not discuss here how to obtain aspectual classification for the two languages. Rather, this will be taken up in Chapters 5 and 6 to come.

4.4.1.3 Why so much emphasis on classification?

Another question that might be asked is the following: Why does classification play such

an important role for verbal denotations, a role far greater, as far as I know, than in other domains? I believe the answer is twofold:

On the one hand, this has historical reasons - Vendler's influential paper, and it is made worse because of the unfortunate identification of Aktionsart with aspect. On the other hand, it is also due to the infelicitous identification of the categories needed for analysis below the sentence and above it, against which I have already argued. This has made researchers of the other level to pay undue attention to matters with which they would not need to be concerned. (In fact, I have noted in Santos (1993) that in practice research in discourse has resorted to a much smaller set of aspectual classes than that required by aspectual calculi.)

What one needs, I believe, is two systems: one for Aktionsart, below the sentence, and one for sentential denotations, once a full sentence is transformed into a proposition. The two systems are not independent, however, because the Aktionsart (or aspectual character) of the sentence has obvious implications for the sentence denotation, but sentence denotation is also, and crucially, a function of tense, and of context. In other words, I claim that sentence denotation is a matter that does not get exhausted by a compositional calculus that gets the final Aktionsart right.

4.4.2 Formal semantics and the questions of representation and processing

This is not the place to give an overview of formal semantic theories. I have already discussed some specific proposals concerning tense and aspect when it suited the needs of the exposition. Let me instead focus on some general issues.

Formal theories of meaning were widely described (too widely, in my opinion) by Bach as follows: "The way in which the word *formal* is used in the term formal semantics [...] means [...] something similar to *explicit* or *precise*" (Bach, 1989:9). In fact, formal theories are also always couched in mathematical terms: model theory (set-theoretic, algebraic, or game-theoretical), situation theory, or deductive systems (proof theory), to mention just the most common varieties.

One interesting property of formal semantic theories is the fact that research concentrates mainly on the meaning of function words and/or grammatical mechanisms. Contrary to what the layman might expect, "content words", i.e., words belonging to open classes -- the scope of lexical semantics -- have received considerably less attention. This is nevertheless easy to explain, for it is those devices which, depending on the kind of semantics, define the restrictions on the structure of the models, correspond to the logical symbols, and/or provide the instruction clues. In sum, they provide, in a way, the shape of the "space" that is filled by language. Lexical semantics, on the other hand (at least when done in a formal framework as in Dowty (1979)), attempts to organize the elements belonging to open classes according to criteria which often resort, in turn, to closed class elements (a typical example is Aktionsart classification, carried out with the help of aspectualizers and aspect operators).

There is, however, one issue in the semantics of natural language that lies well outside the scope of the analogy between natural language and the language of mathematics, which is deemed relevant by many researchers: the concern with psychological relevance; cf. e.g.

Chierchia & McConnell-Ginet (1990). In its weak form, this concern constrains the number and kind of the adequate formalizations, as defended by Zeevat: "natural language places constraints on the structure of the logical formalisms that can interpret it: natural language is not neutral in this respect" (Zeevat,1989:129). In a stronger form, it may lead to the claim that such apparatus is fundamentally inadequate. In fact, Lakoff claims that the feature of language embodiment is essential: "Meaningfulness involves not merely mental structures, but the *structuring* of experience itself. Some kinds of experiences are structured preconceptually because of the way the world is and the way we are" (Lakoff, 1987:302). In other words, the fact that natural language is a human construct makes it heavily dependent on the human body (and human physical capacities), a claim which he argues for with data from psycholinguistics, sociolinguistics, the study of metaphor, and detailed studies of syntactic and semantic linguistic categories.

There is, however, a much less radical view of coping with such matters without abandoning a mathematical approach: simply trying to combine features of mentalistic and formal semantics. And, in fact, while to a large extent the issue of "mental representations" has been discredited in linguistics as a non-verifiable, hence uninteresting, claim,[37] some current theories insist on a related point, which can be best formulated by the slogan "Representations matter".

Particularly, Discourse Representation Theory (DRT) claims to "combine a definition of truth with a systematic account of semantic representation" (Kamp, 1981a:277). This is done by postulating an intermediate level between "the world" and language (represented by their DRS's - discourse representation structures) which is used in human reasoning. Such a level is populated with entities having no model-theoretic counterpart, which must then be explained in terms of their function in discourse processing. In other words, they receive an operational definition, explicitly justified by Kamp's contention that "the rules for the construction of discourse representations have at least as good a claim to being constitutive of meaning as the clauses which make up the definition of truth" (Kamp, 1979:409). Even though such a claim in its general form is hard to refute (or prove), I do not think that the work in DRT has managed to provide any knock-down example. At least not in the realm of tense and aspect: as I argued above, such entities as reference times have not been given sufficient motivation.[38] I note, consequently, that the postulate of such constructs in DRS's runs the risk of being purely ad hoc.

The drift from referential to processing-oriented models of language is not exclusive of the DRT approach, however. Recently, Vlach has contended that tense simply has no referential

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[37] Work in semantics which purported to describe the mental representations human speakers build when they understand a sentence was severely criticized by formal linguists, who noted that *mentalese* was just another language, badly in need of a semantic specification; cf. e.g. Lewis (1972).

[38] As far as the nominal domain is concerned, to which, it is fair to say, DRT seems to have given a more relevant contribution, there have been other proposals in the literature claiming the same empirical coverage and not resorting to an intermediate level, as is the case of Zeevat (1989) and Groenendijk & Stockhof's (1991) dynamic predicate logic, DPL.

import: "[tenses are] features of a sentence that take part in the interpretation process but correspond directly to no part of an ER [event representation]" (Vlach, 1993:235).

Processing-oriented models of language are not necessarily those who keep a score in some representation, however, like DRT or Heim's (1983) File Card semantics. Rather, Hintikka's game-theory is another, and apparently much more successful, model dealing with such concerns; cf. e.g. the papers by Hintikka in Saarinen (1979). Hintikka seems to be the first to have taken seriously the task of providing a semantics for natural language which is inspired by the way natural language works. Hence, his model is the most dynamic, heavily context dependent, and concerned with processing strategies of all that have been proposed so far. Later, situation theory (Barwise & Perry, 1983) was also devised within the spirit of faithfulness to natural language, but as far as I can see, and contrasting with Hintikka's model, its authors did not pay very much attention to processing concerns.

One specially relevant claim for my concern here is Hintikka's insistence on the fundamental vagueness of natural language, which contrasts drastically with the claims of multiple ambiguity made by other schools. I will discuss this issue in some detail in the next, and last, subsection of this chapter before summing up.

4.4.3 Vagueness

One of the most puzzling problems of computational semantics, NLP in general, and formal semantics, is the specification of a procedure which from the meanings of the parts gets the meaning of the whole, or, alternatively, from the meaning of the whole is able to identify the meanings of the parts.

Montague (1970:227) has made a principle out of this desire, positing that natural language interpretation should obey the principle of compositionality, by requiring a homomorphism from the syntactic algebra describing grammatical sequences of a language to the one which interprets the language. Since then, however, many scholars have pointed out that the empirical content of such a principle is almost vacuous; cf. Manaster-Ramer (1992:105): "essentially any conceivable system of syntax and semantics can be described compositionally". In other words, and since no restrictions are put to the combining function, it simply boils down to the requirement that syntax and semantics be given a recursive specification. Montague himself worked with a system obeying some crucial (and too stringent) simplifications: he assumed that the syntactic and semantic building blocks were the same (putting it more adequately, his syntax is totally subordinated to semantics); and that meaning computation was essentially binary and local (i.e., the combination was restricted to adjacent building blocks -- this is a consequence of categorial formalisms).

Hintikka, on the other hand, suggested NL interpretation principles which did not obey the

principle of compositionality (see Hintikka, 1980).[39] For example, his *any*-thesis roughly makes the grammaticality of an expression dependent on the meaning of an alternative expression.

No matter whether one adheres to any formulation of compositionality or not, I would say that most of the time it is not the specification of the final meaning in e.g. a formal representation language such as first order predicate logic that is problematic for any given sentence, but the obtaining of such a meaning from any combination of their parts. This constitutes the major problem for NLP and formalization alike.

Several apparent features of natural language are related to this state of affairs (I use the qualification "apparent" because, of course, these observations may stem from our current lack of a successful model):

1. The extreme degree of context dependence of natural language (almost anything can mean different things in different contexts)

2. Natural language's extreme capability of adapting to strained contexts, i.e., to let expressions acquire meaning independent of their natural one

3. The mismatch between blocks of different systems (semantics, syntax, morphology, phonology): for example, syntactic and semantic blocks are not identical. Neither can all syntactic elements be given semantic import; nor are all semantic elements syntactically distinct. Moreover, the relative importance (hierarchical or scope relations) of blocks with both syntactic and semantic import may differ.

4. Natural language appeals to a collection of very different principles for its interpretation, ranging from ordering, scope, inference, default reasoning, etc.

5. Natural language grants the possibility of economically expressing more (many) situations at the same time without requiring a decision on the part of the hearer.

It is to this last feature I now turn, or at least one aspect of it, trying to analyse in some detail the notion of vagueness.[40]

There are many ways in which vagueness has been recognized as a problem in linguistics and artificial intelligence in general:

1. How to make precise what is, by nature, imprecise. For example, as Dahl (1985) notes, what is the threshold of "bald"? The answer, also standard from the philosophy of science, is: let

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[39] Dowty et al. also mention that the introduction of the principle of compositionality for natural language was rebutted by Chomsky as "mere dogma -- false dogma at that" (Dowty et al., 1981:9). Chomsky is however not well known for his contribution to semantics.

[40] I agree with Kay Wikberg (p.c.) in that the name "vagueness" has unwanted negative connotations. Furthermore, the expression "vague language" has recently been used to describe "things of the sort "something like that"" in Channell (1994). Wikberg suggested that "indeterminacy" would be a better term, and Zwicky & Sadock (1975) survey a fair number of equivalently used expressions. However, I stuck to the term "vagueness" here because it was used in the paper which made me look for this concept in connection with contrastive studies, Keenan (1978). I believe, moreover, that the opposition drawn between ambiguity and vagueness in e.g. Lakoff (1970) is one to which in general formal linguists adhere.

On the other hand, this may be more than one terminological detail, in that vagueness as has been used (and will be discussed below) may encompass more than a lack of specification: For example, Kempson notes that, although in her book she uses the word "vague" interchangeably with "unspecified", "there is a second kind of vagueness which is in principle unspecifiable" (Kempson, 1975:15).

us assume that "all of us know". In less informal terms, "to actually give criteria is no part of linguistics" (Bach, 1986:13).

2. How to distinguish between ambiguity or vagueness? In other words, when do we need more than one representation? Interesting discussions of this subject can be found in Kempson (1977, 1980) or Zwicky & Sadock (1975). Kempson makes an interesting conjecture, namely, that "the only cases of polysemy which arise in natural language are those which can be predicted by general rule" (Kempson, 1980:14). Turning now to grammar in general, I assume that Kempson's polysemy is the lexical counterpart of vagueness, cf. Kempson's definition of polysemy: two differing compatible interpretations of a lexical item are simultaneously possible given a single context which itself allows both interpretations. This makes vagueness systematic, while ambiguity (and homonymy) is accidental.[41]

3) When is more than one representation required by our <u>representation format</u>, and when is it required by language itself? This last problem has especially concerned people working within the framework of Montague grammar (or with any type-theoretic, or categorial, framework): each type has a particular meaning, however typing is something not observable in natural language -- quite the contrary. And so the following discussion of e.g. van Benthem (1986:63-71, and 125):

These various examples point at general type-change mechanisms in natural language. Many expressions do not stay within one single category: they can travel, within certain constraints. [...]

The three kinds of type change thus identified share one common feature: one single expression adapts itself to various linguistic contexts. [...]

Expressions of natural language need not stay in their basic category, but can assume higher types when desired for the purpose of interpretation. [...] Still, there is a system to such type changes: not anything goes.

Vagueness is thus crucially related to classification: it is our desire to classify that runs into problems. I think that what is needed is a way of formally specifying this vagueness, not as a property of the linguistic items (which would be the same as representing them as ambiguous) nor as a property of situations (what exactly could that be?) but as a property of the relationship between linguistic items and the situations they are associated with.

Basically, meaning is not functional: there is no one-to-one relationship between an expression and a situation; it is relational. Or to put it differently, the meaning function assigns <u>a set of situations</u> to each particular expression, which, for economy and processing ease, are related.

When we use a vague expression, it might be that the context of its use blocks (rejects) one or more of the situations described (and thus we may have only described one situation). But the most common case should be that all situations are involved. For reasons of laziness, it is possible that we may only mentally picture the most prototypical one, but this is something

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[41] Other definitions for the two terms make ambiguity refer to two different structural derivations -- relative to grammar, that is -- and vagueness relative to an external -- non-linguistic -- axis, as Lauri Carlson (p.c.) suggests. People who adhere to the latter definition should bear in mind that I use the term vagueness in the present text in a more encompassing way, thus sometimes containing what they might call systematic ambiguities. My criterion for (the kind of) vagueness with which I am concerned here (which is of a discrete kind, just like polysemy) is the existence of contexts where neither interpretation is excluded.

orthogonal to the issue of what is the meaning of an expression. (If I hear you uttering *My neighbour is Greek*, I may picture in my head a young man with dark and curly hair, but this will certainly not commit me to the belief that a Greek neighbour is necessarily so.)

This general idea will be used in my interpretation of the aspectual calculi to be suggested in the next chapters. Basically, aspectual classification concerns kinds of relationships between linguistic items and sentence denotations. In addition to the common one-to-one cases, I will devote special attention to those linguistic expressions associated with a set of denotations, as for example acquisitions, mentioned above.

In particular, I will claim that lack of vagueness preservation across languages will be one of the major grounds for the failure of meaning preservation in translation.

4.5 Summing up

In the present chapter, I have presented and discussed some issues related to the meaning of tense and aspect, and which provide the theoretical basis for the studies performed in the course of this dissertation. Again, I note that the sections above do not attempt an overview of either current work in the field nor of most problems discussed in the literature.

In fact, it may in a way be read as precisely a justification why I did <u>not</u> follow some current influential schools, most notably DRT or algebraic semantics. The approach I will follow (inspired by Moens (1987)), was in fact hardly mentioned at all in this chapter, partly because it will be surveyed thoroughly in the next, but also because its general features neither preclude nor require the conclusions I wanted to draw here.

One of the most important ideas I would like to stress here, at least from the point of view of the rest of this dissertation, is a principled distinction among the following semantic phenomena:

1. Tense, having to do with ordering issues among at most three times, one of them necessarily that of the speech event (real or imaginary), and another defined by what the tense applies to;

2. Aktionsart, having to do with the kind of situation(s) described by the verbs: the internal, constitutive properties of a situation (such as whether it is inherently extended, whether it has parts or phases, whether it has results, inherent limits, whether it is gradual, etc.);

3. Perspectival aspect, having to do with the positioning of an observer relative to a situation occurring in time (note that perspectival aspect is only defined for events and temporary states);

4. Temporal localization, having to do with localization on a time line;

5. Quantification phenomena (nominal or verbal) which can pluralize, existentially quantify, or "intensionalize" a given situation in several ways (cf. respectively: *build houses*, *to have done*, *read every book he would find*). This corresponds to what I have previously described by "as more complex expressions are being built, aspect values can be produced which are not available at the lexical level" (Santos, 1993:10). Note, as well, O.Lopes's remark: "the verb

almost always designates an act, process or situation as singular" (Lopes, 1971: 225, my translation);

6. The transformation of a sentence into a proposition, assigning furthermore a particular (set of) kinds (belonging to the language's ontology) to its argument (e.g., an event, an event and a state, a state, etc...)

From the point of view of the linguistic forms that realize these functions, a complicating issue in both languages is that "tense form" (e.g. simple past, Imperfeito) plays a role in semantic tense, temporal localization and propositionhood. Furthermore, in Portuguese "tense form" also expresses perspectival aspect, at least (and apparently obligatorily) in the past. This should not be considered a drawback of natural language, but on the contrary, a source for its power as an efficient and economic information vehicle.

Regarding narrative interpretation, my claim is (based mainly on Sandström (1993)) that the mechanisms underlying it are not a function of tense and aspect, even though the referential import of tense and aspect would provide clues for the obtaining of a coherent narrative. This position, however, is not relevant for the present dissertation, which will only be concerned with the contrast of sentence meaning in two languages.

As far as ontological commitments are concerned, I defended the position that, independently of the modelling of time, three cases should be identified for Portuguese: events, states and properties. I claimed that most formal semantic models up to date have only dealt with the internal structure of events. Furthermore, my suggestion is that concepts relevant to event conjoining had also been used to account for event structure and sentence building without real motivation.

On the relation between language and the situations it conveys, I claimed that most expressions are vague relative to ontological commitments, and that this could partly model the context dependence of language.

It will now be the task of the chapters of Part II to show that these assumptions are viable, and productive, for the description of Portuguese, English, and the translation between them.