TENSE AND TEMPORAL ORDER

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Abstract

This thesis investigates the nature of temporal reference in natural language. Reference to time enters into linguistic structures in two distinct ways, namely tense and temporal modification by adverbials.

We start by considering temporal modification, since it is noncontroversial here that an analysis in terms of predicates of events can be implemented straightforwardly. Events, then, are conceived along the lines of Davidson (1987a) and are assumed to be encoded in linguistic representations as proposed by Higginbotham (1985), etc. Being predicated of events, temporal adverbials serve to specify an event for two properties, viz. which are temporal duration and temporal location; the first of these answers to the question How long? the latter, to the question when? Both can be specified by means of temporal adverbials.

Taking the analysis of temporal adverbs as a guide, we analyze tenses as predicates of events as well, thereby placing in the context of the Davidsonian theory of adverbial modification the idea due to Kiparsky (1988), that tense is adverbial in nature. It is immediately obvious that tense is concerned only with temporal location, not with duration.

We propose to analyze the tenses as functional instances of the abstract ordering relation of events we find at work in adverbial modification, and specifically in the temporal connectives or conjunctions. In the case of simple matrix clauses, tense establishes an ordering relation between the event purportedly described in the sentence and an utterance-event.
Analyzing the tenses as ordering relations predicts two possibilities for construing embedded tenses. One option, which we call Serial embedded tense, is for an embedded event to be placed in an ordering relation with the event of the next-higher clause. Alternatively, with what we call Parallel embedded tense, the embedded event is ordered relative to the utterance-event by its tense, independently of, and parallel to, the ordering of the matrix event vis-à-vis the same utterance event.

Both patterns are found to exist side by side in Latin, where Parallel and Serial tense are expressed by indicative and subjunctive tense-marking, respectively. But as we see in the latter parts of this thesis, also in English we find evidence that both patterns are available. Parallel tense, subject to certain restrictions to be made precise, give rise to the "double access" reading discussed by Enç (1987), Ogihara (1989), and others, while Serial tense is responsible for the so-called "sequence of tense phenomena". Both of these will be discussed in several frameworks; they provide crucial cases which permit sorting out the different predictions made by competing analyses.

The view proposed here, which treats the tenses as two-place predicates of events is found to be superior to alternatives, both in its coverage of tense-phenomena, and in its simplicity. The semantics of tense can be assimilated to known schemes for interpreting context-dependent expressions.

Thesis Supervisor: James Higginbotham
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This thesis is dedicated to
Lori Holmes

Tempora mutantur,
et nos in illis.
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Introduction

The present research project is concerned with the function of tense and temporal reference in the grammar of natural language. Specifically, the problem to be accounted for is how, and by what means, reference to time is encoded in language and grammar, so that the interpretations of linguistic structures can be evaluated relative to time. The analysis proposed is centered around the claim that all time-related aspects of grammar can be explained in linguistic theory in terms of the Event-Hypothesis of Davidson (1967a), Higginbotham (1985), and others, with just minor extensions as required by our analysis. This claim is given initial plausibility by the combination of two factors: first, the Event-position which is instrumental in the Davidsonian analysis of adverbial modification can be applied, in particular, to cases of temporal modification; and second, the idea that tense is in some sense adverbial in nature, which goes back at least to Kiparsky (1968) and which has most recently been implemented in a Reichenbachian framework by Hornstein (1990b), can be realized in terms of the Event-Hypothesis as well. To the extent that this is correct, the resultant analysis can account for both tense and temporal modification in a uniform manner by means and mechanisms that are required in the grammar for independent reasons.

The thrust of this proposal is not aimed primarily at demonstrating the empirical inadequacy of existing proposals. In fact, for the most part these are entirely adequate to account for the range of phenomena they are intended for. Rather, the main thrust of the argument here is that the same can be accomplished less costly, in terms of straightforward extensions of principles and mechanisms that are needed independently. Thus what I hope to contribute here is firstly a
new arrangement of the facts (which can be assumed known), and secondly, a more coherent, and more economical theory that explains these facts. In this sense, the approach taken here is reductionist.

The two notions which are central to this investigation are introduced and discussed in Chapter One. The first of these, time, can be regarded simply as the fourth dimension of objective reality, and hence as infinite, linear, and non-directional. Reference to time enters into linguistic structures in two distinct ways, in the form of tense and that of temporal modification by adverbials. Events, second, are conceived along the lines of Davidson (1987a) and are assumed to be encoded in linguistic representations as proposed by Higginbotham (1985), etc. For the sake of consistency, the Event-Hypothesis will be generalized so as to apply to all major lexical categories (nouns, verbs, and adjectives), in all contexts.

The notions of events and time are seen to intersect in two distinct ways: Firstly, given that events take place in time, they can be located in time; and secondly, given that events (typically) take time to take place, they have extension along the dimension of time. Accordingly, we will speak of the temporal location and the temporal duration of an event. With temporal modification of sentences by means of adverbials, the location in time of an event is specified in relation to a temporal fix-point, or axis of orientation. This requires three ingredients: (i) a temporal fix-point or axis of orientation, (ii) an ordering relation between this reference point and the event to be located, and (iii) the distance (in the dimension of time) between the two. On the other hand, the specification of the duration of an event is comparatively simpler, requiring only the last of the just-mentioned factors, construed as the distance between the de-
ginning and end points of an event. A survey of the different forms of temporal modifiers, as carried out in great detail by Crystal (1968), Leech (1970), Kučera & Trnka (1975), and others, serves to make clear that all and only these factors enter into the temporal specification of an event by means of adverbials.

Chapter Two first delineates matters pertaining to tense from such related notions as are frequently referred to by the catch-all term "aspect", and others so as to eliminate from further discussion, such non-tense-related categories as the English progressive [be+ING], the perfect [have+EN], the aspectual classes of predicates of Vendler (1967a), and other associated notions. Only two auxiliary concepts will be retained after this discussion. Firstly, we define the notion of aspect in a relational sense, which allows us to distinguish three aspects of an event, viz. initiative, terminative, and imperfective, referring respectively to the beginning and end points of an event, as well as a (not further characterized) "middle" part, as suggested by Bull (1971). Secondly, we assume as given the distinction between telic and atelic events due to Garey (1957), which is expressible in terms of the notion of aspect, as defined.

Subsequently, we examine how the temporal connectives before, after, and when establish ordering relations between events. This will serve to illustrate how the abstract ordering relations established in Chapter One interact so as to account for the different patterns of orderings of events.

Finally, also in Chapter Two, we take up the investigation of the other area of grammar where time is of relevance, viz. tense, with a brief discussion of the standard analysis of tense, following Montague (1974) and others. A major part
of the discussion is devoted to the deficiencies of, and problems associated with, this approach, of which a fair number are documented in the pertinent literature, particularly in the work of Enç (1981, 1986, 1987), and others.

After this, Chapter Three examines a number of tense-phenomena from a variety of languages which overtly express tenses in their morphological paradigms. Matters are found to be straightforward and uniform in the case of simple matrix sentences. More interestingly, in comparison, embedded sentences display some degree of variation in the construal of their tenses. Concretely, two patterns are seen to emerge, which we will refer to as Serial and Parallel Tense. These two patterns are distinguished overtly in the morphology of some languages, so for example in Latin in the distinction between subjunctive and indicative tense, respectively.

In the former case, the tense of a subordinate clause serves to establish a temporal ordering of the embedded event not with the utterance but with the event of the next-higher clause. As a result, there is no direct relation between the temporal location of the embedded event and the utterance; rather, the relation is indirect, in virtue of the embedded tense being construed in series, so to speak, with the matrix tense. That is, the subordinate event is ordered by its tense relative to the matrix event, which in turn is ordered relative to the utterance by its own tense. For reasons that are self-evident, this pattern for construing embedded tenses is called consecutio temporum (sequencing of tenses) in classical philology and traditional grammar. It is completely free in its distribution, in the sense that any of the three tenses can occur embedded under any other tense in this fashion.
On the alternative pattern, in contrast, the event of an embedded clause is set by its tense in an ordering-relation to the utterance-situation directly, in parallel, as it were, to the way the tense of the matrix event is construed in relation to the same axis. As a result, each event is ordered relative to the common axis independently of the other.

It is important to note that despite the differences between the serial and the parallel patterns for embedded tenses, the tenses uniformly express the three ordering relations mentioned earlier in both patterns. That is to say, the difference between the two concern not the ordering relations themselves, but rather one of their relata, namely the temporal axis of orientation.

Besides the serial and parallel tense patterns just mentioned, there is another configuration in which embedded clauses can stand in relation to their matrix sentences. As observed for the Romance languages by Picallo (1984), among others, embedded subjunctive clauses exhibit a phenomenon which the latter calls anaphoric tense, in which the temporal location of an subordinate event is necessarily the same as that of the event of the containing clause. As the evidence presented makes clear, however, the configuration found here is quite unlike that of an embedded serial present tense, in spite of the fact that the two would seem to make very similar predictions for the purely temporal aspects of interpretation. In fact, the same anaphoric tense pattern also obtains with certain clauses which have mostly been regarded as untensed. Specifically, this concerns the implicative infinitival clauses and gerunds discussed by Karttunen (1971) for English and Finnish. Naturally, matters are somewhat less conspicuous in these latter cases, as compared to the Romance subjunctives, due to the absence of overt morphological marking. We suggest an analysis of both the subjunctives and the
non-finite clauses as cases of bound variable anaphora (cf. in this regard the discussion of similar phenomena with overt NP-arguments in Higginbotham (1980)). What is anaphoric here is thus not the tense(-relation), but rather the event. The facts of temporal interpretation then follow automatically.

Subsequently, in Chapter Four, we present our own analysis of tense phenomena such as the ones examined in the preceding Chapter, taking into account the assumptions made in the first two Chapters. Having excluded from consideration those matters which are not strictly speaking time-related, in the sense that they neither enter into the specification of the temporal duration of an event nor into that of its temporal location, and having acknowledged the inadequacy of the standard analysis, we turn to the examination of tense proper, which concerns the external relationship of an event to a temporal reference point, or axis of orientation. That is, tense is seen to facilitate the temporal location of an event in much the same way this is achieved by means of temporal adverbials. In fact, tense phenomena can be analyzed as involving a subset of the mechanisms found earlier with temporal modification by adverbials, namely an axis of orientation and an ordering relation between this axis and the event to be located in time. (The third factor of temporal specification found with adverbial modifiers, viz. the manifestation of temporal duration (of either an event or the distance of an event from the axis), does not play a rôle in tense phenomena.) The axis of orientation relative to which an event is located in time by means of tense is typically, though not necessarily, situated in the performance of a speech act, or more generally, in an utterance situation. Relative to such a temporal axis, an event can be located in time in only three ways, given that time is linear. That is, an event can either be simultaneous with an utterance, or it can either precede or follow this axis. Accordingly, we have present, past, and
future events, relative to an axis. These three tenses exhaust the semantic domain of tense, in that no matter what the location of an event in the temporal dimension, it is expressible in terms of one of these three tenses. Moreover, no other ordering relations between an event and an axis of orientation are logically possible.

We begin by discussing the two distinct factors that enter into tense, which are the temporal ordering relations on the one hand, and the relata, or arguments, of these relations on the other hand. As to the former, we argue on the basis of certain asymmetries between past and future tenses that the theory should distinguish three primitive ordering relations (corresponding roughly to the adverbial temporal connectives before, after, and when), rather than just two (simultaneity and precedence), as in both traditional tense-logic and the theory of Reichenbach (1947). Regarding the relata, or arguments, of the tense relations, we present evidence pointing to the conclusion that the temporal axis of orientation uniformly makes for the first argument of a tense-relation, whereas the event to be located in time constitutes its second argument. Defining the three tenses as the three ordering relations then allows us to treat both the serial and the parallel tense patterns discussed previously in terms of the same set of tenses.

After having defined the required ingredients, we proceed to stating the truth-conditions for simple tensed sentences. Particular attention is paid to the fact that in most cases, the use of the tenses is sensitive to the context of utterance, which has resulted in the view that the tenses are inde- dential for Burge (1974), Higginbotham (1990), and other researchers taking the view that the tenses refer directly to time-points or -intervals. (This is called the referential analysis of tense.) On the analysis we propose, on the other
hand, the tenses do not refer to times, but rather express temporal ordering relations between events. Given this, we have to take a slightly more differentiated view of their indexicality, or sensitivity to the context of utterance. On this analysis, it is of course not the tenses themselves that are indexical, or context-sensitive, but rather their relata. That is, the tense of a simple matrix sentence serves to order the event described in that sentence relative to an utterance of it, where an utterance is conceived of as an event to which the speaker refers implicitly in virtue of performing a speech act. In this manner we straightforwardly capture the intuition that the utterance of a past-tensed sentence follows (in time) the event described by that sentence; similarly, the utterance of a future-tensed sentence will precede (in time) the event that the sentence is about, and the utterance of a present-tensed sentence will be simultaneous with its event. In all three cases, the first argument of the tense-relation is the utterance itself, and the context-sensitivity of the temporal interpretation of a sentence follows from this, not from the tense(-relation). Given this, the truth-conditions for simple tensed sentences can be stated straightforwardly.

Chapter Five, finally, extends the analysis proposed in Chapter Four for simple sentences to the more complex cases encountered in Chapter Five. Embedded Parallel tense is found to establish an ordering relation between the event and the utterance-situation, same as in simple matrix sentences. In these cases, the context-dependence of the temporal interpretation of a sentence is thus due, not to the tense-relation, but to its first argument, viz. the utterance. The so-called "double access" readings in indirect speech report are accounted straightforwardly for in virtue of the fact that the tense-relation (though not the temporal axis which is its relatum) is part of the proposition being reported. It thus
follows automatically that my indirect report of a sentence #ab as uttered by speaker #b places me in the same temporal ordering relation vis-à-vis the event #a described in #b as speaker #b placed himself in his original utterance of #a. The reason for this is that #b contains that ordering relation. Thus, tense falls under the constraint formulated in Davidson (1968) as one of "same-saying" (which is of course much more general), and in Ogihara (1989) as one of "temporal isomorphy".

With embedded parallel tense, in contrast, an embedded event is related not to the utterance, but to its matrix event. Given this, the temporal interpretation of a subordinate clause is not dependent on the utterance situation. As is expected, it is precisely these cases which have been considered as exceptions to the generalization that tenses are context-sensitive by those frameworks which treat tenses as referential. Such cases do not represent instances of indexical tenses. Cases of indirect speech reports that follow the parallel-tense pattern also (trivially) fall under the generalization made in the preceding paragraph, that the tense-relation is an integral part of the proposition that is being reported.

In this context we can also resolve the problems associated with the so-called "Sequence of Tense" phenomena in English. The solution that falls out from our analysis basically parallels the views of traditional grammar on these matters, contra Enç (1987). That is, some apparent (surface-) past-tense forms are due to a low-level agreement process which we call Fast Harmony, following C.L. Baker (1989). This process is limited to tense-forms embedded under morphological past-tense forms in cases of Parallel tense patterns. Both the sequence of tense phenomena with Serial tense and the Double access readings with Parallel tense serve as test
cases which allow us to evaluate our proposal against those Enç (1987), Hornstein (1990b), and Ogihara (1989).

On the basis of this we demonstrate the conclusion that our analysis is not only simpler and more economical, but also superior to existing alternatives.

This said, let us now begin with our journey through time.
Chapter One: General Background and Assumptions

Section 1: Time

Since this thesis is concerned with how time enters into natural language, as outlined in the preceding Introduction, it is both necessary and useful to start out with some preliminary thoughts on what we understand time to be here. Every account of temporal phenomena in language includes certain implicit or explicit assumptions about the nature of time. In the analysis to be presented in this thesis, these assumptions can be kept to a minimum, in accordance with our general contention that time enters into language only very indirectly. In other words, it does not matter so much for our analysis of temporal phenomena in language what time really is in the physical world, so long as it is compatible with our assumptions.

In theories that attempt to explain the nature of the objective reality of the world surrounding us, time is often regarded as a fourth dimension, on a par, more or less, with the three spatial dimensions. While no doubt this must be regarded as a gross oversimplification in the context of those theories of physics which are concerned with time more specifically, it will prove more than adequate for our purposes. On such a view, time is characterized at once as having three intrinsic properties: it is linear, it is unbounded (i.e., has infinite duration), and it is divisible in infinitely many
ways into infinitely many segments. It follows from all this that time can be represented as an infinite straight line.

The view of time as the fourth dimension can be assumed for concreteness, although it goes beyond what is required by the analysis of temporal linguistic phenomena presented in later parts of this thesis. The only assumptions we really need to make regarding the nature of physical time is that it is linear, and to a much lesser degree of importance, that it is divisible into segments. Time's infinite duration, on the other hand, has little relevance to the present account. Finally, as is common in the literature on time in language, we will represent time simply as a segment of a straight line, the left side of which is understood as being temporally earlier than the right side, as shown in (1).

(1) \[ \text{Past} \quad \text{Present} \quad \text{Future} \]

This choice of representation is arbitrary, to some degree, though it will do for our purposes.¹

¹ Note, incidentally, that there are two distinct ways in which people conceptualize time. One is the "moving time" metaphor, according to which time flows by a stationary observer. That is, time comes out of the future, passes by the experiencer, and disappears in the past. Alternatively, on the "moving ego" metaphor, time is stationary and the experiencer conceives of himself as marching through time, from the past towards the future. While this observation is an old one, credit for pointing out its linguistic significance is given to the Lectures on Deixis by Charles Fillmore (1971) (University of California at Santa Cruz) by H. Clark (1973), Feagans (1974), and others. Both metaphors are found in English (and many other languages): Examples consistent with the moving time view include the following years, as time goes by or time marches on, etc. As for the alternative, consider for instance such moving ego metaphors as the years ahead, the days to come, marching through the years, and so on. Feagans (1974) reports (p. 143) that of thirty adult non-linguists tested twenty-seven used the moving ego metaphor for conceptualizing time.
In this context, we may also point out in passing that more generally human beings appear to be very badly equipped for dealing with time, as it is inaccessible to the five primary senses. Therefore, our experience of time is indirect for the most part, mediated by the observation of events. A piece of circumstantial evidence for this derives from the fact just noted, that we tend to conceive time as directional. For it is clear upon reflection that the temporal dimension itself is no more directional than any of the spatial dimensions. However, the events by which we experience time are directional, as we will see in Section 1.1 of Chapter Two below, proceeding invariably from the beginning towards the end. Thus the apparent directionality of time, I submit, results not from the entity perceived, but from the particular means which facilitate the perception of time. The directionality of events is projected onto the temporal dimension itself.

In sum, the notion of time as it will be relevant to this thesis is rather minimalist. As noted, the only assumption which is crucial here is that time is linear and divisible. It matters not whether it is also infinite or directional, etc. We may call this minimalist conception of time "linguistic time", though it must be noted carefully that this term is one of convenience only; in particular, it should not be understood as implying that time as it enters into language is somehow different from physical time more generally. Thus we should accept this term as a kind of shorthand only, for that particular cluster of properties of time that are relevant to the grammar, and at the exclusion of other properties which might be relevant to, and will have to be explained by, a theory of time in physics. The usefulness of the notion of linguistic time thus stems only from the fact that it allows us to talk about time in manner that leaves a number of is-
sues pertaining to the nature of time out of the discussion. After all, if we examine the modes of interaction of time and grammar, our main focus of interest lies on grammar, not on time. It is in regard to the former that we will make certain claims; concerning the latter, it will suffice to make the assumptions stated above, which are noncontroversial.

1.1 Time in Language

Taking the minimalist notion of (linguistic) time of the preceding Section as given, we can now turn to the question of how time enters into language and grammar. It goes without saying that we are here interested exclusively in those aspects of the connection between time and events that pertain to linguistic competence. Questions of performance, including questions of how language is processed in time, are entirely outside the scope of this study.

Superficially, we distinguish two ways in which time enters into language. The first and more obvious way is via certain lexical expressions whose meaning explicitly belongs to time, as illustrated by the underlined expressions in (2).

(2) a) John arrived on Monday.
   b) Mary left yesterday.
   c) She'll be ready in five minutes.
   d) It took Sam two years to write his thesis.
   e) He hesitated for a moment.

The second way in which time enters into language, perhaps less obvious, concerns certain functional elements such as the tenses and the temporal connectives, as illustrated in (3) below.

(3) a) John arrived.
    b) Mary will leave.
c) The fire started **after** the explosion.
d) Sam had the measles **when** he was a child.

These differ from the above in several respects. For instance, the lexical temporal expressions form an open class of expressions whose members differ from one another in more or less arbitrary and idiosyncratic ways, whereas the functional expressions form a closed class whose members divide up the relevant semantic domain in a highly systematic manner. To the former we can easily add further expressions without affecting the meanings of the others; with the latter, this is not possible, since the meaning in large part derives from opposition with other expressions in the same semantic field. The former are **content words** and the latter, **function words**; or in the terminology of Fillmore (1971), the lexical temporal expressions illustrated in (2) above are part of the major category lexicon which includes nouns, adjectives and verbs, whereas the functional expressions (temporal and otherwise) form the minor category lexicon which comprises the "little words" such as determiners, pronouns, etc., i.e. the non-logical constants of model-theoretic semantics.

In the following we will be concerned almost exclusively with the functional expressions pertaining to time, and in particular, with tense. The reason for this is transparent: they represent the nuts and bolts of the grammar of temporal reference, and their occurrence is not so much determined by what a speaker wants to say as by how he can say it. The lexical expressions of time, in contrast, will be mentioned only in passing where the occasion or need requires it.
1.2 Time as a Mass-Concept:

Besides the ones already mentioned, time has a certain linguistic property that deserves special mention here, one which has been overlooked in virtually all of the literature on time and temporal phenomena in language. Specifically this concerns the fact that time must be classified linguistically as a mass term; in this sense, time is like water or wine, etc. Like these, time typically requires a measure phrase of some sort, for instance, which may account for the overwhelming prominence of units of measurements in the human conceptualization of time. Indeed, the vast majority of temporal expressions in the vocabularies of human languages constitute units of measurement for time, as is the case for expressions such as year, month, day, minute, and so on. These, however, are temporal expressions only in a very indirect sense; by way of analogy, the relation of the expression hour to time is like that of the expression gallon to water.

In the case of time we have a definite tendency to take the units by which we measure time for time itself, as when we think of days and years as time, rather than units of measurement for time. The same occurs with other mass concepts to some degree, such as when we ask the gas station attendant for ten gallons when what we really want is gasoline, or when we order another bottle in lieu of some more wine. In all such cases, we take the unit by which we measure or count for the substance measured or counted. This tendency notwithstanding, it is of course clear upon reflection that the two ought not to be confused.

Aside from measure phrases, we get additional support for the conclusion that time is a mass term from the fact that it is quantified by much and little, as opposed to many and few. More generally, it cannot be counted, and like all mass
terms, it does not readily admit of a plural from. As with any mass term, however, it is fairly easy to derive a corresponding count term. For example, *beer* is basically a mass noun, though it readily turns into a count term such as *two beers*; as is well known, we refer in this case to measured quantities of beer (*can(ful)*s, *bottle(ful)*s, *pitcher(ful)*s, pints, etc.), or to kinds of beer (*Budweiser*, *Ale*, *Guinness*, etc.).

Something similar can be done with time: there exists a plural count noun *times*, and we can count *one time* (i.e. *once*), *two times* (i.e. *twice*), *three times*, *many times*, etc. Observe, however, that we are thereby no longer referring to (segments of) the temporal dimension. What we count in these cases is not time, but rather *occasions*, such as occurrences of events. That is, what we quantify when we count *times* is not time, but *frequency*. Again, the two are not to be confused, as they are not the same. Thus, even if it is true that I sleep once a day, if I sleep for two days, it does not follow that I slept twice.

Equally importantly, we must realize that the English language is somewhat exceptional in this respect; most other languages do not express the (mass) concept of time (as it pertains to the temporal dimension) and the (count) concept of occasion or frequency of occurrence in terms of related lexical items. Thus in Spanish we have to distinguish *tiempo* from *vez*, respectively; in German, *Zeit*, from *Mal*; and in French, *temps*, from *fois*. Similar lexical distinctions are found in Chinese, Arabic, Japanese, Hindi, Bengali, and a host of other languages.²

² Thanks go, respectively, to Lisa Cheng, Hamida Demirdache, Kumiko Murasugi, and Utpal Lahiri (twice).
The importance of the distinction between mass time and count times should not be underestimated. Oftentimes, it appears to be blurred in the literature. The discussion in Par-tee (1973, 1984) of the apparent similarities of reference to time with (pro)nominal (co-)reference of nominal arguments provides a case in point; if one attempts to translate these articles into any of the languages mentioned in the preceding paragraph, the corresponding words for occasion or even event make for much more appropriate translations than the words for time. We will return to this in the context of the discussion of the referential analysis of tense, in Chapter Four, Section 2, below.

Finally, it should also be noted that the fact that linguistically time is a mass concept, as well as the concomitant distinction between time and frequency of occurrence, bears primarily on the lexical temporal expressions. In contrast, with the functional elements pertaining to the domain of time no similar distinction arises, nor does it seem relevant that time is a mass concept. We may take this as a preliminary indication of the correctness of the conclusion at the end of this thesis, that these functional elements do not refer to time, but to ordering relations obtaining between events.

1.3 Summary

Summarizing our brief discussion of the notion time, we assume that time is linear; that it is divisible into segments; and that we can represent it as a straight line. We also suggested in passing that the human experience of time is mediated by events, perhaps exclusively so, and that the apparent directionality of time as perceived by humans, which does not appear to follow from any of time's physical proper-
ties, may well be a result of this, given that events are inherently directional. Subsequently, in Section 1.1, we distinguished lexical expressions with temporal meanings from certain functional elements such as tenses and temporal connectives. And finally, in Section 1.2, we noted that linguistically time is a mass concept, to be distinguished from the perhaps related concept of frequency of occurrence, which is basically atemporal. As we also noted, many of the lexical temporal expressions in fact denote measure phrases for time, rather than time itself.
Section 2: Events and the Event Hypothesis
2.0 Introduction

Having clarified in Section 1 above the notion of time as it will be relevant here we now turn to the notion of event, some general aspects of which will be discussed in 2.1 hereafter. Following this, 2.2 will present an introduction to the Event-Hypothesis of Davidson (1967a), as set forth by Higginbotham (1985), and we will discuss some of the reasons that motivate this view. Section 2.3, next, explores extensions of the Event-Hypothesis in two areas. The first of these concerns the extension of the analysis to non-action sentences, which is widely assumed in the literature. The second extension of the Event-Hypothesis, which is perhaps somewhat more controversial, pertains to sentences whose main predicate is of a category other than verbs. In both areas we argue that (some of) the exact same considerations which motivated Davidson's original proposal apply as well. Afterwards, in 2.4, we will examine how E-positions are satisfied. And 2.5 subsequently discussed and rejects the Neo-Davidsonian view. Finally, summary and conclusions follow in 2.6.

2.1 Events

In his Outline of Philosophy, Russell (1927) suggested that events are the "stuff" from which the world is made up. On the view advanced there, an event is "something having a small finite duration and a small finite extension in space". Such an event may or may not be complex, and if it is, then it has a finite number of parts which are again events having small finite extension in space and time. Events which are

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3 Chapter XXVI "Events, Matter, and Mind", p. 287 ff.
not complex are "minimal events" and these, too, occupy a small finite region of space and time.

Evidently, events in this sense are entities of the physical world, in the same sense in which time and space also pertain to the objective world. To be feasible for our purposes, the notion of an event needs to be restricted considerably, of course, since we are not so much concerned with objective reality here as with the human conception of it (and in particular, as it relates to language). Specifically, we need to relativize the notion of event to a particular linguistic description. Suppose for example that John was a witness to a certain event the other day, which he describes to Bill as in (4)a), and to Mary as in (4)b).

(4) a) A crowd of people blocked traffic in front of Government Center.
    b) A crowd of people demonstrated in front of Government Center.

By assumption, John reports the same objective event in both cases, viz. a rally in downtown Boston. Yet it is clear that in some sense the sentences above are about different events: one is about a "traffic-blocking" event, the other about a "demonstration". And it is also clear that we want to be able to say that the two sentences represent two different events: for they differ not only with respect to the description supplied by the main predicate (block vs. demonstrate), but also with respect to a number of additional linguistic properties, such as the number of participants and the thematic relationships of the participants to the event, etc. etc.

When relativized to human conception and linguistic description, as suggested, the notion of event becomes rather like that of a snapshot. This notion, too, is relative to a certain mode of conception, i.e. in this case, perception by with a camera; and it, too, requires a certain medium by
which the perception can be expressed, viz. the photographic film or paper which conveys an event. Thus, it is not licit, in my judgment, to say, What a snapshot! if we are looking at a real-life situation in which, say, a dog is chasing the mailman;4 however, if we are looking at a photograph of that very same situation, this comment would certainly be appropriate. Similarly, there is no point to talking about events in the context of linguistic theory unless that notion is understood as relative to the peculiarities of the human mode of conceiving them, and the particular medium by which they are conveyed to other humans, viz. a linguistic description of it in the form of a sentence or noun phrase.

Given these considerations, I will assume that the notion of event as it pertains to the present inquiry refers to a more or less continuous and contiguous space-time region surrounding certain entities, and including their properties and the relations between them, as conceptualized by humans and, where necessary, under a certain linguistic description. Events in this sense are regarded as individuals, and we refer to them as such in language, for instance by means of event nominals such as demonstration, etc.

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4 Ken Hale (p.c.) has reminded me that this exclamation is appropriate in the given situation if it is understood in the sense of a potential snapshot, in which case there is no photographic medium required. This is of course not what is intended here; the intended analogy is between actual events and actual snapshots.
2.2 The Event Hypothesis

2.2.1 Origins: Action Sentences

We owe to Davidson (1967a) the idea that ordinary action sentences (such as the ones in (4) above) implicitly quantify over actions, i.e. certain kind of events. Since action sentences evidently do not provide any overt term denoting the actions described by them, he suggests that the logical forms of such sentences be augmented by a term referring to the action. Thus, for the sentence in (5)a), we get the now well known kind of logical form in b), where the terms \( a \) stands for the event or action of buttering.

\[
\begin{align*}
(5) & \quad \text{a}) \text{John buttered the toast in the kitchen at midnight.} \\
& \quad \text{b}) \ (j,a) \ [\text{butter}(j,t,a) & \text{in.the.kitchen}(a) \\
& & \text{& at.midnight}(a)]
\end{align*}
\]

The Event-Hypothesis, as it has been called because of its perhaps most salient feature, viz. the event-denoting term, has been criticized from various positions and for various reasons. Such criticism notwithstanding, it has been met with great enthusiasm by many philosophers and linguists since its inception, and presently enjoys fairly great popularity especially in the latter circle. But also among philosophers, the Event-Hypothesis is taken seriously, though perhaps for different reasons. At any rate, it is generally considered a viable theory, as is evident from the lively discussion centered around Davidson’s proposal. For an overview of the issues and the various positions taken vis-à-vis them, cf. Bennett (1988).

Perhaps the main reasons why the Event-Hypothesis has been favorably received, especially among linguists, derive from the fact that it provides a rather elegant solution to two problems which have been recognized at least since Kenny (1963). These two problems are variable adicity and an ac-
count of *adverbial modification* of such sentence, and in particular, their attendant entailment relations. We briefly discuss these two points in turn. In addition to a solution to these two problems, which are semantic in nature, Davidson also provides at least one syntactic argument in support of his analysis, which will be reviewed subsequently.  

2.2.2 Variable Adicity

The first advantage of the Event-Hypothesis over at least some of its competitors concerns the fact that on this view a predicate such as the verb *butter* in (5) above can be regarded as having a fixed number of argument positions. This is an advantage, of course, only over those analyses which treat the locative and temporal phrases as arguments of the main predicate, as is the case for example in Case Grammar (cf. Fillmore (1968)), or in traditional predicate logic. For on this kind of a view, *butter* is a four-place predicate in (8) a), but a three-place predicate in b) and c); in d), finally, the predicate is only diadic.

(8) a) John buttered the toast in the kitchen at midnight.

b) John buttered the toast in the kitchen.

c) John buttered the toast at midnight.

d) John buttered the toast.

There are of course other factors which recommend Davidson's proposal, some of which are primarily of conceptual nature, such as the fact that his is an attempt to provide an account of natural language semantics in terms of first-order rather than higher-order logic. Furthermore, the paper also deserves to be taken seriously as an account of action sentences, as its title indicates, which topic is of concern mainly in the philosophy of language. In the following we will only be concerned with the two points mentioned in the text. For further details, I refer to Davidson's original paper.
On Davidson's (1987a) event-theory, by contrast, the verb *to butter* is a invariably a two-place predicate, as the temporal and locative phrases are not analyzed as arguments of the main verb, but rather as predicates of the event, as the logical form in (5) b) above illustrates. (6) a) through d) thus differ only in the number of conjuncts in the logical forms of the respective sentences; the number of arguments of the main predicate *butter*, however, is the same in all cases. (Cf. also the logical forms in (7) below.)

2.2.3 Adverb-Dropping Entailments

The second advantage is actually one of the nicest features of Davidson's theory. It pertains to the fact that adverbially modified sentences always seem to entail the simple sentences without the modifiers that represent the "core meaning" of the modified sentences. Thus in the examples

More correctly, butter is of course a triadic predicate on Davidson's view, including the event position.

The generalization that (the truth of) an adverbially modified sentence entails the (truth of) the "core sentence" without the modifier holds for all adverbials with which we will be concerned here; in particular, it holds for temporal and locative modifiers.

To be more precise, the above generalization is true only for downward entailing (on this notion, cf. Ladusaw (1979), etc.) adverbials, i.e. cases where the extension of an adverbially modified predicate is smaller than, or the same as, the extension of the unmodified predicate. Such is the case, for instance, for walk slowly as compared to walk, and truly sorry vs. sorry, leave in the morning vs. leave, etc. However, the generalization does not hold for upward entailing adverbs, i.e. cases where the extension of an adverbially modified predicate is larger than the extension of the unmodified predicate. This includes the modal (or epistemic or evidential) adverbs possibly, allegedly, never, etc. For discussion, cf. eg. Bennett (1988) (Ch. XI) and references cited there. For a taxonomy of adverbials along these lines, though in the context of an alternative theory of adverbial modification,
given in (8) above, the truth or falsehood of sentence a) entails the truth or falsehood of the sentences in b), c) and d). Similarly, the sentences in b) and c) both entail d). These "adverb-dropping" entailments, as they are sometimes called, were discussed for the first time, I believe, in Kechenbach (1947), Section 53.

On Davidson's analysis, such inferences are captured straightforwardly on the basis of an elementary logical principle which holds that if \( P \land Q \) is true, then so is \( P \). The logical forms in (7) below illustrate this for the sentences in (6) a) through d) above.

(7) a) \[ \text{butter}(j,t;g) \land \text{in.the.kitchen}(g) \]
& \[ \text{at.midnight}(g) \]

b) \[ \text{butter}(j,t;g) \land \text{in.the.kitchen}(g) \]

c) \[ \text{butter}(j,t;g) \land \text{at.midnight}(g) \]

d) \[ \text{butter}(j,t;g) \]

The analysis in terms of events thus yields the correct entailments of the sort that if John buttered the toast in the kitchen, then John buttered the toast.

2.2.4 Pronominal Coreference

On the view advocated by Davidson (1967a), the event-denoting terms in action sentences refer to actions (or events) in pretty much the same way as explicit arguments refer to other kinds of objects. Like the latter, so he argues, the former can be referred to anaphorically by means of pronominals, as illustrated by the following examples (taken from Geis (1975a)). This, in essence, constitutes Davidson's argument from syntax in favor of the event analysis.

\[ \text{cf. Clark (1970).} \]
(8)   a) I bought a house
      --it is downtown and it has four bedrooms.

       b) John stumbled
          --he did it in the park and he did it at noon.

What the it refers to in (8)b is the event (or action) of stumbling, which satisfies Davidson's special event-argument position in the action-verb stumble, just like in the case of (8)a. it co-refers with the object of buy, viz. house.

Unfortunately, however, the parallelism between event-arguments and regular NP arguments is not as perfect as it should be for the argument to be entirely convincing. Firstly, elements other than arguments can be referred to by means of subsequent pronominals, as our examples in (9) demonstrate. For instance, the NP a box inside the locative adverbial in a) makes a perfectly suitable antecedent for the later pronoun it. Likewise in b), which is perhaps somewhat less than perfect, it (or better yet that) can refer to the color denoted by the adjective red.

(9)   a) John found the money in a box.
      It was hidden under the bed.

       b) Mary is wearing a red blouse.
          It is also the color of her shoes.

Secondly, as Geis (1975a) points out, it behaves rather differently in (8)b), where it is coreferent with the event, as compared to (8)a), where it corefers with the object argument. For it is normally the case that anaphoric pronouns appear in plural form when they have plural antecedents, which is transparently true for the conjunction of object-arguments in (10)a). The same is not true, however, for conjunctions of events, as (10)b) shows. Even though we are obviously dealing with two stumblings here, the pronouns dependent on events do not admit of a plural form.
(10)  a) I bought a house and Mary bought a house — they are both downtown and they both have four bedrooms.

          b) *John stumbled and Bill stumbled — they did them in the park and they did them at noon.

The conclusion Geis suggest, following Ross (1972), is that the it in (8)b), unlike that in (8)a), is the expletive object it found in (11), for example, which, like its subject counterpart in (12), does not admit of plural forms either. 8

(11)  a) John hates it [that Joe married Sue]

          b) *John hates them [that [Joe married Sue] and [Bill married Mary]]

(12)  a) it seems [that Joe married Sue]

          b) *they seem [that Joe married Sue] and [that Bill married Mary]

However, Geis' suggestion that event-it is really the same as expletive it is clearly wrong in view of the fact that it occurs above in what appears to be thematic position. For the predicate do in the object position of which it oc-

8 Howard Lasnik (p.c.) has pointed out to me that pronominal coreference is not the only phenomenon where plurals are impossible, contra all logical expectations. Another such case is provided by subject-verb agreement in examples such as (i) below. Here, too, we are obviously looking at two incidents, each of which is unfortunate; even so, the plural is impossible.

(i) [that [John stumbled] and [Mary fell]] is/*are unfortunate

Furthermore, note also that the two clauses in the subject position of (i) denote a fact, rather than events, as the difference in meaning between the two sentences in (ii) illustrates.

(ii) a) Mary's fall was unfortunate = [that M. fell] was unfortunate

          b) Mary's fall was slow, thanks to the parachute ≠ ?*[that M. fell] was slow, thanks to the parachute

As noted in Bennett (1988) (Chapter II), and elsewhere, it is a more general property of facts that they invariably occur in the singular.
curs is clearly the main verb do, and not the homophonous auxiliary. This becomes obvious when we turn the second sentence of (8)b into a question; witness (13), where auxiliary and main verb do co-occur.

(13) did he do it in the park? did he do it at noon?

Furthermore, Jim Higginbotham (p.c.) has reminded me that the impossibility of plural pronominal anaphora carries over to the "naked infinitive" complements of perception verbs, as discussed in Higginbotham (1983a). These are obviously thematic, and hence cannot be analyzed as expletive, as evidenced by the unacceptability of plural them referring to the two events of stumbling and falling in (14)b).

(14) a) I saw John stumble, but you didn't see it.
   b) I saw John stumble and Mary fall, but you didn't see it/∗∗them.

Finally, in the light of (15) below, it also does not seem to be correct to generalize the impossibility of plural pronouns referring to events to a universal prohibition against plurals referring to events. For as c) below demonstrates, under identical conditions the plural is required with the anaphoric epithet, in contrast to anaphoric pronouns, whether personal or demonstrative, in a) and b).

(15) John shouted obscenities and Bill gestured rudely.
   a) They did { it / ∗them } without any apparent reasons.
   b) { this / ∗these }
   c) { ∗this thing / these things }

Given this, it looks rather as though the fact observed by Geis (1975a) is a fact about pronouns, rather than events. Jim Higginbotham has suggested (p.c.) that the relevant constraint is that the plural pronoun they/them can only take NPs as antecedents. In this case, given that the event argument in (10)b) is not expressed overtly, the ungrammaticality of this sentence follows automatically.

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What seems to be at the core of the phenomenon here is **descriptive content**. That is to say, the correct generalization appears to be that it is the only NP which can be anaphoric in the total absence of any descriptive content. Plural *they*, in particular, requires descriptive content in its antecedent when it is used anaphorically. Other plural anaphora, such as the epithet in (15) c) above, have to provide at least a vestige of descriptive content in case none is provided by their antecedents; hence the well-formedness of (15)c).

The same point can be recast in slightly different terms in the generalization that pronominal anaphora generally seems to require the sharing of certain *Φ-features* (such as person, gender, number, etc.) of antecedent and anaphor. That is, a pronoun needs to agree with its antecedent in terms of these features. If the antecedent has no *Φ-features*, as is presumably the case where the antecedent is a sentence (with extraposition, for instance) or an implicit event-argument (as in the cases under discussion), pronominal coreference is severely restricted. In these cases, only the pronoun *it*, which is least marked in terms of *Φ-features* on any view, can occur.

The generalization above seems to be corroborated by the following two sets of examples. In (16), first, the verb *argue* has no descriptive content and no *Φ-features* in respect to which an anaphoric pronoun can agree with it, as it is the main predicate not of a nominal description, but of a proposition. Thus it is not possible, as shown in a), to refer to the two events of *arguing* with a plural pronoun. Singular (or perhaps better: unmarked) *it*, on the other hand, is acceptable, as b) indicates.
(18) John argued with Mary and Bill argued with Sue.
   a) * They were about money.
   b) It was about money.
   c) The arguments were about money.
   d) * The argument was about money.
   e) In both cases, the argument was about money.

By contrast, reference to the events of arguing takes the expected plural form as soon as we have some descriptive content, as the well-formedness of c) and the unacceptability of d) demonstrate.\(^9\) Here the anaphoric epithets supply their own \(\Phi\)-features and are not subject to the agreement-requirement for pronouns.\(^10\) Hence they can be either plural or singular as in c) and e), respectively, provided that the discourse remains coherent. If this is correct, then a) is out for a different reason than d): in the former we have a violation of a grammatical requirement of agreement between antecedent and pronoun while in the latter case we would have a violation of Gricean maxims of conversation, since the sentence in d) is incompatible with the state of affairs reported in the first sentence of (16).

Contrasting with the behavior of anaphoric NPs in (16), where the antecedent is implicit the event-argument, we find no difference between anaphoric descriptions and anaphoric

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\(^9\) Sentence d) is acceptable in this context on a reading of the first sentence in (16) according to which there is one big argument that is fought pairwise. This is of course not the intended reading here, as we are interested in the plurality of independent arguments.

Note also, incidentally, that reference to the event is independent of the description to some extent, since the same facts obtain when we replace arguments and argument with quarrels and quarrel, respectively.

\(^10\) I hope it is clear here that the relevant notion of grammatical agreement as required for pronouns must go beyond simple co-indexing, or having the same referent".
pronouns in (17) below, where the antecedent is a regular
NP. For both, only the plural forms in a) and c) are licit.11

(17) John had an argument with Mary and Bill had an argument
with Sue.
   a) They were about money.
   b) * It was about money.
   c) The arguments were about money.
   d) * The argument was about money.

Finally, the contrast between the following two sets of
examples also appears to corroborate the view that an account
of the irregularities found with pronominal anaphora which
form the basis of Geis’ objection to Davidson’s argument is
incumbent on an analysis of it (or of pronominal agreement
more generally), rather than on the event-hypothesis. Thus
both, which is also not subject to Φ-feature agreement under
coreference, behaves like epithets, rather than pronouns.12
It contrasts in this respect with both of them, where the
pronoun is subject to the usual constraints.

(18) John argued with Mary and Bill argued with Sue.
   a) Both were about money.
   b) * Both of them were about money.
   c) Both (of the) arguments were about money.

11 Again we want to exclude the “big argument” interpre-
tation mentioned in the preceding footnote.
Note also that the NP an argument in (17) is not the
event-argument of its sentence, but rather a regular object-
argument of have. The relevant event here is one of having,
not of arguing. Suppose that John has been at odds with Mary
for some time, and that he is expecting for them to have a
quarrel sooner or later. In this situation it is still possi-
ble to say (i) without contradiction.
   (i) John had a big argument with Mary at the party
   last night. It came totally unexpected to him.
What the sentence asserts to be unexpected here is the having
of an argument (at the party last night), not the argument
itself, which John had indeed been expecting. Cf. Section
2.4.3 below.

12 Thanks go to Jim Higginbotham (p.c) for bringing
such cases to my attention.
(19) John had an argument with Mary and Bill had an argument with Sue.
   a) Both were about money.
   b) Both of them were about money.
   c) Both (of the) arguments were about money.

In sum, implicit event-arguments as antecedents of referentially dependent NPs differ from regular NP-antecedents in the following manner: The normal pattern for regular NPs is that first mention is made by means of an indefinite description, and later mentions, by means of either a definite description or a definite pronoun, there generally being no difference between the two cases.13 Here, any appropriate pronoun is licit as a second mention because the NP of first mention is itself a (indefinite) description which supplies the requisite Φ-features. On the other hand, the normal first mention of an event happens by means of a sentence, which gives it no descriptive content, and which does not provide the Φ-features required for pronominal coreference (except with it). The second mention then must supply a description, which is why pronouns are licensed only for third and subsequent mentions. Thus, the generalization that covers all cases is that pronouns presuppose Φ-features in their antecedents, the only exception to this being the default pronoun it. This means, then, that implicit event-arguments lack Φ-features accessible to anaphoric agreement. The same explanation carries over to the lack of subject-verb agreement noted in footnote 8 above.

13 This pattern is described in detail in Heim (1982), where it is analyzed in terms of a theory of "file-change semantics". Note that here as well as with reference to events, subsequent mentions via non-pronominal NPs are independent of the particular description used in any prior mention. That is, anaphoric dependency is preserved even if the description changes, as shown in (i):

   (i) John met a Swede. He fell in love with the girl.
Given the above consideration, we conclude that the data discussed by Geis (1975a), as well as other differences in anaphoric dependency between events and regular NPs do not provide any strong reasons for rejecting Davidson's (1967a) syntactic argument for an event-position, although we readily concede that the data from pronominal anaphora to implicit events are perhaps the weakest of the arguments presented by Davidson. More generally, we note in closing that the problems for an adequate analysis of *it* goes far beyond the cases touched upon in this Section. For further discussion on this topic, I refer in particular to Morgan (1968), Geis (1975a), (1975b), and references cited there. Without going into particulars, it seems that the account in terms of Φ-feature agreement suggested above offers the most promising possibilities for a unified analysis of *it*. In fact, the expletive pronouns discussed in the sources mentioned (and elsewhere) are also subsumed under the above generalization: Since the clauses that are co-indexed with expletives also lack Φ-features, they cannot be referred to by pronouns other than unspecified *it*. The same constraints thus apply to event-*it* in (15a) and (16b) as well as to expletive *it* in (11) and (12). Also covered by the same constraints is event-*this* and -*that* in examples such as (15b), which behaves like *it*, and unlike referentially dependent descriptions.14

2.2.5 Summary

In this section, we traced the origins of the Event-Hypothesis as part of an explanatory theory of linguistic phenomena. We started out in Section 2.2.1, with Davidson's original proposal for an analysis of action-sentences, and we

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14 These constraints do not cover deictic *this* and *that*, of course, nor deictic pronouns more generally.
subsequently examined its merits in various areas. **Section 2.2.2** then briefly touched on the problem of variable adicity, which Davidson's analysis avoids rather elegantly. Next, **Section 2.2.3** pointed out the virtues of the Davidsonian event-position for an account of adverbial modification and the concomitant problem associated with adverb-dropping inferences. Finally, in **Section 2.2.4** we examined Davidson's more syntactically oriented argument for an Event-position, arising from pronominal anaphora on events, and dealt with various problems associated with this argument. Most prominent among them is the objection raised by Geis (1975a), that only the singular pronominal *it* can be used under coreference to an event; the corresponding plural form yields unacceptably results, in particular, for conjoined events. However, the fact that anaphoric NPs containing *Φ*-features, including epithets, behave differently from anaphoric *it* in this respect seems to indicate that Geis' observation concerns the nature of *it* and pronominal anaphora more generally, rather than the nature of events.

**2.3 Extensions of the Event Hypothesis**

**2.3.1 Non-Action Sentences**

Linguists and Philosophers alike were quick to point out that the problems associated with variable adicity and entailments in adverbially modified sentences make no distinction between active and stative sentences (cf. Clark (1970), Geis (1975a, b), etc.) This is illustrated by examples of the following kind:

(20) a) John knew the answer.
    b) John knew the answer last week.

(21) a) John was in Boston.
    b) John was in Boston repeatedly.
    c) John was in Boston repeatedly last year.
As with active predicates before, stative (20)b) entails stative a), and (21) b) and c) both entail a); c) also entails b). Not extending Davidson's proposal to include cases such as these would lead to a very curious situation indeed; for in that case, time and place adverbials occurring with statives such as given in (20) and (21) would have to come under a different analysis of modification than those same adverbials when they occur with action predicates, as in (8) earlier. Obviously, such a bifurcation of the explanation of adverbial modification would be highly undesirable, quite aside from the fact that it seems entirely to lack any kind of motivation.

As Bennett (1988) points out (on p.176, crediting David Lewis), even such a timelessly true statement as (22) a) harbors the same kind of entailment, of b). Its logical form must therefore express something like (23), on a Davidsonian view.

(22)  a) This mathematical series converges steadily.  
     b) This mathematical series converges.

(23) for some x: x is a convergence, and x is of this mathematical series, and x is steady  
     (Bennett (1988), p.176)

Similarly, Davidson's syntactic argument based on event-pronominalization, whatever it status may be, carries over to states. What I saw in (24) a) is that John knew the answer; what is obvious in b) is that he was miserable.

(24)  a) John knew the answer --I saw it immediately  
     b) John was miserable --it was obvious

Given these considerations, there appear to be no reasons not to extend Davidson's original proposal for action sentences to stative predicates. In fact, this extension seems un-
avoidable. (For further discussion on this point, cf. Bennett (1988), Ch. XI.) Besides Clark (1970), Geis (1975a,b), and Bennett (1988), the same conclusion is reached by Higginbotham (1985), Barwise & Perry (1983), and others. Disregarding terminological differences, the idea that the analysis based on a Davidsonian argument position be extended to non-active predicates has been widely accepted. More generally, the prevailing sentiment in the literature seems to be that either all predicates have such a position, or else none at all.

2.3.2 Non-Verbal Predicates

Higginbotham (1985) (p. 555) proposes to include Davidson's hidden event-argument in the lexical representations of verbal predicates. Concretely, he suggests (ibid.) that the lexical entry for the verb see as it occurs, for example, in a sentence such as (25) a) below is as in c), where the part in angled brackets stands for the thematic grid (cf. Stowell (1981)) of the verb. "The position E corresponds to the 'hidden' argument place for events ..." "The bundle of objects answering to these positions might well be called 'situations, following Barwise & Perry (1983)." (Higginbotham, loc. cit.).

(25)  a) Mary saw John
    b) (ja) see(Mary, John; a)
    c) see, (+V,-N), <1,2;E>

Even though Higginbotham does not discuss such examples, we can reasonably assume that in the progressive sentence in (26) a; below the sentential event position presumably comes from the lexical entry of the verb, which is as illustrated in c). (We can ignore tense and progressive form for the moment).
(28)  a) John was running  
b) (ja) run(John; a)  
c) run, (+V, -N), <1; E>

That is, the copula be in (28)a) above does not seem to make a contribution to the event structure of the sentence.

The question this raises now is where the event position comes from in the following sentence, which is like (28)a) above, except for the fact that the main predicate is not a (present participial) verb form, but rather an adjective. To the extent that we are justified in assuming that this sentence picks out an event --which assumption can be justified on the same grounds as is the case for sentences with verbal predicates-- and assuming further that the role of the copula in (27) is the same as in (26), we are led to conclude that the event position stems from the lexical entry of the adjective happy, which must then have the form given in c).

(27)  a) John was [happy]  
b) (ja) happy(John; a)  
c) happy, (+V, +N), <1; E>

The assumption that the event-position in (26)b) and (27)b) derives from the main predicate rather than the copula be is further supported by the fact that parallel cases can be found in Small Clauses, where no copula is present. Thus, the interpretation of the Small Clause complement in (28)a) is the same as that of (27)a); the logical form of the Small Clause must therefore be the same as (27)b). Moreover, the adverbial in (28)b) clearly modifies the complement, not the matrix clause, and if is to fall under a Davidsonian analysis of modification, then the Small Clause must contain an E-position. Finally, pronominal reference to the event picked out by the Small Clause is also possible in the usual manner, as evidenced by c), where it refers back to John's being happy.
(28)  a)  I thought [ John happy ]  
     b)  I thought [ John happy in New York ]  
     c)  It shows in his face

We are justified, therefore, in ignoring the role of the auxiliary verb *be* in these cases. It contributes nothing to the logical forms of the examples.

Basically the same argument can be made for the predicate nominal in (29) and the predicate PP in (30). In both instances, parity of reasoning dictates the assumption that the main event position of the sentence derives from the predicate NP or PP, and ultimately from the lexical heads of the respective projections. The structure of the predicate-nominal sentence in (29)a), first, is thus exactly parallel to (28) and (27) above.

(29)  a)  John was [a champion]  
       b)  (je) champion(John; e)  
       c)  champion, (-V,+N), <1;E>

Finally, sentences whose main predicates are PPs, such as (30) a) below, also receive a parallel analysis, as in b).

(30)  a)  John was [in the park]  
       b)  (}a) in.the.park(John; e)

What is rendered above in terms of the unanalyzed complex PP predicate *in the park* is more appropriately analyzed as in (31) a) below. As this makes clear, the main predicate of

15 Howard Lasnik has called my attention to the fact that (28) b) admits of a reading on which it does not entail a). This is of course not the intended interpretation. In spite of this, the point made in the text still holds on the intended reading, as is made clear by the entailment of (ii) below by (i), which also lacks a copula.

(i)  I knew/thought [ John happily/safely in Hawaii ]  
(ii)  I knew/thought [ John in Hawaii ]
(30) a) above is really the preposition in, which must have the thematic grid shown in (31) b).

(31) a) (3\{a\}) in(John, the.park; a)
b) in, (-V,-N), <1,2;E>

Further support for assuming that the thematic grids of prepositions include E-positions, too, derives from examples such as (32), in which bare prepositions are the main predicates.18

(32) a) John is in. (= At home, or in the office)
b) Mary is out. (She went out)
c) Bill is over. (He came over a while ago)
d) Functional projections are in. (= in fashion)
e) Disco is out. (= passé)
f) F. was out for two hours after drinking too much.
g) The game is on/over.
h) Sue is down. (= depressed)
i) The system is down. (= shut down, inoperative)
j) The end is near.

It should be noted here that the E-position of the preposition in in (31)b) is to be distinguished from the position predicated of the main event in standard Davidsonian sentences such as (33) below. Rather, the position marked by a in (33)b) below corresponds to the regular subject position 1 of the in-relation in (31)b), which is filled by John in (31)a). Thus, what is in the mirror in (33)a) is neither John nor Mary, but simply the event of John's seeing Mary, just as in (31)a) above it is John who is in the park. The only difference between the two is that in the latter case the object of which the property of being in the park is predicated is a person, whereas in the former, it is an

18 I am indebted to Ken Hale for pointing out this class of examples.
It is likely that many of the examples in (32) contain additional arguments that are not represented explicitly.
event. The E-position of \textit{in} is omitted from the representation in (33)b).\textsuperscript{17}

(33) \hspace{1cm} a) John saw Mary in the mirror  
\hspace{1cm} \hspace{1cm} b) (\textit{ja}) see(John, Mary; \textit{a}) \& in(\textit{a}, the.mirror)

2.3.3 Summary

In this Section, we briefly examined a number of extensions of the Event-Hypothesis of Davidson (1967a) in contexts other than action sentences. The first part, in Sub-section 2.3.1, concerned sentences with stative predicates; with respect to these, it is widely assumed that they, too, have event-positions. Subsequently, in Sub-section 2.3.2, we considered some more controversial cases of sentences with non-verbal main predicates. Regarding these, I argued that the very same reasons that motivate an E-position for action sentences argue for E-positions in these cases. In particular, to the extent that the Event-Hypothesis makes for a plausible analysis of adverbial modification, it does so in all cases, and regardless of the categorial nature of the main predicate. The alternative, that it is the copula which supplies the event-position, is highly implausible in the light of the fact that Small Clauses behave in essentially the same way as ordinary sentences.

Finally, if we are correct in concluding that all of the major categories (nouns, verbs, adjectives, and prepositions) include E-positions, we might explore an alternative to the assumptions of Higginbotham (1985:555), that the E-positions arise from the thematic grids of lexical entries. Instead, one could argue that they are functionally supplied to lexical-\textsuperscript{17} In order to avoid confusion I will generally omit irrelevant E-positions from logical forms.

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al predicates, perhaps upon insertion in syntactic phrase markers. Making the assumption that an E-position is functionally supplied would eliminate what appears to be a great deal of redundancy from the lexicon. This redundancy arises from the fact that on the view assumed by Higginbotham (1985), the presence of an E-position in the thematic grid must be stored in the lexicon (along with other information) for each single item. But whereas other information contained in thematic grids (such as adicity, thematic roles, linking of roles to argument positions, etc.) varies from one verb to another, there is no such variation in regard to the event position. A further difference between event positions and the other argument positions concerns the fact that the latter are projected (in the sense of X-bar theory) onto subject and object positions in the phrase markers; E-positions, on the other hand, are not syntactically projected. Hence from this perspective, too, the grammar would be simplified by the assumption that predicates are supplied with an E-position upon insertion into phrase markers.

2.4 Saturation of E-Positions

In the discussion of the Event-Hypothesis so far we have been crucially relying on Davidson's observations regarding adverb-dropping entailments and pronominal anaphora as evidence for the presence of an implicit event-argument. We have seen that it makes sense to generalize the proposal of Davidson (1967a) concerning action sentences to all the main predicates of sentences. I will now turn to questions of how E-positions are satisfied.

We begin in 2.4.1 thereafter with the form of satisfaction of event-positions which is universally accepted, viz. binding by a quantificational operator. That is, the E-position

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is filled by a variable which is bound by, and receives its value from, an event-operator. Next, in 2.4.2, we consider cases which will be analyzed as instances of bound-variable anaphora in the sense of Higginbotham (1980), in which the variable filling the E-position is not bound directly by a quantificational operator; instead, I will argue that it is anaphorically dependent on the event of a superordinate sentence. And finally we will consider in 2.4.3 some cases for which it has been argued that the E-position is predicated directly of an overt nominal element in the sentence.

2.4.1 Event Operators

In the unmarked case, as noted above, event-positions are assumed to be satisfied via existential quantification over events, as in Davidson's original example repeated below. What the sentence asserts, then, is that there is some event e in which John butters the toast.

(34)  a) John buttered the toast.
      b) (\(\exists e\)) butter(John, the.toast; e)

Besides existential quantification over events, it has also been suggested in the literature that events may be quantified over universally, as in the second clause of the following example from Higginbotham (1986a). The intended reading here is that I went there before you ever went there; i.e., the event of my going there precedes any and all events of your going there.

(35)  a) (I went there before) you went there.
      b) (\(\exists e\)) [ went there(1;e) &
         \[Ve_; went.there(you;e_) \] [ e before e_; ]

We will return to these examples later on in the context of a discussion of the temporal connectives before and after.
Finally, there also appears to be some kind of equivalent to the definite description operator found with noun phrases, as is suggested by the next example from Partee (1984) (discussed previously in Partee (1973)). Here, existential quantification over events of leaving seems too weak, as the sentence clearly is about a very specific event.\textsuperscript{18} (Incidentally, the operator THE in (38)b), whatever it is, is so named for mnemonic reasons; it is not to be confused with the English definite article.)

(38) a) She left me.
    b) (THE\textsubscript{g}) leave(she, I; g)

\textbf{2.4.2 "Anaphoric Events"}

I will now turn to a set of observations due to Karttunen (1971) which can be interpreted as providing further evidence for the Event-Hypothesis. At the same time, the facts to be discussed in the present sub-section illustrate a kind of relationship between the event positions of verbs which I will call event-dependency.

There exists a class of verbs taking sentential complements which display a rather surprising behavior with respect

\textsuperscript{18} This is of course not the point Partee makes with these examples. For her and most other researchers (eg. Enç (1987), Kearns (1991), etc.) this example and others like it indicates that the time of the event is specific, rather than the event itself. As I mentioned in Section 1.2, this view arises from the confusion of the mass sense of time with the count concept of occasion (ie. event). Thus where these authors say that (36)a) asserts the existence of a definite time at which she left me I say that the sentences asserts the existence of a definite event of her leaving me. The latter view is clearly superior in view of the fact that similar points can be made about place and manner, etc., as we will see later on when we consider Partee’s proposal more closely.
to the kinds of diagnostics we have been using as evidence for the presence of event-arguments. These verbs are called **implicative verbs** by Karttunen (1971). This class of verbs is represented by the examples given in (37) below; contrasting with these are the non-implicative verbs in (38).\(^{19}\)

(37) **Implicative Verbs:** (Karttunen (1971), p. 286)
manage, remember, bother, get, dare, venture, condescend, happen, see fit, be careful, have the misfortune/sense, take the time/opportunity/trouble, take it upon oneself.

(38) **Non-Implicative Verbs:** (Karttunen (1971), p. 286)
agree, decide, want, hope, promise, plan, intend, try, be likely, be eager/ready, have in mind.

The class of implicative predicates is described thus:\(^{20}\)

\(^{19}\) Karttunen (1971) compares the difference between implicative and non-implicative predicates to that of Kiparsky & Kiparsky (1970), between factives and non-factives. Both distinctions apply to complements of verbs, nouns, and adjectives. Both distinctions are non-binary; that is, they allow for verbs to fall in neither classes. However, whereas the latter take tensed complements, the former select infinitivals. Furthermore, whereas factives presuppose the truth of their complements, implicatives imply it (understood in the sense of Austin’s (1962) notion of implication rather than that of a logical implication (entailment) of standard two-valued logic; for discussion, cf. Karttunen (1971), p. 290f). The difference is thus that factive complements are true regardless of whether the matrix is asserted or negated, while implicative complements are implied to be true if the matrix is asserted, and false if the matrix is negated. Credit for the term implicative is given to R. Wall. All page references are to the version reprinted in Petófi & Franck, eds. (1973). Most of the examples in this Section are Karttunen’s, though some appear here in slightly modified form.

\(^{20}\) Karttunen points out (in fn. 3) that whereas non-implicative verbs of English generally have Finnish counterparts of like kind in, some Finnish implicative have non-implicative counter-parts in English. This is not the contradictory statement that it appears to be, since some verbs fall in neither category, as mentioned in the preceding footnote.
(39) "An asserted main sentence with one of [the] verbs [given in (37)] as predicate commits the speaker to an implied proposition which consists of the complement sentence as augmented by the tense and other modifiers of the main sentence. Questioning a sentence with an implicative predicate amounts to questioning that implied proposition. [...] The main sentence can be looked upon as a statement whether this decisive condition is fulfilled ... From an affirmative assertion it can legitimately be inferred that the implied proposition is asserted to be true; from a negative assertion, that it is false." (Karttunen (1971), p. 285)

This is illustrated in the examples in (40), where the truth of the first sentence of each pair implies that of the second.

(40) a) John managed to solve the problem
     ==> John solved the problem

     b) John saw fit to remain silent
     ==> John remained silent

In this respect, the above examples contrast with the ones in (41) below, where the non-implicative verbs do not have such implications associated with them.

(41) a) John hoped to solve the problem
     /=/> John solved the problem

     b) John decided to remain silent
     /=/> John remained silent

As for negation and questioning of an implicative matrix verb, which was mentioned in (39) above, the following examples basically speak for themselves. Thus in (42)a), if the first sentence is true (or false), then so is the second; and in b), an answer to the first sentence necessarily constitutes an answer to the second sentence.

(42) a) John didn't manage to solve the problem
     ==> John didn't solve the problem

     b) Did John manage to solve the problem?
     ==> Did John solve the problem?
Again this is in contrast to the behavior of a non-implicative verb such as hope, as shown in (43). Here, the negation of the matrix clause does not imply negation of the complement clause, as in a), and the first sentence in b) may well be answered differently than the second sentence.

(43)  

a) John didn't hope to solve the problem
     \[\Rightarrow\] John didn't solve the problem

b) Did John hope to solve the problem?
     \[\Rightarrow\] Did John solve the problem?

Turning now to adverbial modification, what I qualified as surprising at the beginning of this section concerns the fact that temporal and locative adverbs occurring in a matrix clause with an implicative predicate also modify the complement clause, as Karttunen observes. Thus, the two sentences cannot be modified by two adverbials which contradict each other when co-occurring in the same sentence. This is illustrated in (44):

(44)  

a) **On the sofa, John managed to sleep in the bed

b) On the sofa, John decided to sleep on the bed

c) **On the sofa, John slept in the bed

By the same token, (45) a) does not just imply b), but rather c), which contains the modifier which in a) is in the matrix sentence:

(45)  

a) Yesterday, John managed to solve the problem

b) John solved the problem

c) John solved the problem yesterday

Similarly, (48) a) implies b):

(48)  

a) At the door, John saw fit to apologize

b) John apologized at the door

Note that the point here is not that (45) a) is synonym-
ous with c), or (48) a), with b); they are not. Rather, the point is simply that the truth-value of one implies the same truth-value for the other. The examples in (47) make this clearer: a) is obviously not synonymous with b); however, the truth of either implies the truth of c).

(47) a) Before he left, John remembered to call Mary
b) John remembered [ to call Mary before he left ]
c) John called Mary before he left

Note furthermore, that the sentence in (47) c), implied by a), actually says more than the complement clause in a), since the implication includes the adverbial modifier of the matrix clause of a). The same point is made, perhaps even more clearly, by the examples in (48), where a) does not imply b). As a matter of fact, a) may be true while b) is false (in case John has actually written to Mary at least once, though more than a year ago). Rather, what (48) a) implies is c).

(48) a) Since last year, John hasn’t bothered to write to Mary
b) John hasn’t written to Mary
c) John hasn’t written to Mary since last year

Thus the proposition which is implied by implicative constructions is not just the complement clause as such, but

21 This is to be expected under the standard assumption in semantics that the meaning of each expression contributes (compositionally) to the meanings of successively larger constituents. In other words, we expect a correlation between the number of expressions in a phrase and the "richness" of its meaning. To suppose that (45) a) is synonymous with c), for instance, would be to suppose that the matrix predicate manage makes no contribution to the meaning of the former sentence, and hence has no semantic contents, which is absurd. Moreover, it goes against the spirit of the Principle of Full Interpretation of Chomsky (1986a), which mandates that there be no uninterpreted elements in syntactic representations at LF.
rather the complement clause as augmented by any modifiers occurring in the matrix clause, as Karttunen (1971) concludes (on p. 294).

The descriptive generalization Karttunen (1971) informally draws (on p. 290) on the basis of these and additional considerations (for which cf. the original) is the following: "While intending to do is one thing and doing is another, managing to do is inseparable in space and time from doing; it is the same event [emphasis added]."

While Karttunen's proposed solution to the problem presented by implicative predicates proceeds in terms of a procedure which constructs the relevant presuppositions from the complement clause and the modifiers of the matrix sentence, it seems to me that it receives a much more straightforward representational explanation under a Davidsonian view. The solution I have in mind here starts off from the emphasized part of the quote from Karttunen (1971) given at the end of the preceding paragraph, but takes the term "event" to apply to the generalized Davidsonian notion of event that I have been arguing for throughout Section 2.3.

Concretely, I propose to derive the contrast between implicative and non-implicative constructions in the manner to be outlined presently. Consider our earlier examples (40)a and (41)a, which are repeated here for convenience:

(40)a) John managed to solve the problem
(41)a) John hoped to solve the problem

22 The term is used loosely here. In addition to the temporal and locative adverbials discussed here, it includes assertion, negation, question, command and other illocutionary forces, tense, modality, etc. For the entire range, cf. Karttunen (1971).
Assume the verbs manage, hope, and solve have the thematic grids in (49), each with its own event-position,

(49)  a) manage (+V, -N) <1, 2; E>
b) hope (+V, -N) <1, 2; E>
c) solve (+V, -N) <1, 2; E>

and assume that the <1> position of manage and hope is satisfied by John, and that of solve by PRO, which in turn is controlled by John; the <2> position of solve is filled by the problem, that of manage and hope by the infinitival clause PRO to solve the problem, which we abbreviate as X for convenience. Given these (noncontroversial) assumptions, the matrix clauses of (40)a) and (41)a) come out as in (50) a) and b), respectively; the embedded clause X will then be something like c).

(50)  a) (j{a}[ manage(j, X; a) ]
b) (j{a}[ hope(j, X; a) ]
c) (j{a}[ solve(PRO, the problem; a) ]

Suppose now that implicative verbs such as manage differ from their non-implicative counter-parts like hope in that they do not permit their complements to contain an event-operator. If so, the event-position of the complement gets bound, by default, as it were, by the event-operator of the matrix clause. The distinction between our example sentences can then be represented as in (51):

(51)a) (j{a}[ manage(j, [<<solve(PRO, the problem; a)>]; a) ]

b) (j{a}[hope(j, [<<j{a} solve(PRO, the problem; a)>]; a)])

The distinction I just proposed is conceptually on a par with (and may even be reducible to) the S-bar deletion property of verbs of the believe-class, as discussed in Chomsky (1981) and elsewhere. In this sense, the proposed distinction
between implicative and non-implicative predicates is not unprecedented.

Furthermore, as regards the mechanism by which I propose to account for the distinction observed by Karttunen (1971), nothing is needed beyond what is required for independent reasons. The binding of the embedded event in (51)a above by its matrix event is essentially the same as the phenomenon of bound anaphora discussed in Higginbotham (1980), the sole difference being that there it is applied to regular thematic arguments, and here, to event-arguments.\textsuperscript{23} At LF, the cases discussed in Higginbotham (1980) yield representations that are identical in kind to (51)a above. Consider, for instance, the case in (52):

\begin{align*}
(52) \quad &a) \quad \text{someone}_1 \text{ thinks } \text{he}_1 \text{ is crazy} \\
&b) \quad [ \text{someone}_1 \ [ x_1 \text{ thinks } [ \text{he}_1 \text{ is crazy } ] ] ]
\end{align*}

Thus, the phenomena observed by Karttunen (1971) can be regarded as representing a special case of a more general structural pattern found in natural language. Moreover, to the extent that the proposed analysis is correct, it can be seen as providing further evidence for the assumption that event-arguments are not all that different from regular thematic arguments, despite the fact that they are not usually projected (in the sense of X-bar theory) on Phrase Markers.

Finally, and most importantly, the analysis of implicative predicates suggested above accounts for the full range of facts discussed by Karttunen (1971). To verify this, let

\textsuperscript{23} This is true as far as the respective LF-representations are concerned. Presumably, however, there is a difference as to derivation between Higginbotham's (1980) cases and mine: the former are derived via Quantifier Raising (cf. May (1977)) whereas the latter are most likely base-generated.
us quickly go over the cases considered above. In (51) above we already illustrated the basic examples in (40) and (41).

Keeping the representations in (51) in mind, consider Negation in (53) and Question in (54) where the a) sentences exemplify the implicatives, and the b) sentences, the non-implicatives.

(53) a) John didn't manage to solve the problem \(\Rightarrow\) John didn't solve the problem \(=\) (42)a

b) John didn't hope to solve the problem \(\Leftarrow\Rightarrow\) John didn't solve the problem \(=\) (43)a

The first sentence above asserts that there is no managing-event; hence there is no solving-event either, since the two events are bound by the same operator, on the view advanced above. In effect, the sentence says that there is no event e in which John managed to do something, and in which event e John solved the problem. In contrast to this, in the b) sentence we are looking at two events, each of which can be independently asserted or negated. This sentence thus says that there is no event e such that John hope in e that there would be some other event e' in which he solved the problem.

Similarly, (54)a) below asks whether or not there exists an event e such that John managed to do something, and in which event e John solved the problem. Again, since the two events are co-indexed, one cannot be questioned independently of the other. And again the non-implicative in b) is different in this regard, since here the embedded sentence quantifies over solving-events independently of matrix quantification over events of hoping. Hence asking whether or not an event of the latter kind exists does not imply questioning of the existence of the former kind of event.

(54) a) Did John manage to solve the problem? \(\Rightarrow\) Did John solve the problem? \(=\) (42)b

b) Did John hope to solve the problem? \(\Leftarrow\Rightarrow\) Did John solve the problem? \(=\) (43)b
Next, the facts about adverbial modification also get a simple Davidsonian explanation on the view proposed here. Consider the examples in (44), repeated below. With the implicative construction in a), first, we have only one event which is common to both clauses. Hence the two locative adverbials are both predicated of the same event; hence we get a contradiction, since a single event cannot take place in two distinct locations. The simplex sentence in c) is out for the same reason.

(44) a) **On the sofa, John managed to sleep in the bed.  
   b) On the sofa, John decided to sleep on the bed.  
   c) **On the sofa, John slept in the bed.

The non-implicative construction in b), in contrast, presents no such problems since here the two locatives are predicated of separate events. The above three cases are illustrated somewhat more perspicuously in (55):

(55)a) (j[ manage(j, [sleep(j; a) & in.bed(a)]; a)  
              & on.the.sofa(a) ]  
   b) (j[ decide(j,[sleep(j; a) & in.bed(a)]; a)  
              & on.the.sofa(a) ]  
   c) (j[ sleep(j; a) & on.the.sofa(a) & in.bed(a) ]

Basically the same explanation applies to the implications from (45) a) to b) and c), and from (48) a) to b) in the examples repeated below.

(45) a) Yesterday, John managed to solve the problem.  
   b) John solved the problem.  
   c) John solved the problem yesterday.

(48) a) At the door, John saw fit to apologize.  
   b) John apologized at the door.

In both case we are looking at a structure which can be represented abstractly as in (58):
(58)  a) (\text{ja}) [s1 .. (\alpha) .. [s2 .. (\alpha) .. ] & \text{Adverb}(\alpha)]  

b) (\text{ja}) [s2 .. (\alpha) .. ]  

c) (\text{ja}) [s2 .. (\alpha) .. & \text{Adverb}(\alpha)]  

Here the implication from (58) a) to b) and c) is transparent. Actually, this is not all that different from the standard Davidsonian cases of adverb-dropping entailments (cf. Section 2.2.3), as in the entailment of (38) b) by c). The main difference between the two is that in normal cases of adverb-dropping entailments we are dealing with the symmetrical structure of a logical conjunction whereas with Karttunen’s cases the structure is asymmetrical, given that one sentence is embedded in the other. This predicts certain asymmetries in meaning, though it does not affect the truth-values.

The asymmetries in meaning just alluded to can be observed in the context of examples like (47), where a) and b) clearly differ in meaning. Concretely, we observe here a scope difference in the interpretation of the adverbial clause, which is the result of the above-mentioned asymmetry that distinguishes these cases from regular adverb-dropping entailments. However, note that the truth-values are the same for all three sentences; there is no situation which makes one sentence true without at the same time resulting in the truth of the other two. Again this is made transparent in an abstract representation such as (57) below.\textsuperscript{24}

\textsuperscript{24} A word of caution is in order here regarding the verb \textit{remember}. Note first that \textit{remember} \textit{that} \textit{S} is factive rather than implicative, and hence is irrelevant to the present discussion. Similarly with \textit{remember V+ing}, which is also not implicative in the relevant sense, the relation between the two clauses being one of presupposition. Finally, as Karttunen (1971) himself notes (in fn. 5), some speakers can also interpret \textit{remember to} in the factive sense of \textit{remember that}. However, this does not detract from the validity of claims made about the implicative sense.

The different readings available for \textit{remember} are also
(47)  a) Before he left, John remembered to call Mary.
     b) John remembered [ to call Mary before he left ]
     c) John called Mary before he left.

(57)  a) (ję) [s1 .. (e) .. [s2 .. (e) .. ] & Adverb(e) ]
     b) (ję) [s1 .. (e) .. [s2 .. (e) .. & Adverb(e) ] ]
     c) (ję) [s2 .. (e) .. & Adverb(e) ]

The contrast between the implicative cases above and non-implicatives such as (58) below are familiar by now, so that we need not say much about our final set of examples. Non-implicative (58) does not imply (48)b, in contrast to implicative (48)a), for reasons evident in (59):

(58)    At the door, John had in mind to apologize.
(48)  a) At the door, John saw fit to apologize.
     b) John apologized at the door.

(59)  a) (ję){s1 ..(e) .. [s2 (ję)[ ..(e) .. ] & Adv(e)}
     b) (ję){s1 ..(e) .. [s2 ..(e) .. ] & Adverb(e)}

The analysis suggested above for implicative constructions will be of relevance again later on when we address tense and temporal interpretation more directly. Moreover, the infinitival clauses discussed here are not the only cases that fall under the proposed analysis. Romance subjunctive clauses (discussed by Picallo (1984) and others) will be seen Chapter Three, Section 3 to behave just like implicative infinitivals in regard to tense and temporal interpretation.

2.4.3 E-Positions and Event Nominals

There remains one last class of cases to be discussed in which the E-position of a predicate is assumed to be filled by an overt event-denoting NP. These cases, so I will argue

the subject of disagreement between Hornstein (1990b) (p. 226 fn. 40) and Stowell (1982).
here, arise from a confusion of the implicit event-arguments which satisfy the E-positions with event nominals which serve as regular arguments of a predicate.

For instance, Higginbotham (1989) suggests with respect to the following examples (p. 484f) that certain verbs which subcategorize for event-nominals take events as arguments.

(60)  
   a) John underwent an operation.
   b) John suffered rejection.

Specifically, Higginbotham argues that the Davidsonian E-position does not get satisfied by virtue of existential quantification over events in all cases. Rather, in verbs such as underg0, suffer, etc., the E-position is predicated of the event-nominal which is the complement of such a verb. Thus, the thematic grids of these verbs would have to be as shown in (61), rather than (62):

(61)  
   a) undergo, (+V,-N), <1;E>  
   b) suffer, (+V,-N), <1;E>

(62)  
   a) undergo, (+V,-N), <1,2;E>
   b) suffer, (+V,-N), <1,2;E>

Consequently, the logical forms of the sentences in (60) are then presumably as in (63), rather than (64), on Higginbotham's view:

(63)  
   a) undergo(John, an operation)
   b) suffer(John, rejection)

(64)  
   a) \( \exists a \) undergo(John, an operation; a)
   b) \( \exists a \) suffer(John, rejection; a)

Thus, the sentences in (60), having logical forms as in (63), do not contain events of undergoing and suffering apart from the events of operation and rejection. That is, in the first sentence, operation is the event in which John par-
ticipates, not undergoing; and similarly in the second sentence, the event is rejection, not suffering.

Yet this cannot be right, as can easily be shown with the help of adverbial modifiers, for instance. Thus (85) a) below, modelled after (80) a) above, can only mean that little time elapsed between diagnosis and treatment; it cannot mean, however, what (85)b) means, viz. that the treatment itself took little time. Hence, what is quick in (85)a) is John's undergoing an operation; the sentence leaves it completely open whether or not the surgical procedure was quick.

(85)  a) John quickly underwent an operation.
   b) John underwent a quick operation.

(85)a) clearly has a manner reading parallel to the one of John quickly wrote to Mary, which does not assert that the writing of the letter was done in haste, but that John wasted no time in getting the letter out. In this case as well as in (85) a), the manner adverbial is predicated of the event. As a consequence, the resultant reading for (85) a) is quite distinct from that of b).

The same point is illustrated by the sentence in (68), which ought to be contradictory if Higginbotham (1989) were correct. Yet evidently it isn't: It makes perfect sense to say that the particular weight-loss program John underwent is basically very successful, while at the same time asserting that John's participation in it wasn't.

(68) John unsuccessfully underwent a very successful weight-loss program.

Suppose that the thematic grid of undergo were as given in (81)a) above; suppose further that Higginbotham were right and that the complement NP a successful weight-loss program supplies a value for the argument which satisfies the E-positi-
tion of the verb. Then, on the regular Davidsonian analysis of adverbial modification as conjunctive predication of the event, we would be predicating unsuccessful of a successful weight-loss program and the result would be a contradiction. The logical form in (87)a) illustrates this case.

(87)  
  a)  undergo(j, successful(wlp))
      & unsuccessful(successful(wlp))
  b)  \{ a [ undergo(j, successful(wlp); a)
      & unsuccessful(a) ]

In order to avoid this unwarranted contradiction we need a separate E-position here, as shown in (87)b). For these reasons and others, we want to be able to modify the verbal event independently of the event-nominal in complement position in both (85) and (88) above.

Similarly, evidence for an E-position which is independent of any complement NPs denoting events can be constructed on the basis of Higginbotham's second example in (80)b) above, which is repeated here as (88)a). Suppose we follow up on this sentence with the one in (88)b), where the pronoun it is to be understood as having an antecedent in (88)a). The result is then an ambiguity: On one reading, it is anaphoric on the NP rejection. Such might be the case, for instance, if the rejection was very loud, so that everybody overheard it. However, there is another reading available, on which what everybody noticed is not the rejection itself, but rather John's suffering from it. This second reading can be accounted for only if we assume that the sentence in (88)a) contains an antecedent for the pronoun occurring in the b)-sentence. In other words, (88)a) must contain an event-denoting term (distinct from the rejection).

(88)  
  a)  John suffered rejection.
  b)  Everybody noticed it.
Given these consideration, we conclude that the thematic grids of the verbs *undergo* and *suffer* are as in (62), not as in (81), as Higginbotham claims. The correct logical forms of his sentences in (80) must then be the ones in (84) instead of (83).

Higginbotham (1989) advances the same claim for the *do* of agency as it occurs in sentences such as (89)b below (p. 484). Here, too, the E-position of the verb *do* is said to be predicated of an NP referring to an event, rather than being existentially bound by a sentential operator. In the case of (89)b, the event-nominal is pronominal *it*, referring to the buttering-event in (89)a.

(89)  
  a)  John buttered the toast.  
  b)  He did *it* in the bathroom while taking a shower.

But again, it is just as easy to demonstrate that this cannot be correct here as it was in the previous cases. This time, we use pronominal coreference to (sentential) events rather than adverbial modification to illustrate this conclusion. Suppose I continue the little story I started in (89) a), b) above with the sentence in (70):

(70)  
  *It* upset his mother very much

There are two ways in which (70) can be interpreted here: either *it* refers to *John’s buttering the toast* in (89)a), or it refers to *his doing it in the bathroom while taking a shower* in (89)b). Since these are obviously two different events, it will not do to say that the event described in (89) a) provides the value for the E-position of the verb *do* in b); the latter, rather, picks out a separate event.
2.4.4 Summary

In this Section we examined ways in which event-positions are satisfied. In 2.4.1 we started out with the standard case of existential quantification over events. In addition, we admitted existentially general and definite event operators. In 2.4.2 we examined the dependency of event in certain infinitival clauses on the events of superordinate sentences, which we explained in terms of the absence of an event-operator. As we saw, a number of phenomena receive a straightforward explanation thereby. Finally, in 2.4.3 we rejected the idea that E-positions can be predicated directly of overt NPs in sentences.

The generalization that covers our findings of this Section is thus that E-positions are filled by variables in all cases. The event-variables are either bound by a (existential, universal, or definite) quantificational operator, or else have an antecedent in a c-commanding position, in which case they are anaphoric.

2.5 The Neo-Davidsonian View
2.5.1 General Comments

A number of researchers, including Castañeda (1987), Parsons (1980, 1985), Bennett (1988), Higginbotham (1989), Dowty (1986, 1988), etc. have proposed to make Davidson's logical forms "more fine-grained" (Bennett (1988), p. 169) by representing also the subject and object arguments as conjoined predicates of the event. On such a view, the sentence in (71) is analyzed not as in a), but rather as in b). The relations rendered here as SUB(ject) and OBJ(ect) can be thought of as thematic roles or proto-roles, in the sense of Dowty (1986, 1988).
(71) John buttered the toast in the kitchen at midnight
    a) je [ butter(j,t,e) & in_kitchen(e) & at_midnight(e) ]
    b) je [ butter(e) & SUB(j,e) & OBJ(t,e)
              & in_kitchen(e) & at_midnight(e) ]

Several advantages are attributed to this innovation, none of which I find very convincing. One point, raised by Bennett (1988) (p. 170) concerns the case of verbs such as *stab* which are ordinarily transitive, but which can be used intransitively as well in sentences such as *He picked up the dagger and stabbed with it*. Now, *Brutus stabbed Caesar* entails that *Brutus stabbed* (in this sense of *stab*), which entailment can be obtained on the neo-Davidsonian view expressed in (71)b) simply by omission of the OBJ-conjunct. On Davidson's original proposal, as shown in (71)a), this is impossible, unless *Brutus stabbed* meant *Brutus stabbed something*, which it doesn't.

The reason why I find this argument rather weak stems from the fact that verbs that behave like *stab* are rare, and therefore seem to be the exception rather than the rule. For, a greater number of basically transitive verbs when used intransitively do indeed imply an object. Take *eat*, for example: *John ate* clearly implies that *John ate something*, and not simply that he went through the motions associated with eating. Similarly, if *John ate his shoe*, we hesitate to say that *John ate*. Davidson's original proposal gets this entailment for free, while Bennett's revision of it would have to stipulate an OBJ-conjunct with a null argument. Now, it is not clear to me on what basis a language learner is supposed to come to know that *eat* allows this (in the absence of any overt evidence) while *run* doesn't. Moreover, the revisionist view predicts that *eat* with a null object implies a truly intransitive reading of *eat* (à la *Brutus stabbed*), which it does not have.
Another purported advantage of the "more fine-grained" analysis, also mentioned by Bennett (1988) (p. 169), is that the logical form in (71) b), but not that in a), allows us to capture the inference that John did something to the toast in the same manner as the adverb-dropping inferences, by omission of a conjunct. In the case at hand, it is the first conjunct, butter(e), in (71)c) which is dropped. Similarly, Bennett claims (ibid.), if you and I agree that the king did something to the queen, but you think that he insulted her and I think he hit her, our agreement concerns all conjuncts but the first, and this agreement is inferred on the basis of the universal SUB and OBJ relations.

The reasoning here is slightly flawed, in my opinion. Suppose you think that John was arrested in the park last week and I think all the flowers were in full bloom in the park last week. Thus, we agree that there was some event which took place in the park last week, which agreement we arrive at by dropping all conjuncts in the respective logical forms but the last two, which predicate in the park and last week of the events. Clearly, whatever agreement may exist between us in this case does not derive from universal locative and temporal relations. Yet this is exactly the structure of the argument on the basis of which Bennett draws conclusions about universal subject- and object-relations. Or suppose you think that John had a fatal heart-attack and I think someone pushed John off the roof. In this case we can both agree that something happened to John which caused him to become dead, even though in your thought John participates in a subject relation, and in mine, in an object relation. The point is, there are aspects of sentence meanings on which our agreement can be based which have nothing to do with conjunctions in logical forms. In the example I just gave, our agreement is due to a certain degree of semantic overlap in the lexical meanings of the predicates involved, combined with knowledge
of the world. In Bennett's example, one might say, our agreement is due to the fact that insult and hit overlap in their lexical meanings, in the sense that both are lexically specified as assigning an agent theta-role to their subject, and a patient theta-role to their objects. Given this, then, I fail to see what forces the move from agreeing on the fact that the king did something to the queen to universal subject and object relations in Bennett's sense.

Related to this is the claim that the revised Event-Hypothesis allows the generalization of subject- and object-relations across different verbs. "Davidson's compacted treatment suppresses the single [SUB] relation that holds between a collapsing table and its collapse, between a running girl and her run, a stabber and his stab." (Bennett (1988), p. 169).

This argument only works if one takes a rather naive view towards linguistic theory in general, and syntax in particular. The subject- and object-relations here are those of the surface structure, as is evident from Bennett's choice of examples. For collapse is an unaccusative verb, whose surface subject is its deep structure object; collapse isn't something the table does, it is something that happens to it. By contrast, run is unergative, and its surface subject is also its deep structure subject.25 Presumably Bennett would also say that if you think that John was arrested by the police and I think that John escaped the police we are in agreement, on the basis of the universal SUB relation, that John did something. Obviously, this is nonsense.

Quite aside from this, even if we agree that the entailments regarding subjects and objects are valid, it should be

25 For terminology and discussion of these two types of predicates, cf. Perlmutter (1988).
noted that the above arguments for a neo-Davidsonian view rest on an assumption which is not even made explicit, and which seems rather dubious. This concerns the fact that these arguments presuppose that it is somehow desirable to bring inferences concerning subjects and objects, and even predicates, under the same explanatory account as the adverb-dropping entailments discussed in Section 2.2.3 above. Yet it is not at all clear why this should be so. In point of fact, the entailments seem to go in exactly opposite ways: Recall that Davidson’s original argument from adverb-dropping inferences goes from a sentence with adverbial to sentence without adverbial (if John walks slowly, then John walks). On the other hand, the above arguments go the other way, in the sense that the inference is from a truncated sentence without a certain constituent to an expanded sentence with that constituent (if SUB(k,e) & OBJ(q,e) then the king did something to the queen and if John ate, then John ate something). Of course there are inferences concerning predicates and arguments, but that is beside the point; the point is that these are sufficiently different from adverb-dropping entailments to require at least some supporting argumentation as to why they should be handled in the same manner, as conjunctions of predicates in logical form. In the absence of this kind of support, arguments from inferences based on predicates and arguments don’t really carry much force. After all, there are alternative methods for expressing inferences.

Furthermore, the revised Event-Hypothesis fails to account for the intuition that subject and object arguments are entailed by a predicate such as butter in a way in which locative temporal and instrumental adverbials, etc., are not. This is a direct result of the fact that a logical representation effectively obliterates the argument vs. adjunct distinction, as both are expressed in the same fashion by means of conjunction. The original proposal, on the other hand, has
a straightforward account for this. By the same token, the problem of variable adicity of predicates, which Davidson's proposal sought to avoid, reappears in the revised account, since basically all verbs (and by extension, all other predicates discussed in Section 2.3.2 above) are treated as monadic.

These last two points apply to all versions of the neo-Davidsonian view, whereas the ones before that bear only on Bennett's proposal. There is however a syntactically more sophisticated version of the neo-Davidsonian theory which uses thematic roles to express the relations between arguments and the event they participate in, and which is therefore not subject to the criticisms of Bennett's view. Such a theory has been proposed, and discussed in detail, in Dowty (1988, 1988) and elsewhere, as part of a characterization of an interpretive meta-language into which natural language expressions are translated in a principled fashion. Such a view, no doubt, is to be taken more seriously than the previous one.

2.5.2 Higginbotham (1989) on Events

A view which is basically very similar, though perhaps a bit more linguistically oriented, is outlined in Higginbotham (1989), in an extension of earlier work (cf. Higginbotham 1983a, 1983b, 1986, 1987b, and especially 1985). Because the view advanced there is more highly differentiated than any other, and because unlike most other proposals it makes specific predictions for the syntactic aspects of the Event-Hypothesis, it is well worth our while to briefly sketch its essential traits.
2.5.2.1. Events in the Object Language

Recall from the beginning of Section 2.3.2 that Higginbotham (1985) introduced the event-position into syntactic representation by suggesting that it, like regular argument positions, is provided in the thematic grid (in the sense of Stowell (1981)) associated with the lexical entries of predicates. That is, a natural language predicate such as the verb walk, say, has a lexical entry as in (72):\(^{28}\)

(72) \[ \text{`walk', } (-N,+V), <1;E>, \text{ ACTOR(1)} \]

Lexical entries are projected to phrase-markers at the syntactic level of D-structure, in accordance with the principles of X-bar theory (cf. eg. Chomsky (1981), (1988b)). On Higginbotham's (1985) view (p. 555), (72) above is to be regarded as a terminal node of such a syntactic phrase marker. Given that, the E-position in the lexical entry of a verb has been introduced into the syntactic DS-representation. Hence, by the projection principle, which Higginbotham also assumes, it must be available at all levels of representation. Furthermore, given the fact that regular argument positions as well the theta roles assigned to the arguments that satisfy these positions play a rather crucial role in syntactic theory, it stands to reason that the event position, being conceptually on a par with regular argument positions, also plays some kind of role in syntax. This is the view I want to pursue in quite a literal sense in this thesis in arguing that various semantic phenomena with syntactic and morphological repercussions arise from the presence of event-positions in syntactic as well as semantic representations.

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There are some indications that my rendering of Higginbotham (1985) in the preceding paragraph might not quite be what was intended by the author. For in Higginbotham (1989) he cautions (fn. 4, p. 472) that "The formulas [such as that given on the right-hand side of the bi-conditional in (73) below] are not representations of English sentences at any linguistic level, but expressions of a regimented extension of English, that are provably equivalent to the truth of the English syntactic structures whose regimentations they are."

(73) 'John walks' is true \iff \phi \langle \text{John}, \alpha \rangle

This appears to suggest that Higginbotham wants to confine the event-position (and its associated mechanisms) to the meta-language on the right-hand side of (73), while excluding it from the object language. Thus, it could mean either that (in the relevant context) Higginbotham simply was not interested in the left-hand side of (73) and wanted to concentrate instead on properties of the meta-language, or it could mean that he explicitly rejects the idea of having an event-position represented in the structural descriptions of the object language. As to the latter, I fail to see any reasons that would prevent the event position from entering syntactic representations. This is all the more so in the light of the fact that Higginbotham (1989) reaffirms the view that E-positions are provided by virtue of the thematic grid of a lexical entry, as in (72) above, for instance. Moreover, if the E-position enters into syntactic representations, then so does an appropriate binder for it. This is required by the theta criterion, some version of which Higginbotham (1985), (1989) explicitly assumes.\(^{27}\) In the following, I will thus proceed from the assumption that syntactic representations do

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\(^{27}\) In its essence, (the relevant half of) the theta criterion requires that every open position in a thematic grid be discharged by one of four modes of theta-discharge. For details, cf. the works cited in the text.
contain event-positions, and I will examine Higginbotham's proposals from this point of view.

While Higginbotham exclusively employs the more traditional notation in (1985), a neo-Davidsonian view is introduced in subsequent work. In his (1989) in particular, Higginbotham develops a highly differentiated view that uses both versions of the Event-Hypothesis side by side. In the object language, on the one hand, he continues to assume, as he did in (1985), that English predicates such as the verb walk have lexical entries whose thematic grids reflect a more traditional view, as illustrated in (72) above. On the other hand, neo-Davidsonian representations appear in the theory in a dual function: Firstly, they appear in the interpretive meta-language in which reference and truth are determined; and secondly, they illustrate conceptual primitives in the lexical decomposition of natural language predicates.

2.5.2.2. Events in the Meta-Language and the Lexicon:

In the explanation of object-language structures, Higginbotham (1989) seems to favor a neo-Davidsonian analysis, suggesting (on p.474) that John walks might be "understood" (ie. translated into the meta-language) as in (74):

(74) \text{walkso}(\text{a}) \& \text{ACTOR}(\text{John,}\text{a}) \ [\text{Higginbotham's (12)}]\]

In the same context, Higginbotham (1989) explicitly warns against confusing representations of this kind with the more traditional Davidsonian representations, as in (72) above, for he writes (on p. 474) "... it would be wrong to suppose that the 'walkso' of [(74)] is the familiar 'walks' of English given in [(72) above]; on the contrary, the latter verb has two argument positions, not one, and cannot appear without discharging the Actor thematic role. [...] So we must re-
gard 'walkso' as a kind of theoretical construct." (emphasis added). Thus, the English verb walk is a relation between an event (of walking) and its actor, whereas the theoretical construct walko is a monadic predicate of events.

Aside from the meta-language, such theoretical constructs are useful also for a theory of the lexicon, in that they ".. enable us to characterize the root-related homonyms" (ibid.). Root-related homonyms, which were first discussed by Charles Fillmore, are two or more lexical items which are obviously related by virtue of the fact that they share the same core concept of their meaning, but which differ with regard to their thematic grids. Examples of this include the two verbs spray in (75) below. Note that even though the two sentences in (75) are almost synonymous, they are clearly different in some respects. For instance, if John merely writes Down with apartheid on a wall with the help of a can of day-glo paint, then it is OK to say a), but not b). For b) to be true, the whole wall has to be covered with paint. (Whichever NP is the direct object has to be "thoroughly involved" in the event; for discussion of this phenomenon, cf. Levin (1985) and references cited there; for additional data, cf. also Fraser (1971).)

(75)  a) John sprayed paint (on the wall) (spray1)
     b) John sprayed the wall (with paint) (spray2)

In each case, the parenthesized PP is optional, and hence can not be an argument of the main predicate by Higginbotham's assumptions; it must therefore be an adverbial adjunct. According to Higginbotham (1989), we are here dealing

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28 This is not generally the case. Fraser (1971) points out (on p. 807) that "The prepositional phrase is usually required in locative sentences but seldom required in device sentences. [Cf..] she stuffed the bookcase vs. *she stuffed another book." Fraser calls (75) a) a device sentence, and b) a locational sentence.
with two distinct English verbs, spray₁ and spray₂. The fact that these two verbs are related is captured by stipulating that the two share the abstract theoretical construct sprayo, which is simply a one-place predicate true of events, and in particular, true of the two events describe in (75) a) and b). The differences between spray₁ and spray₂, on the other hand, arise from the fact that the theoretical construct sprayo combines with different thematic relations in these two cases. This is illustrated in (78).²⁸

(78) a) spray₁(x,y;g) <->

   sprayo(g) & Actor(x,g) & Theme(y,g)

b) spray₂(x,y;g) <->

   sprayo(g) & Actor(x,g) & Direction(y,g)

This view of the relation between root-related homonyms is to be understood in the context of Higginbotham's (1989) planetary model of thematic roles, graphically illustrated in (77) (= Higginbotham's (#13)).

(77)

```
   sprayo
   /    \
  /  \
```

   Actor
   \
   \
   Theme

   \
   Direction

The idea here is that each abstract concept has associated with it various compatible thematic relationships in which participants can stand to an event. The set of possible the-

²⁸Higginbotham (1989) uses the label Medium for the thematic role I here call Theme. Not that I want to attach too much significance to these names -- their purpose here being that of identifying thematic relations, rather than that of defining them -- but I prefer the term Theme over Medium here because the latter term seems to me to imply an instrumental function, which paint clearly does not have here.
matic roles (which is finite and small) is universal\textsuperscript{30} and hence the same for all languages, as are also, presumably, the abstract monadic predicates of events. Particular lexical predicates in particular languages are the results of various combinations of core concepts with thematic roles. In the case at hand, abstract \textit{spray} can co-occur in an event with participants expressing the roles of Actor, Theme, Direction, and perhaps others as well.\textsuperscript{31} As shown in (78) above, English offers two lexicalizations off of this general schema, viz. \textit{spray\textsubscript{1}} and \textit{spray\textsubscript{2}}. Both verbs are basically transitive (not counting the E-position), in the sense that two thematic roles are obligatorily assigned to arguments, and the extra role(s) can be expressed optionally with the help of adjunct-PPs.

Recapitulating Higginbotham's view on the representation of events, we note that natural language predicates are thought to have a thematic grid, including an event position, the representation of which is "compacted" as in Davidson's (1987a) original proposal. At the same time, neo-Davidsonian conjunctions of monadic predicates of events with one or more thematic relations seem to play a dual role in the theory: On the one hand, they are part of the meta-language in which expressions of the object language are evaluated for reference and truth; on the other hand, they represent the conceptual primitives of lexical items of the object language.


\textsuperscript{31} Higginbotham (1989) does not go into the question exactly which thematic relations are to be included in the planetary model. For instance, it is not quite clear whether, say, temporal and locative relations are to be represented in the orbit of \textit{spray}. Presumably the answer is negative here, since temporal and locative adverbials can be added to the main predicate of practically every sentence. That is, they are not really part of the core meaning of \textit{spray}.

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As to the former aspect of neo-Davidsonian representations, the objection against the elimination of the argument-adverb distinction, raised earlier against Bennett's view, applies here as well. Thus, the sentences in (75) a)-b) above, which in the object language have clearly distinct structures, as shown in the left-hand sides of (78) a)-b), respectively, are indistinguishable in the meta-language on the right-hand sides of the conditionals below.

(78)a) \[ \text{spray}_{1}(x,y;\mathbf{a}) \land \text{on}(\mathbf{a},z) \iff \]
\[ [\text{spray}_{0}(\mathbf{a}) \land \text{Actor}(x,\mathbf{a}) \land \text{Theme}(y,\mathbf{a})] \land \text{Direction}(z,\mathbf{a}) \]

b) \[ \text{spray}_{2}(x,y;\mathbf{a}) \land \text{with}(\mathbf{a},z) \iff \]
\[ [\text{spray}_{0}(\mathbf{a}) \land \text{Actor}(x,\mathbf{a}) \land \text{Direction}(y,\mathbf{a})] \land \text{Theme}(z,\mathbf{a}) \]

Furthermore, the meta-language representations of both verbs spray are indistinguishable from that of, say, put as it occurs in a sentence such as (79)a) below, in which both Direction and Theme are obligatory, and hence expressed by arguments rather than adverbials, as illustrated in (79)b). Aside from the differences in the core concepts, i.e. the theoretical constructs sprayo and puto --which are trivial-- the three verbs spray1, spray2 and put are presumably all built from the same planetary thematic roles given in (77) above. Obviously there is something missing here, for in (75) a) John sprayed paint on the wall does entail John sprayed paint, but (79)a) does not entail John put the book, for that is not a sentence of English. The underlying problem here is thus that in cases like (78) we have a diadic predicate, while in cases like (79) we have a triadic predicate. Solving this problem, which we will not attempt here, requires of course that we are able to distinguish these cases, which the planetary model does not enable us to do.

(79) a) John put the book on the shelf
b) \[ \text{put}(x,y,z;\mathbf{a}) \iff \]
\[ \text{puto}(\mathbf{a}) \land \text{Actor}(x,\mathbf{a}) \land \text{Theme}(y,\mathbf{a}) \land \text{Direction}(z,\mathbf{a}) \]
Similarly, the meta-language representation of (80) a) in b) below is once again the same as that of the previous examples in the neo-Davidsonian notation, despite the fact that it is different from both (75)a) and (79)a). (80)a) differs from (79)a), though not from (75)a), by the fact that the Directional phrase is optional; and it differs from (75)a), though not from (79) a), in that it lacks a root-related homonym in which the Directional participant is the direct object.32

(80) a) the dog chased the cat (on the tree)
   b) chase(x,y; a) & on(a,z) \iff
       [chaseo(a) & Actor(x,a) & Theme(y,a)] & Direction(z,a)

In sum, the three cases in (75), (79), and (80) are different from one another in ways that are intuitively clear and quite transparent. Yet the neo-Davidsonian notation adopted by Higginbotham (1989) for the meta-language treats all three cases in the same manner. In fact, it cannot distinguish between them. If both arguments and adverbs are analyzed as conjoined predicates, the distinction between them is lost, as mentioned earlier, and hence it becomes impossible to account for the conjunct-dropping entailments in a principled fashion.

2.6 Summary and Conclusion

We began this Section in 2.1 with some general comments on the notion of event. In 2.2 we introduced the Event-Hypothesis of Davidson (1967a) and others. We took Higginbotham (1985) literally in supposing that the implicit E-position is

32 In addition, there is also the problem of stating the conditions under which thematic participants in the event can or must occur without a preposition. This, too, will be left open here.
represented lexically and syntactically in the theta-grid (cf. Stowell (1981)) of a lexical predicate. We assume therefore that the event-argument is included in the representation at every linguistic level, in virtue of the Projection Principle of Chomsky (1981), etc. The consequences of this view have not been fully explored in this respect, and much of what I will have to say later on is to be understood as an attempt at capitalizing on this assumption.

Also in 2.2 we examined the virtues of the Event-Hypothesis in regard to problems of variable adicity, adverbial modification and the concomitant problem associated with adverb-dropping inferences, all of which it solves very elegantly. In the same subsection we also discussed Davidson's argument from pronominal anaphoric reference to events, and we addressed some of the objections that have been raised against it.

Section 2.3 then explored the extension of the Event-Hypothesis to non-action sentences and to sentences with non-verbal main predicates. With respect to both, we argued that the reasons that motivate an E-position for action sentences also support the assumption of an E-position in these predicates. For example, if we did not make these extensions of the hypothesis then we would need two analyses of adverbial modification, namely Davidson's for action sentences and another for the remaining cases. Clearly this is undesirable.

Afterwards, Section 2.4 considered the question how E-positions are satisfied. We observed that they are filled by variables in all cases. These variables can then be bound by existential, universal, or definite quantificational operators. Alternatively, in the implicative infinitival clauses discussed by Karttunen (1971) the event-variable is not bound
by its own event-operator, but is instead anaphorically dependent on the event of the next-higher sentence.

Finally, in Section 2.5 we discussed the Neo-Davidsonian version of the Event-Hypothesis, which we rejected since it makes unwarranted predictions while at the same time it does not add any significant contributions to the theory.
Section 3: Events and Time

Having discussed the notions of time and events in the preceding two Sections, we now turn to the question of how the two relate to each other. From the fact that we chose in Section 1 to regard (objective) time as the fourth dimension of reality it follows almost automatically that if events occur, they occur in time (as much as they occur in space). Furthermore, besides taking place in time, events typically also take time to take place. On the view explored by Russell (1927), for instance, events are thought of as having, or occupying, a "small finite amount of space-time" (Ch. XXVI). Thus, events seem to relate to the temporal dimension in two ways: They occur in time and they have time. Accordingly, we speak of the temporal location and the temporal extension of an event.

More concretely, we are of course primarily interested in how events relate to time at the linguistic level, i.e. in the theory of grammar. This will require that we first consider the question how time enters into language, or more precisely, how reference to time is made in language. This question is addressed in more detail below, though it is clear from the start that there are basically only two distinct areas in grammar where time enters into linguistic structures, namely tense and temporal adverbial modification. In order to account for these two sets of phenomena, it has been suggested in the literature, for example by Enç (1988), (1987), Green (1989), Kearns (1991), and others, that sentences contain implicit Time arguments, i.e. terms that refer to Times, in a

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33 Russell (1927) explicitly rejects the idea that events are mathematical points without extension in any dimension (ibidem).
fashion that parallels reference to events via the arguments in E-positions.

As regards events in grammar, we saw in Section 2 above that there is fairly strong evidence to support the central tenet of the Event-Hypothesis, viz. that sentences contain implicit terms which refer to events. Note, moreover, that the considerations that led to this hypothesis are quite independent of the concerns of this thesis. Given this, we are certainly justified in assuming that sentences contain event-positions.

To what extent we also need to assume implicit terms referring to times or other suchlike entities, either in addition to or in lieu of event-positions, is likewise an empirical question. The general thrust of the present study is towards rejecting this idea, not because it would lead to an inadequate or inconsistent account of temporal phenomena in language (which it doesn’t), but because it does not seem to make any substantial contributions to the theory. In other words, time-arguments represent an unnecessary complication of the theory which is not warranted by the complexity of the data the theory is intended to account for.

The view that I want to explore instead here is that reference to time is made uniformly in terms of predicates of, and relations between, events, plus the usual temporal ordering relations, and that part of the lexicon that denotes temporal units. As we will see, most of what time-arguments are intended to accomplish can be obtained straightforwardly and much more cheaply from the event-hypothesis, which is required on independent grounds not related to questions of temporal interpretation. To the extent that this endeavor can be completed successfully, time-arguments are simply superfluous.
3.0 Introduction

In the preceding section we asked how time enters into the grammar. In partial answer to this question we will distinguish in Section 3.1 two forms of temporal reference in grammar, namely tense and temporal modification by means of adverbials. The latter case, at least, also provides a partial answer to the prior question, how events relate to time in language and grammar. For it follows without further stipulation from the general analysis of adverbial modification proposed by Davidson (1987a) that at least in its form of temporal modification, reference to time is made in virtue of predicates of events having inherently temporal meanings. The same kind of approach can also be applied to tense, so I will suggest here and argue in subsequent Chapters, if we can combine Davidson's analysis of modification with the idea originally due to Kiparsky (1988), that tense is essentially adverbial in nature as well. To the extent that this is successful, we will be able to provide a unified account of both sets of phenomena. This is perhaps the main objective of this thesis.

Section 3.2, next, takes a look at the syntax adverbial modifiers, in order to find what is common to all of them from the point of view of form.

Following this, Section 3.3 presents a brief semantic typology of temporal modification aimed at uncovering the semantic function(s) of temporal adverbials. Concretely, we will distinguish two forms of temporal specification of an event on the basis of the two ways in which events relate to time. The first form of temporal specification deals with the temporal location of an event, i.e. the place in the temporal
dimension at which an event takes place. The second, in contrast, specifies temporal extension, i.e. the duration of an event in the dimension of time.

Section 3.4, finally, addresses the semantics of adverbial modification by discussing the primitive ingredients and mechanisms that underlie the forms of temporal modification considered previously.

3.1 Temporal Reference

3.1.0 Introduction

There are basically two different ways in which time can enter into language. The first way is via the lexicon, and the second, via the functional part of sentence grammar. In the former case we have lexical expressions which more or less explicitly denote temporal entities. Typically, these expressions surface in the form of adverbials. Thus we call this form of specification for time temporal modification. This will be discussed in Section 3.1.1.

Alternatively, time can enter into linguistic structures in the form of certain functional elements pertaining to the AUX or INFL complex. These are expressed overtly in some languages; the phenomenon is known as tense. This second notion will be discussed in Sections 3.1.2.

3.1.1 Temporal Modification

We begin by briefly considering temporal modification by temporal adverbials, since here matters are more transparent than with tense, for two reasons: Firstly, in most if not all cases it is immediately clear which parts of a structure con-
tribute to its temporal interpretation, in virtue of the lexical meaning of the expressions of which adverbs of time are composed. And secondly, it is also clear here that simple predication over events as proposed by Davidson (1967a) provides us with all the mechanisms needed for an account of them.

Consider then that part of the lexicon (of English or any other language\(^ {34}\)) which we may call the *temporal vocabulary*. This consists of an open class of expressions which denote temporal entities such as the ones listed in (81); also included here are all calendar units, the names of the seasons, and so on.\(^ {35}\)

(81) minute, hour, morning, day, night, week, month, spring, Tuesday, February, 1969, the twenties, the 18th century, the Middle Ages, etc. etc.

Of course we can use language to talk about the things to which these expressions refer, and hence the members of the temporal vocabulary can occur in the argument positions of sentences such as the ones in (82).

(82) a) **Two years** went by.
    b) John counted **the minutes** (until Mary returned)
    c) **Spring** arrived.

The manner in which time enters into the above examples is really rather trivial, however. In the same fashion we

\(^ {34}\) It is safe to say that the lexicon of every language contains some temporal expressions, though variation may exist of course as to what exactly they are. Even the Hopi language, touted by Whorf as the prime example of a "time-less" language, contains a sizable vocabulary of expressions which have temporal reference either exclusively or in addition to non-temporal meaning, as demonstrated conclusively by Malotki (1983).

\(^ {35}\) The temporal vocabulary of English, Czech and Russian is examined in detail in Kučera & Trnka (1975).
could say that flora enters into the language in *the roses are in bloom* or John rowed *the lawn*. As far as the grammar is concerned, reference to temporal entities here is no different from reference to other kinds of entities, and nothing interesting can be said in these cases about reference to time. In (82) the underlined temporal expressions stand in thematic relationships to the events described by their respective sentences, and hence can be characterized as participants in these events: in a), *two years go by* in the same sense in which *two cars can go by*; counting *minutes* in b) is really no different from counting *marbles or cups of coffee or other things*; in c), finally, *spring* participates in the arrival in much the same way in which a *letter* does in a *letter arrived*.

The case is different when expressions of the temporal vocabulary are used adverbially in sentences, as in (83).

(83)  

a) John lived in Paris for **two years**.
b) John will be back in **five minutes**.
c) John arrived in **spring**.

Here, the referents of the underlined expressions cannot be reasonably said to be participants in the relevant events. These entities are not what the sentences are about. Rather, the underlined expressions in (83) serve to modify sentences that are fundamentally about something else. Thus in a) above the period of *two years* does not participate in the event of John's living in Paris; instead, it provides further information about that event, by characterizing it from the perspective of time. In short, it modifies this event. Specifically, *two years* serves here to specify the period of time during which the event obtained. In other words, it tells us how long the event lasted. Similarly in b) and c), the underlined expressions serve to specify the time when the two events take place; again there is no sense in which the these
times participate in the events that parallels the way this is the case in (82) b) and c) above.

Thus, as a result of the difference in syntactic status as either arguments or adverbial adjuncts, temporal expressions such as the ones listed in (81) above can stand in either of two different relationships to an event. In the cases illustrated in (82) they represent participants in the events; here they are an intrinsic part of the event, as is evidenced by the fact that they cannot be omitted from their sentences. By contrast, in the cases illustrated in (83) they do not participate in the event, but rather serve to externally modify an event as a whole. Given this, they do not represent an intrinsic part of the event, and hence they are omissible. In the following, we will be concerned exclusively with the adverbial use of temporal expressions, since it is only in these cases that we can say that an event is temporally specified.

Temporal modification as exemplified in (83) above is of course just a particular form of adverbial modification more generally. Adverbial modification in turn can be regarded as predication over events, on the analysis of Davidson (1967) introduced in Section 2 above. Given this, we can assume that the underlined temporal expression in (83) above (together with the prepositions that govern them) constitute predicates of events with a temporal meaning. Thus we can analyze such cases as in (84), which illustrates temporal modification for our earlier examples (83) a) and c).

(84) a) (\lambda a)[ live.in.Paris(j;a) & for.2.years(a) ]
b) (\lambda a)[ arrive(j;a) & in.spring(a) ]

The question how an adverbial predicate of events is derived syntactically from a lexical temporal expression (plus preposition, if any) will be addressed in Section 3.2 below.
How they function semantically will then be considered in detail in Sections 3.3 and 3.4.

3.1.2 Tense

As we saw in the preceding Sub-section, temporal reference is made in cases of temporal adverbial modification via lexical expressions with temporal meaning which form (perhaps complex) predicates of events. And as we noted, tense differs from this mainly in virtue of the fact that here reference to time is made not via lexical expressions but via functional elements we call tenses. Concomitantly with this distinction of lexical vs. functional we also find a distinction as to the classes of temporal expressions that enter into temporal modification and tense. In the former case, as we noted above, we have an open class of expressions (listed in the lexicon). With tense, on the other hand, we have a closed class of very few elements, i.e. tenses. For concreteness we can assume that there are three tenses, past, present, and future, and that these three non-lexical expressions denote past time, present time, and future time, respectively. This is sufficient for the time being, since it completely covers the temporal dimension; hence every event that takes place in time can have one of the three tenses.38

We also saw in the preceding Sub-section that temporal adverbial modifiers relate to the events they modify in virtue of being predicated of them. If we were to apply this analysis to tense, we would postulate three predicates of events, PAST, PRESENT and FUTURE, corresponding to the three tenses mentioned in the preceding paragraph. Thus, the sen-

38 The tenses will be addressed in greater depth in the later parts of this thesis.
tence in (85) a), for example, would be analyzed as in (88) a), which says roughly that for some event e John loves Mary in e and e is in the past. And analogously for the other two examples in (85).

(85) a) John loved Mary
    b) John loves Mary
    c) John will love Mary

(88) a) (\{a\} [ love(j,m;e) & PAST(e) ]
    b) (\{a\} [ love(j,m;e) & PRESENT(e) ]
    c) (\{a\} [ love(j,m;e) & FUTURE(e) ]

Provided that such an analysis of tense can be implemented in the theory, it establishes a transparent relation between time and events, as in the case of temporal modification considered in the preceding Sub-section. More importantly, this relation between events and time is expressed in terms of the same mechanism as in the case of temporal modification, namely predication over events. Furthermore, this mechanism is motivated quite independently of considerations that are specific to reference to time in natural language, as we saw in Section 2 above. In return, finally, this analysis of tense would also serve to enhance the appeal of the Event-Hypothesis to some degree, by extending its application to a new domain.

Some initial motivation for trying to implement an analysis of tense in the manner suggested above derives from the fact that arguments have been made on different grounds and in different frameworks, as early as Kiparsky (1968), and as recently as Hornstein (1990b), that tense is adverbial in

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37 Where matters are not clear from the context, I will use *italics* to refer to the tense *forms* as they occur in languages. For example, the English suffix *-ed* is a *past tense form*. In contrast, the meaning of this form, or its semantic function is referred to with CAPITALS. In this example, we thus have an instance of PAST TENSE.
nature. The latter, for instance, argues to this end (in Section 5.2) on the basis of locality conditions on the scope of tense which patterns with the very limited scope found with adverbs. Unlike these other frameworks, however, a Davidson-style analysis of tense has the advantage of making transparent both the syntactic and the semantic parallels between tense on the one hand and adverbial modification on the other hand.

Our program for most of the later Chapters of this thesis is thus to show that the idea of Kiparsky (1968) and Hornstein (1990b) that tense is adverbial can be implemented in linguistic theory in terms of the analysis of adverbial modification proposed by Davidson (1967a). To the extent that such an extension of the Event-Hypothesis to tense can be carried out successfully, we will arrive at a unified analysis of all forms of temporal reference in language. At the same time, we would also have made a big step towards reducing the theoretical vocabulary required for an account of tense.

With this in mind, we can now return to our more immediate concerns of adverbial temporal modification. The following Section will address the syntactic structure of temporal adverbials; the one after that will examine their semantic functions.

3.2 The Syntax of Temporal Modifiers

Temporal modification is effected by means of temporal adverbials, of which there appear to be three kinds on the face of it. We will discuss each of these three kinds in turn below. Despite differences in their appearance at the surface, they all instantiate basically the same pattern. First,
and most important in the present context, they can all be analyzed as predicates of events in the way suggested by Davidson (1987a). Second, they are always optional in the sentences in which they occur, providing us with information above and beyond what is required by the grammar to make a sentence complete. From the point of view of syntax, this correlates with the status of adverbials as adjuncts; from the point of view of semantics, with their status as conjoined predicates of events.\textsuperscript{38}

The superficial distinction of three groups of temporal adverbials alluded to above is the following: The first group includes the so-called "bare NP" adverbs discussed in Larson (1985). The second is constituted by prepositional adjuncts containing time-denoting expressions in complement position. Third, finally, there are sentential adverbials.

3.2.1 Bare NP Adverbs of Time

This class of time adverbs includes the items listed in (87), among others. We can assume with Larson (1985) that these are bare NPs.\textsuperscript{39}

\textsuperscript{38} Recall from Section 2.5 above that we rejected the so-called neo-Davidsonian approach which treats arguments, too, as (parts of) predicates of events. Thus, on the view we adopted there, arguments, being required by the grammar in order to make a sentence complete, are part of the "core" sentence; adverbials, in contrast, representing accessory information, are not part of the core but are represented as conjoined predicates in the manner originally proposed by Davidson (1987a).

\textsuperscript{39} We are making this assumption simply for the sake of the discussion here. For if we didn't, we'd have to subscribe to the alternative promoted by Emonds (1987) and McCawley (1988) (there being no other alternative) who postulate implicit prepositional heads for these items. In this case, the present Section would of course be subsumed under the next
(87) now, then, yesterday, today, tomorrow, always, forever, that day, a year earlier/later, some time next month, last week, etc.

As Larson (1985) points out (p.595-8), "Many NPs that can be construed as referring to a point or period of time can function as temporal modifiers -- for example, NPs headed by common nouns that refer to calendrical units such as days, months, and years." Likewise, the names referring to such units can also be so used; thus for instance, Monday, the first of April, last September, etc. Furthermore, NPs headed by the noun time, and temporal deictics. Not all expressions referring to times can function as bare NP adverbs, however; occasion, period of (time), interval, etc., for instance, are illicit in this function. Larson therefore concludes (ibid.) that an inherently temporal meaning of a nominal is not sufficient for being able to serve as a bare NP adverb. McCawley (1988) points out that besides the nominal head, also the choice of determiner significantly affects the well-formedness of bare NP adverbs.

The temporal adverbials of this group fall straightforwardly under a Davidsonian analysis on the assumption that these expressions are directly predicated of the main event of the sentence, as shown in (88).

(88) a) John arrived yesterday
b) \( (j;g) [ \text{arrive}(j;g) \& \text{yesterday}(g) ] \)

It might perhaps seem odd to regard the adverbs in (87) as predicates. Indeed, Enç (1987) objects to this (in fn. 24) on the basis of an observation attributed to Irene Heim, that

one, and there would be nothing to discuss here. Though I tend to side with these latter authors on this issue, this is basically beside the point here. What matters, rather, is that on either view the adverbs in (87) are analyzable as predicates of events.
it does not seem correct to account for time adverbs such as *yesterday* "... by assuming that the adverb is functioning as a predicate, since this predicate would yield the property of being yesterday, not the property of being included in yesterday." (emphasis added). While at first this seems to be a fatal argument against the view advocated by Larson, it is rather questionable whether it actually carries much force, if we look at it more closely.

Note, first, that the items in (87) above can also be used predicatively in other constructions, under certain circumstances. Thus, they can be predicated of demonstratives, for instance, as shown in (89) a) and b); and even c), with an event-nominal as subject, is acceptable.

(89) a) That was yesterday, but this is today.  
    b) That was then, and this is now.  
    c) The elections will be tomorrow. 

In fact, as b) illustrates, even the pronominal forms *now* and *then* can be used in this manner. This sentence is perfectly natural, say, in the context of statements such as *Gasoline used to be fifteen cents a gallon, but now it's up to almost a dollar fifty*. Given this, it seems perfectly natural to analyze bare NP adverbs as predicates of events.\(^40\)

\(^40\) Jim Higginbotham (p.c.) has reminded me that there is an issue here that is worth exploring, though it does not directly bear on the argument made in the text. This concerns the fact that the simple copula *be* is often somewhat less felicitous in cases where the subject has lexical content, as in ??*that event was yesterday* (though cf. (89)c), which seems more acceptable, as does *the party was yesterday*). No doubt, a light verb such as *happen, obtain, or take place* is much preferred here. Even so, in keeping with the analyses of light verb constructions advanced in Grimshaw (1988), Kearns (1989), etc., it seems most likely that such verbs are not the main predicates of their sentences, but function rather as a kind of dummy verbs required for purely syntactic reasons. After all, to say that an event *occurred* at some time or other is analogous to saying of some object
As to the claim that this yields the wrong interpretation, second, note that (89)c above does not assert that the elections have the property of being the 24-hour interval following today's, either; rather, the sentence asserts that the elections have the property of being included in the 24-hour interval following today's. By the same token, whatever objects the demonstratives that and this in (89)a pick out, the sentence does not mean that these objects are yesterday and tomorrow, respectively. Again, it means that these things are included in the relevant time intervals. And the same goes for now and then in (89)b, in the context given in the preceding paragraph.

Clearly, something is wrong here; but what is it? There are two possible answers to this question. Either Larson's analysis is incorrect and the expressions in (87) above do indeed contain empty prepositions, as suggested by Emonds (1987) and McCawley (1988). In this case, the adverbial in (88) as well as the predicates in (89) are headed by non-overt prepositions, whose semantic contribution is to guarantee that the relevant arguments have the property of being included in the relevant intervals, rather than having the property of being those intervals. So construed, Heim's observation provides evidence for the fact that Larson (1985) is on the wrong track. Accordingly, the adverbials in (87) above fall under the analysis given in the following section, and can still be analyzed as predicated of events.

that it is in some location or other; in either case, the light verb does not attribute any kind of property to the respective entity other than its mere existence at some time or place. If this is correct, then the fact that occur etc. are often preferable to be does not constitute evidence against analyzing the bare NP adverbs as predicates here. Moreover, note that matters are exactly the same if the main predicate is not yesterday but a PP-adverbal: ??that event was on Monday is every bit as odd as the example cited earlier.
Alternatively, one could argue that fault lies in the implicit assumption underlying the Heim/Enc argument: that the English expressions *yesterday*, *today*, and *tomorrow* are always descriptions which apply to 24-hour intervals grouped in familiar fashion around the moment of speech. That is, one could argue that the data in (89) above show that the predicate *today* does not denote the property of being the 24-hour interval which includes the moment of utterance, but rather denotes the property of being included in that interval. Accordingly, *yesterday* and *tomorrow* would then denote the properties of being included in the 24-hour intervals preceding and following *today*, respectively. By the same token, *John is here* does not mean that John has the property of being the location near me; it means rather that John has the property of being included in the location near me, or of being at the location near me. If the denotations of the expression in (87) above are analyzed in this manner, then the "bare NP adverb" approach of Larson (1985) can be preserved, and an analysis as suggested in (88) above can be sustained.

If one chooses to go with this second solution, certain auxiliary assumptions may be needed to account for cases where expressions of this sort occur in argument position. In *today is the last day of April*, for instance, one would not want to say that the property of being included in the current 24-hour interval has the property of being April 30th. Here, *today* would then have to be regarded as elliptical, containing an implicit argument, such that the sentence could be analyzed roughly as "(the day) having the property of being included in the current 24-hour interval has the property of being April 30".

The different uses of expressions such as *yesterday* can be unified if we analyzed them as predicates that are basic-
ally true of times that are included in the 24-hour interval preceding the moment of speech. Their uses as predicates of events then follow from the fact that every event has associated with it a time, namely the time during which it occurred. In this sense, the uses of temporal modifiers such as yesterday (and the other expressions in (87) above) as predicates true of events are derivative on their uses as predicates true of times. Similarly, here is basically a property of locations; and derivatively, for those physical objects that have a location, here is also a property of physical objects.

I will not pursue these matters any further here, as they are inconsequential for the point I want to make. Whichever is the correct solution, it should be clear now that Heim’s argument given in Enç (1987, fn. 24) does not conclusively argue against treating the adverbials in (87) above as predicates of events, at least in some cases.

3.2.2 PP-Adverbials of Time

In the second group, by contrast, the time-denoting expressions are not directly predicated of events. Rather, they are the arguments of certain relations whose other relata are the main events they modify. Such relations are overtly expressed, often by prepositions which are not themselves temporal in meaning such as in, at or on. In other cases, the relation is expressed by present participial forms derived from aspectual verbs such as begin and end, etc., or by special temporal connectives such as during, after, and before.

A few representatives of this class of time adverbials are given here:
(90) on Sunday, during lunch, before dinner, (with) in two hours, after lunch, for a day or two, at two o’clock, on March 15th, 44 B.C., in the year two thousand, in September, by next Friday, from that moment on, until doomsday, since daybreak, in the 19th century, beginning/starting next week, three months ago, etc.

On the Davidsonian analysis of adverbial modification these temporal modifiers are predicated of the events they modify. For instance, the logical form of the sentence in (91) a) is thus something like b):

(91) a) John arrived on Sunday.
    b) [ja] [ arrive(J;ja) & on.Sunday(aj) ]

While this is sufficient for illustrating the idea that underlies the analysis, it is obviously inadequate in that it glosses over the obvious syntactic compositionality of the temporal modifier. Characteristically, the adverbials under discussion in this Sub-section have the structure shown in (92). That is, a preposition P° which is the syntactic head of a PP-adverbial combines with its complement, viz. typically a temporal expression, to form a complex predicate of events such as the final conjunct in (91)b).

(92) PP (Adverbial)
     / \    
    SPEC / \
     / \   \ Complement NP

The syntactic head of a PP-adverbial (whether temporal or otherwise) is a preposition P° which establishes a syntactic and semantic relation between the event to be modified and the temporal expression appearing in the Complement position of P°.41 Thus if we take into account its syntactic struc-

41 The particular kinds of semantic relations that can be expressed by the class of prepositions relevant to this form of temporal modification are discussed in Section 3.3 below. For the moment we are primarily concerned with the
ture, our earlier example (91a), repeated here as (93) a), is more appropriately represented as in (93) b):

(93)  a) John arrived on Sunday.
      b) (j a) [ arrive(j; a) & on(a, Sunday) ]

It is worth noting here that the prepositions that appear in this class of temporal modifiers do not necessarily themselves have a temporal meaning. Thus, the preposition on can equally well be used in a locative adverbial, as illustrated in (94).

(94)  a) John slept on the floor.
      b) (j a) [ sleep(j; a) & on(a, the.floor) ]

Similarly, in can express a temporal relation as in (95) or a locative relation as in (98).

(95)  a) John solved the problem in five minutes.
      b) (j a) [ solve(j, the.problem; a) & in(a, 5.mins) ]

(96)  a) John played ball in the park.
      b) (j a) [ play(j, ball; a) & in(a, the.park) ]

And as the following two examples show, even until with its apparently purely temporal meaning is not unnatural in a non-temporal adverbial such as (98).

(97)  a) John slept until noon.
      b) (j a) [ work(j; a) & until(a, midnight) ]

(98)  a) John rode the train until Chicago.
      b) (j a) [ ride(j, the.train; a) & until(a, Chicago) ]

If the prepositional heads of this class of modifiers is not necessarily temporal in meaning, then their complements must surely have a temporal meaning. As is evident from most of the examples above, this is the case. The only apparent counter-examples to this come from cases where the comple-

syntactic structure.
ments denote events, as could be argued for (97) above, and as is undeniably so in (99) below.

(99)  a) The fire broke out after the explosion.
    b) \[ \langle a \rangle \{ \text{break.out(fire;}a) \& \text{after(a, explosion)} \} \]

However, since as we noted earlier every event has a time associated with it, it can be argued that derivatively event-nominals such as explosion are temporal expressions as well. The temporal expressions that occur in the complement positions of prepositions in temporal adverbials will be classified in Section 3.3 hereafter.

3.2.3 Temporal Adverbial Clauses

The third group of adverbials presents only a slight variation of the pattern observed in the second group. The main difference between Adverbial clauses and the PP-adverbials of the preceding Sub-section, as their names imply, concerns the fact that the former take NPs as complements, and the latter, sentences. A few examples are given in (100).

(100) when the cherries blossom, as soon as his shift ended, before anyone noticed, after everyone left, while John was away, until the work was completed, since he left home, etc.

As is evident from the above examples, the syntactic structure is basically the same as above, modulo the difference in complements mentioned above.

(101) Adverbial Clause
    \[
    \text{SPEC} \quad \text{SPEC}
    \]
    P° \quad \text{Complement Clause}

The class of the syntactic heads of adverbial clauses has traditionally been known as that of temporal conjunctions, or
temporal connectives (so in Hornstein (1990b), for instance). As such, they are arguably members of the category C° (complementizers) rather than the category P° (prepositions), as indicated in (101) above. However, there are at least two reasons that militate against analyzing temporal connectives as complementizers. First, there is the obvious fact that a number of them can take either nominal of clausal complements and hence must certainly be analyzed as prepositions at least in the former cases. In particular, this concerns before, after, since, and until. Second, in older English we often find the complementizer that immediately following temporal connectives (cf. Curme (1931), p.266ff.), as we do in other languages (eg. Swiss German bevor das 'before that S', or French avant que 'before that S', etc.). For these reasons, I prefer to think of temporal connectives as prepositions rather than complementizers. The same position is also adopted by McCawley (1988) who argues in favor of "... accepting Jespersen's (1924:89) categorization of 'subordinating conjunctions' as prepositions " (fn.5, p.585). I should also point out, however, that nothing of consequence hinges on this, and that everything I have to say below is also compatible with the alternative view.

Furthermore, we note that the class of prepositions with clausal complements seems to be smaller than that of prepositions taking nominal complements. Moreover, as mentioned above, there is some degree of overlap between the two classes. And finally, the meaning of temporal connectives is more narrowly restricted to the domain of time than that of the prepositions which can only take nominal complements, which can be construed as evidence to the contrary for the view arbitrarily adopted above that temporal conjunctions are prepositions.

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=telic; B(\(\alpha\)) =Initiative Aspect of atelic \(\alpha\) (ie. its Beginning); M(\(\alpha\)) =Imperfective Aspect (ie. the Middle); F(\(\alpha\)) =Terminative Aspect (ie. the End). As in (27) and (32), "<" represents precedence, and "=" simultaneity.]

(37) **Conjunction of Telic and Atelic Events:**

a) before(\(a, \beta\)) \(\iff\) B(\(a\)) < \(\beta\)
b) after(\(a, \beta\)) \(\iff\) \(\beta\) < F(\(a\))
c) when(\(a, \beta\)) \(\iff\) M(\(a\)) = \(\beta\)

2.5 **Conjunction of Two Atelic Events**

Finally, we address the most complicated of temporal orderings of events, where both are atelic. Since each atelic event has three Aspects to be ordered relative to those of the other event, the number of possible distinct orderings is naturally much greater than in any of the cases considered so far.

2.5.1 **Patterns**

Temporal conjunctions involving two telic events can express thirteen different configurations of relative positions of events. These are pictured in (38) below.

(38) **Possible Orderings: \(a\) =Atelic, \(\beta\) =Atelic**

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154
Recall from the previous Sub-section that the same prepositions occur with the same meaning (i.e. expressing the same relations) in either locative or temporal adverbials. The same does not appear to be true of the heads of adverbial clauses, as the following examples demonstrate. In (102) a), for example, before can only be interpreted as relating the times of the two events in time, but not as relating the locations of these events in space, for example. This is so in spite of the fact that the same word can clearly express a locative relation in the examples in b), in addition to the temporal relation in c). Only a temporal interpretation is available also for the example in b). Barring this, the sentence is unintelligible on the intended spatial reading which is paraphrasable as the place where the children used to climb the tree is in front of the place where the house burnt down last week.

(102) a) John arrived before Mary left.
    b) John was called before the grand jury.
       The dog was chasing the mailman before him.
    c) The mailman arrived before noon.
    d) * Children used to climb the tree before the house burnt down last month.

Similarly with after, only a temporal relation can be expressed if the complement is clausal, as in (103) a). Yet again, both a spatial and a temporal reading are possible if the complement is nominal, as in b) and c), respectively. And d) is again unintelligible on a spatial interpretation corresponding to b), roughly the place where we got gas is behind the location where the railroad crosses the road.

(103) a) John arrived after Mary left.
    b) The gas station is after the RR crossing.
       The dog ran after the mailman.
    c) The park closed after sunset.
    d) * We got gas after (where) the RR crosses the road.
       * The gas station is situated after (where) the RR crossing is located.
In the following example as well, the connective until can only be understood as relating the times of the two events, though not their locations. (104) can only mean that the spy followed me the whole time up to the time at which he lost sight of me, but not the spy followed me all over the place to the particular site at which he lost sight of me.\footnote{The latter, spatial, interpretation of the relation expressed by before may well be (conversationally) implicated by (104), though it certainly is not asserted. Thus if the spy used closed circuit cameras for his surveillance, then he could have followed me the whole time without really following me anywhere in space.}

(104) The spy followed me until he lost me out of sight.

The fact that the temporal connectives have more narrowly restricted temporal reading than their prepositional counterparts which only take NP complements may correlate with the fact that clausal complements do not denote times like the temporal expression do, which we discussed in the preceding Sub-section. What the connective relates semantically here is not what the clause denotes, but the event that it describes. That is, the sentence in (105) a) is interpreted as in b).

(105) a) John arrived after Max left
    b) (\exists a) arrive(j;a) (\exists a': leave(m;a')) [after(e,e')]

As before we can assume here that these events have times associated with them, and that it is these times of events that are related by the temporal connective.

Since the event of the adverbial clause together with the temporal connective again forms a complex predicate of events which modifies the matrix clause, these are not very different from the bare NP adverbs and the PP-adverbials considered earlier. Though strictly speaking we are here looking at two-place predicates of events, as (105) b) above makes clear.
3.2.4 Summary

Summarizing the discussion of this Section, we distinguished for chiefly expository purposes three prima facie very different kinds of temporal modifiers, viz. (i) bare NP adverbs, (ii) PP-adverbials, and (iii) adverbial clauses. These three different types are arguably all instances of the same underlying structure in which a possibly non-overt preposition relates an NP or a sentence to the event of the sentence to be modified. As we noted in passing above, such a view is adopted in McCawley (1988), following the lead of Jespersen (1924).

More importantly, in the present context, regardless of whether there are three kinds of temporal adverbials or only one, all of them can be analyzed as proposed by Davidson (1987a) as predicates of events.

A semantic classification of the different forms of temporal modification follows in the next Section.

3.3 Semantic Typology of Temporal Modifiers

3.3.0 Introduction: Forms of Temporal Specification

In the preceding Sub-section we observed that all syntactic forms of temporal adverbial modification are analyzable in terms of predication over events. If we now examine all the examples considered above and ask in each case exactly what is the relation between time and an event that is specified by an adverbial, then we discover that each case instantiates one of two basic relations between time and events. That is, in regard to the temporal specification of events,
we have to distinguish two forms, pertaining to the two ways in which events relate to time. Recall from the beginning of Section 3.0 above that we distinguished between the location in time of events and their having time, i.e. extension along the temporal dimension. Stating the same point slightly differently, we can say that events take place in time, and that they take time to take place. Accordingly, we distinguish temporal location and temporal duration, respectively.

In the traditional taxonomy of temporal adverbials three kinds are distinguished on the basis of their contribution to the meanings to the sentences they modify. These contributions are distinguished on the basis of three distinct questions, to which the three kinds of adverbials provide the answers (so for example in Crystal (1966), Leech (1970), Kučera & Trnka (1975), and others). (106) illustrates this.

\begin{itemize}
\item[(106)] Temporal Adverbials:
\begin{itemize}
\item a) when? \hspace{1cm} \textbf{temporal location}
\item b) how long? \hspace{1cm} \textbf{temporal duration}
\item [c) how often? \hspace{1cm} \textbf{frequency }]
\end{itemize}
\end{itemize}

The forms of temporal specification listed here exhaust the range of relations between events and time found established by adverbial modifiers. There are not others. Of the three, we will exclude the adverbials of frequency of (106) c) from consideration in this study, since they do not pertain strictly speaking to time as a dimension (in the \textit{mass}-sense of the word \textit{time}; cf. Section 1.2 above). Rather, they pertain to the frequency of occurrence or recurrence of an event (in the \textit{count}-sense of the word as in \textit{how many times}). This leaves us with two possibilities for the temporal specification of an event, viz. the ones in (106) a) and b). We discuss each in its turn in the following two Sub-sections.
3.3.1 Temporal Duration

Adverbials of time indicating the duration of an event represent the most straightforward cases of an event's temporal specification. In the simplest cases, these consist of the preposition for with a complement that refers to a temporal interval simpliciter. 43 Two such cases are illustrated in (107), where both a while and ten hours denote intervals. The only difference between the two cases stems from the fact that the former is subjective and varies according to context whereas the latter is fixed in length by extra-linguistic convention.

(107) a) John slept for a while.
     b) Mary worked for ten hours.

The lexical temporal expressions which occur in adverbials indicating temporal duration must denote simple predicates of times. That is, they can only denote the extension of an interval, but must not contain any indication of location in time. I will refer to these as Simple Expressions of duration (SED). Some examples are given in (108); again, the ones in a) are subjective and context-sensitive whereas the ones on b) have duration fixed by extra-linguistic convention.

(108) Simple Expressions of Duration:
     a) while, moment, instant, age, etc.
     b) year, month, day, week, hour, minute, second, etc.

For example, year belongs in this class since it simply indicates a certain duration, but last year, that year and 1969

43 What is meant here will become clearer in the following paragraph.

I should also mention here that not all sentences can be modified by a for-adverbial. In particular, telic events can not be so modified. We will return to this in Chapter Two below when we address aspectual properties of events.
indicate temporal location in addition. These latter adverbia-
als answer not to how long? but to when? Similarly with day
vs. today, this / that day, yesterday, someday, or Tuesday,
etc.

We observe a number of generalizations which appear to
govern the class of temporal expressions that occur in ad-
verbial modifiers of duration. Firstly, simple Expressions of
Duration are mostly indefinite;\(^{44}\) secondly, they may contain
ordinal numerals; and finally, any temporal expression con-
taining an element which quantifies over sub-intervals, such
as all, entire, or whole denotes a simple interval.

If the above examples with preposition for specify the
entire duration of the events (however long it may be), then
the following sentences will differ from them in virtue of
the fact that the preposition in relates an interval which is
larger in size than the time of the modified event. Thus in
(109) a), five minutes denotes a time interval longer than
the time it took Sam to solve the problem. In this sense, the
adverbial specifies an upper bound for the duration of the
event. Thus (108)a) is not falsified if Sam actually solved
the problem in only two minutes. It differs in this respect
from (107)b) above, which most certainly is falsified if
Mary worked for two hours only.

(109) a)  Sam solved the problem in five minutes.
b)  John slept for five hours in two days.

This difference between in and for is most transparent in
(109) b), where the two kinds of modifiers occur side by
side. Again, the for-adverbial specifies the exact duration
of the event whereas the in-adverbial specifies a larger in-

\(^{44}\) An obvious counter-example is He's out of the office
for the rest of the day.

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interval in which the duration of the event is contained. Like for, in combines with Simple Expressions of Duration such as are given in (108) above to form complex predicates of temporal duration.

Of the two, the relation expressed by in seems to be more marked than the one indicated by for, since with adverbials lacking an overt head we only get the latter interpretation. Consider (110), for example, where a) can only mean that Bill rested for the entire day, not that he rested for some time within the relevant 24-hour interval. Similarly in b), the duration of Mary's hesitation is not contained in, but equals, a minute or two; and c) asserts that John did not work for the entire six months, not just for some time within that period.45

(110) a) Bill rested all day.
     b) Mary hesitated a minute or two.
     c) Sam was out of work six months.

Not only interval-denoting expressions can occur in modifiers indicating duration, but also events, as in the next example. Again, this is licit because every event has an associated time interval (viz. the interval during which the event occurred).

(111) Max snored throughout the lecture.

45 There are apparent counter-examples to this, such as
  (i) Sam was out of work last year,
which does not mean that he did not work at all during the last twelve months; rather, it means that within that period there were times when Sam did not work. The reason why this is only an apparent counter-example is that the adverbial in (i) does not answer the question how long? but rather when? Given this, it is properly dealt with in the context of the discussion of temporal location of events, in the following Sub-section.
Similarly with events that are described by sentences, as in the following example. Note again that the temporal connective (for) as long as (like the ones discussed in Section 3.2.3 above) has an exclusively temporal reading.

(112)a) John ran (for) as long as Mary ran.
       b) John ran (for) as far as Mary ran.

For although the predicate long can basically be applied in either the spatial or the temporal domain, the temporal connective (for) as long as can only interpreted temporally in the sense of for as long a time as, but not spatially in the sense of for as long a distance as. (112) a) has no reading on which it is synonymous with b).

The two prepositions for and in (and their synonyms) seem to be the only ones that can combine with simple Units of Duration to form adverbial modifiers indicating temporal extension. The former can also be non-overt, as in (110) above. We can analyze these as instantiations of the two abstract relations \text{FOR}(\epsilon, \mathcal{D}) and \text{IN}(\epsilon, \mathcal{D}), for some event \epsilon and some simple expression of duration \mathcal{D}. As noted, the two differ in meaning from each other in that the former indicates the duration of an event from beginning to end, whereas the latter merely gives a time-frame within which (the time of) the event is contained. All other prepositions answer not to the question how long?, but rather to when? Hence they specify temporal location rather than duration.

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\text{Incidentally, the same is true of the corresponding question, how long?, as in how long a trip is it from here to New York? which asks for an answer in terms of hours and minutes, not miles. Similarly, if a state trooper asks (for) how long have you been driving without a valid license? the answer has to be in terms of days, weeks, months, etc., not the number of miles driven.}
3.3.2 Temporal Location

Matters are somewhat more complicated with adverbials of temporal location. This is so, in part, because we are forced to distinguish between two ways in which temporal location can be specified. As we will see in a short while, however, both of them operate on the basis of the same principles and primitives. The main difference between the two kinds hinges on whether the specification of temporal location occurs in the lexicon or in the syntax.

Consider first the syntactic cases, which are exemplified in (113), (114), and (115). In the first set, the adverbials contain lexical temporal expressions; in the second, event nominals; and in the third, events as described by sentences.

(113) a) The vampire woke up at the stroke of midnight.
     b) Mary got up before noon.
     c) Sam went to bed after midnight.

(114) a) John got a tan at the ball-game.
     b) John memorized his speech before the convention.
     c) The fire started after the explosion.

(115) a) The vampire woke up when the bell struck midnight.
     b) John was at the station before the train arrived.
     c) The firemen arrived after the fire was extinguished.

In all three sets, we find the same three ordering relations illustrated in a), b), and c). Since the underlined adverbials are complex predicates of events, the first argument of these relations is the event to be modified, described in the matrix clause. Their second arguments are the times denoted by the lexical temporal expressions in (113), and the relevant events (or their times) in (114) and (115).
As in the previous sub-section we can again assume that the particular prepositions and temporal connectives used are particular lexical instantiations of abstract relations between events and times. Corresponding to the a), b), and c) examples above we thus have the three abstract relations \( \text{WHEN}(e,t) \), \( \text{BEFORE}(e,t) \), and \( \text{AFTER}(e,t) \), for some event \( e \) and some time \( t \), which express simultaneity, anteriority and posteriority, respectively. \( \text{WHEN} \) surfaces as \( at \) if the complement is nominal, and as \( when \) if it is clausal.\(^4\) As we observed earlier, the clausal temporal connective again has a more narrowly restricted temporal reading than its prepositional cousin which takes NP-complements. Thus, for instance, (114)a) can have a spatial interpretation, synonymous with John got a tan at the ball-park, or .. at Fenway Park. However, only a temporal reading is available for John got a tan when the Red Sox played Chicago.

In the above examples, the syntactic structure of the adverbials correspond element for element to their semantic structures: The head, whether preposition or temporal connective, establishes an ordering relationship between the event to be modified in the main clause and a time furnished by the complement expression. The temporal location of the main event is thus specified in relation to this time, which I will call the temporal axis of orientation, or simply axis.

Matters need not always be this transparent, however. Thus in addition to the syntactic cases above, we also find lexical adverbials of temporal location expressing various combinations or an ordering relation and a temporal axis. Perhaps the most prominent representatives of this class are the indexical adverbs in (116). These expressions are index-

\(^4\) This alternation is analogous to the one of \( \text{during} + \text{NP} \) vs. \( \text{while} + S \).
because, as is well-known, their denotations vary from one context of utterance to the next.

(116) yesterday, today, tomorrow

What is constant across the three expressions of temporal location in (116) is the fact that the axis of orientation relative to which the modified event is located in time is the speech time. Taking this into account, the three expressions differ only with respect to the particular ordering relations they express: yesterday is the day BEFORE (the day of) the utterance, and tomorrow is the day AFTER. Finally, today is the day WHEN the word is uttered, or perhaps the day IN which the utterance occurs.

The same three abstract relations presumably also underlie the other expressions that are elements of the Personal Calendar (in the terminology of Bull (1971)), such as the ones in (117)a). Here last and next are instances of the notions of anteriority and posteriority, i.e. the abstract relations BEFORE and AFTER. Hence the synonymy with (117)b). In addition, last and next also make implicit reference to the axis of orientation, which is again situated in the speech act.

(117) a) last week, this week, next week; etc.
   b) the week before/after this week,

The notion of simultaneity is expressed in (117)a) by demonstrative this. Thus this week denotes the week surrounding the moment of utterance. That is, it is either the week WHEN, or the week IN which, the word is uttered.

More generally, any temporal expression containing an indexical (such as a demonstrative) implies some kind of locational relation in time. Thus if this indicates simultaneity, then that indicates its negation, or complement. The main
difference between this case and the earlier ones is that here non-simultaneity is not further differentiated as BEFORE and AFTER. Thus the first expression in (118) only reveals that the month referred to is not the current month; it does not tell us, however, whether that month precedes or follows the present one.

(118) that month, this month; etc.

The same is true for the temporal demonstrative pronouns now and then.

The generalization that governs these cases is that whenever an indexical is combined with one of the Simple Expressions of Duration (cf. (108) above), the resulting structure specifies the temporal location of the event modified, not its duration. Thus even though month simply expresses duration (cf. the preceding Section), the forms in (118) indicate location, since they answer to the questions when, not how long?

In examples (113) to (115) above we saw cases where the semantic compositionality of adverbials of temporal location is syntactically transparent: the preposition or temporal connective is the syntactic head, and the axis of orientation is denoted by the temporal expression or description of event which is the syntactic complement of the head. Then in (116) to (118) we found cases where abstract relations and axis are both expressed by a single lexical item. In both cases, we noted, the same principles are at work: the event to be modified is located in time in relation to some known point in time. Moreover, the relations temporal location are the same in all cases.

The two different ways of specifying temporal location (ie. in the lexicon vs. in the syntax) are not mutually ex-
clusive, however. As (119) a) shows, the two can be combined to produce an interpretation that is synonymous with that of the syntactically more explicit sentence in b).

(119) a) John arrived the day before yesterday.
   b) J. arrived the day before the day before today.

More generally, the time or event that serves as the axis of orientation must itself have a location in time. In other words, not only the adverbial as a whole must denote a temporal location that answers the question when? for the matrix sentence, but so must the axis itself. This is demonstrated in (120) and (121).

(120) a) When did Mary go to bed?
   b) Mary went to bed before midnight.

(121) a) Before When?
   b) Before midnight.

The temporal expressions found here in adverbials of temporal location differ in this respect from the Simple Expressions of Duration found in the preceding Sub-section with adverbials of temporal duration. The latter, as we observed, answer the question how long? rather than when? The simple SEDs in (108), which Kučera & Trnka (1975) (p.2) call the "M-set", contrast with the ones in (122) below, which these authors call the "L-set". Like the former, these latter expressions typically denote intervals. Unlike them, however, the latter expressions fall into sets with certain systematic properties, which will become clear in a moment.

(122) Systematic Intervals:
   a) morning, afternoon, evening, night.
   b) Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday.
   c) January, February, March, ..., November, December.
   d) Spring, summer, fall, winter.
   e) yesterday, today, tomorrow.
As Kučera & Trnka (1975) point out, the sets of expressions given in a), b), c), and d) above, and others like them, are antonymy sets in the sense of Katz (1964). Such sets have the property that all of their members are mutually exclusive. That is, as (123) a) below illustrates, a single sentence can not be modified by two members of the same antonymy set; however, as b) shows, members of different antonymy sets can well be combined in this manner.

(123) a) **On Monday, John arrived on Tuesday.
       b) On Monday, John arrived in the evening.

Both classes of expressions denote times, or intervals of time, evidently. Where they differ is that the Systematic expressions indicate not only the duration of an interval, but also a relation between it and some other time. In (122) e), for example (which repeats (116)), yesterday denotes a 24-hour interval which stands in the BEFORE-relation to the present 24-hour interval. In this respect it differs from the underlying simple Expression of Duration, viz. day; the latter simply denotes a 24-hour interval, without specifying a relation between the particular interval denoted, if any, and other intervals of the same kind. Similarly in (122)b), Monday differs from day in that it specifies the relation of its referent to the referents of the other members of the same antonymy set. In other words, to know the meaning of the expression Monday one needs to know the meanings of all seven weekdays, including the ordering relations that obtain between them.

Finally, it must be noted carefully that although we observed earlier that Simple Expressions of Duration are mostly

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48 The term is used by Katz (1964) to refer to sets of expressions in a common referential domain whose members are mutually exclusive, such as expressions of sex and gender, or color terms, etc.
indefinite, the difference between them and the Systematic Intervals is not one of "definiteness" or "indefiniteness" of times (or events). As the following examples demonstrate, indefiniteness is orthogonal to the distinction at issue here, which is whether or not some kind of (ordering-) relation is specified in the meaning of the temporal expression.

(124) a) John rested for a day.
     b) John rested for the day.
     c) * John rested for a Tuesday.

(125) a) John arrived on a Tuesday.
     b) John arrived on that Tuesday.

3.3.3 Combinations of Duration and Location

The two kinds of adverbials discussed in the preceding Sub-sections, specifying temporal duration and temporal location, can co-occur freely in the same sentence, as in (126).

(126) a) John worked for six months last year.
     b) Mary slept for twelve hours on Sunday.

Similarly in (127) below, both temporal location and temporal duration are specified. Unlike in the example above, however, the Simple Expression of Duration two hours does not modify the main event here, but rather the before-relation between it and midnight.

(127) Mary arrived two hours before midnight.

Thus, what is specified here is the duration of the interval
between Mary's arrival and midnight, not the duration of a single event.\textsuperscript{49}

In a similar fashion, the duration of a single event can be inferred from the temporal locations of its beginning and end points, as illustrated in (128).

(128) John worked from noon to midnight.

This is not to be confused with specification of duration, however. (128) is not synonymous with (129) below, even though the former implies the latter.

(129) John worked for twelve hours.

Clearly, (128) says more than (129), in that it locates the event in time.

3.4. The Primitives Involved

By way of summarizing our observations in the preceding Sub-sections, we now briefly discuss the major notions we encountered above. At the outset, we identified two areas of grammar where the relation of events to time is of relevance, namely tense and temporal adverbial modification. Subsequently, we examined the latter of the two in greater depth, since

\textsuperscript{49} Observe that *Mary arrived for two hours* is not well-formed, since telic events such as arrive are incompatible with modifiers expressing duration of the event. To the extent that this sentence is interpretable at all, two hours is predicated not of the overtly described event of arriving, but of some implied event of staying after the arrival. Similarly, John got up for two hours does not mean that it took John two hours to get out of bed; rather, it means that he stayed out of bed for two hours after getting up.
in this area matters pertaining to the relations of events to time are more transparent. This is so in three ways.

Firstly, from the point of view of the mechanisms of grammar that are involved, we concluded that all forms of temporal adverbial modification can plausibly be analyzed as Davidson-style predicates of events. To what extent this analysis carries over to tense, as we hypothesized earlier, is yet to be determined.

Secondly, we noted with respect to the form of adverbial modifiers of time that despite superficial differences, both the syntactic and semantic structures are surprisingly uniform. Typically, they consist of a (possibly non-overt) syntactic head (a temporal connective or preposition) and its complement, which is either a nominal or a clause. The complement denotes or describes either an event or a temporal interval, which enters into a relation, expressed by the syntactic head, with the event of the sentence to be modified by the adverbial. In other words, the head and its complement jointly form a complex predicate of the main event.

Concerning the semantic function of temporal adverbial modifiers, finally, we distinguished between specification of the temporal duration of an event and specification of its temporal location. In both cases, the same semantic structure of the adverbial is the same, as noted above: It consists of some kind of relation between the matrix event on the one hand and some kind of relatum on the other hand.

Temporal modifiers of duration, first, establish an essentially equative relation between the event and the relatum, which furnishes a temporal interval pure and simple, without any indication of temporal location). We named this
relation FOR. It specifies the event as having a duration equal to some given interval. This is summarized in (130).

\[ (130) \quad \text{FOR}(e,D) \iff \text{Time of } e \text{ equals } D \]
where FOR surfaces either as for or in null-form
where D either denotes an interval (e.g. a moment)
or consists of an ordinal numeral plus a unit of measurement

Second, modifiers of temporal location establish a linear ordering relation between the main event and some temporal fix-point or axis of orientation. The axis itself must have a specified temporal location, in virtue either of knowledge shared by the discourse participants, or of the lexical meanings of the relevant expressions. As for the ordering relations, we distinguished three of them, namely BEFORE, AFTER, and WHEN, expressing anteriority, posteriority, and simultaneity, respectively. Their properties are summarized in (131) through (133) [where A is the axis, i.e. either an interval specified for temporal location or the temporal location of another event].

\[ (131) \quad \text{BEFORE}(e,A) \iff \text{Time of } e \text{ precedes } A \]
where BEFORE surfaces as before

\[ (132) \quad \text{AFTER}(e,A) \iff \text{Time of } e \text{ follows } A \]
where AFTER surfaces as after

\[ (133) \quad \text{WHEN}(e,A) \iff \text{Time of } e \text{ is simultaneous with } A \]
where WHEN surfaces as when+S or at+NP

Temporal location and temporal duration are the only two time-related properties for which an event can be specified by means of a temporal adverbial modifier. Both properties are specified in the same basic manner, in terms of a relation between one entity which has the relevant property and an entity which lacks it. The latter is typically (though not
necessarily)\textsuperscript{50} the event of the sentence to be modified by the adverbial. It gets the relevant property from the other relatum, which must be specified for it by entering into a certain relation with it. These relations, as we saw, are specific to either duration or location. In the former case, we found an equative relation (\textsc{for}) and a containment relation (\textsc{in}). In the latter case, we observed three relations of linear ordering (\textsc{before}, \textsc{after}, and \textsc{when}).

In the following, we will thus assume these notion as primitives. For the time being, their characterization as given above are sufficient.

To what extent the same notions are instrumental in understanding tense is still an open question, which will be addressed in the following Chapters.

\textsuperscript{50} For example, (i) can serve as an answer for both (ii) and (iii). In the former case, the time of Bill’s leaving is presumed known, and Mary’s arrival is located relative to it; in the latter case, the time of Mary’s arrival is presumed known and that of Bill’s leaving is determined on the basis of it. (i) Mary arrived after Bill left. (ii) When did Mary arrive? (iii) When did Bill leave?
Chapter Two: Tense and Other AUX-Related Notions

0. Introduction

In the preceding Chapter One we examined the notions of events and time, and we sought out the two areas in grammar where the two intersect. One of these, namely temporal modification, was discussed in greater detail, and was demonstrated to fall under the familiar analysis of adverbial modification more generally, due to Davidson (1967a). The purpose of this, recall, was to sort out the notions and mechanisms that enter into the two functions reference to time plays in language, viz. those of specifying temporal location and duration. What we found at the core of both phenomena were a number of relations between the event to be modified on the one hand and a relatum which is specified for the relevant property (i.e. duration or location, as the case may be). This latter relatum of an adverbial modifier, as we saw, is typically either a time interval (e.g. hour, morning, Monday, etc.) or (the time of) an event. As for the other argument of the relation, on the other hand, we have been assuming thus far that it is simply the event of the matrix sentence. This raises questions about the status of the arguments of the basic relations discussed at the end of the preceding Chapter: Are they times? or events? Neither is entirely correct, as we will see in this Chapter. What these relations relate are Aspects of events.

The discussion of the notion Aspect in Section 1 serves two purposes. Firstly, Aspects provide internal structure for
events as required for a complete account of the relations of temporal specification. And secondly, with an eye on the account of tense to be developed, it is necessary to distinguish the notions of Aspect and Tense in order to gain an understanding of what exactly the theory of tense is supposed to account for. Since the term Aspect has been used with a variety of senses in a number of theories, much of this Section will simply be a matter of defining the terminology as it is used in this thesis. In our usage, an event has three Aspects, which are its Beginning and End points, and a Middle between the first two.

As mentioned above, Section 1 will address the notion of Aspect, for two reasons. Firstly, there is the problem hinted at in the preceding paragraph, of distinguishing the notion of Aspect from that of Tense. Intuitively, the distinction is clear: Aspect deals with the typology of kinds of events, based on their internal composition, whereas Tense is concerned with the external relationships of events to the temporal dimension. The second reason for our having to address Aspect before we can go on with the investigation of temporal phenomena derives from the fact that in order to capture these phenomena we need to assume that events have a minimal amount of internal structure, namely a Beginning and an End, and a Middle between the two. This usage of the term Aspect follows that of Bull (1971), which differs from its usage in other accounts. As the term Aspect has been used with a variety of senses in a number of theories, much of this Section will simply be a matter of defining the terminology as it is used in this thesis.

Section 2 will subsequently examine the three temporal ordering relations BEFORE, AFTER, and WHEN in the light of the discussion of Section 1. Specifically we will investigate the three temporal conjunctions or connectives before, after,
and when, which determine an ordering relation between two events described by sentences. As we will see, what is relevant to their felicitous use in any given situation is not so much the relative ordering of events as wholes as that of the Aspects of the two events.

Finally, Section 3 will take up the discussion of Tense we began in Section 3.1.2 of Chapter One. Concretely, we will briefly examine the standard analysis of tense, and review some of the problems that have been pointed out for this approach.
Section 1: Aspect and Aspects of Events

1.0 Introduction

In order to complete our account of the temporal ordering relations discussed earlier in the context of adverbial temporal modification we need to assume that events have some degree of internal structure. The internal structure of an event is frequently considered to be the domain of aspect, so for example in Bull (1971), Comrie (1976), and Woisetschläger (1977). The internal structure we need to assume, and our understanding of the notion Aspect, will be presented in Section 1.1 hereafter.

Other views of the notion aspect will subsequently be discussed in Section 1.2. To the extent that they bear on our analysis of temporal phenomena in language, we will correlate them with our understanding of Aspect.

Many different things have been called "aspect" in the literature, including some that seem to intersect the notion of tense. Two which readily come to mind are the English progressive (on which cf. also Kearns (1991)) and perfective forms. These notions, too, will have to be addressed before we can go on to our investigation of Tense. They will be discussed in Section 1.3 below.

1.1 The Aspects of Events

As mentioned earlier, we need some internal structure of events in order to complete our account of the temporal ordering relations of events and times as discussed in Chapter One, Section 3 above. The reason for this derives from the
fact that the ordering relations BEFORE, AFTER, and WHEN, if applied to events or intervals that have temporal duration, make no predictions in cases of partial overlap of events. This is most easily demonstrated by means of an example. Consider the situation represented graphically in (1) below, where a stands for (the time of) the event of John's being a senator and β, for that of Mary's being a senator, and where time passes from left to right as indicated.

(1) a: -------------------------- (John was a senator) 
                  ⊣
β:  ------------------------ (Mary was a senator) (time)

There can be no doubt here that the ordering of a and β is such that a is AFTER β, and β is BEFORE a. Matters are less clear, however, in the situation represented in (2) below, where a partially overlaps β.

(2) a: -------------------------- (John was a senator) 
                  ⊣
β:  ------------------------ (Mary was a senator) (time)

Is this a case of AFTER(a, β) or AFTER(β, a), or both? Or is it a case of WHEN(a, β) instead, or in addition? In Section 2 below I will give an account of the ordering relations that apply in cases of partial overlap such as the one in (2). As I will show there, an adequate account of these cases can be given on the basis of the assumption that what is ordered by the temporal ordering relations is either the beginning and end points of events, or their middles.

For this reason and others, I will adopt the usage of the term Aspect from Bull (1971), where it refers to the three parts of an event shown in (3). More specifically, I will assume that an event has a Beginning or Initiative Aspect as well as an End or Terminative Aspect, and the Middle or Im-
perfective Aspect which is simply the event minus its two terminal aspects; it is of minor significance here.

(3) Aspects of Events:

- ---------|======event======|--------- - (time)
|\----------v--------/|

\ imperfective \ institative

The Beginning and End of an event have location in time, but no extension.

It must be noted that Aspects on this understanding of the term are things, namely subparts of events. They are not properties of events. (Just like the subject of a sentence is not a property of the sentence, but a subpart of it.) Furthermore, they must not be confused with the "aspectual marking" of verb forms as we find it in many languages, such as the perfective or imperfective markers -ing and -ed in English, for example. The aspects defined in (3) above are typically not expressed by any morphemes in a linguistic structure. Rather, they are given as integral parts of the lexical meanings of expressions.

A basically very similar view of the internal structure of an event is taken in Woisetschläger (1977), though his notion of aspect refers to something else.

The metaphysical status of Aspects as defined above raises no special problems. The two end-points of an event, i.e. its Initiative and Terminative Aspects, are instances of a more general concept of boundary or surface which is entirely noncontroversial in other realms. For example, with physical objects such as rocks and tables, etc., we readily

1 On which cf. Sections 1.2.3 and 1.2.4 below.
agree that they can be conceived as comprising a surface and an interior which is often inaccessible, strictly speaking. Indeed, we typically identify or recognize such objects by their surfaces or boundaries. The usage of spatial prepositions is often also dependent on the relative spatial relations of the surfaces of objects, rather than their interiors, or the objects as wholes. For example, we cannot say that John is at or near the garage if John is in the garage. Similarly, if I swallow a quarter we cannot say that this quarter is at, near, in front of, behind or under me. Just like objects have surfaces, events have end-points. The reason for there being two end-points (Beginning and End) arises not from any special properties of events, but from the fact that our attention is focussed on the single dimension of time. With both concrete objects and events, the respective boundaries clearly have no status independently of the entities whose boundaries they are. Thus we do not have to attribute Aspects to events; they already have them because of the way the world is structured.

Finally, we note that the notion of Aspect as defined by (3) above allow for temporal intervals to be defined in only two ways. An interval can be defined either by the beginning and end of the same event, or else by the end of one event and the beginning of another. These two possibilities are illustrated in (4) and (5), respectively:

(4)

|==event==|
- __________|________________ |________________ | (time)
\-----v-----/
interval

(5)

|==event1==|
- __________|________________ |________________ | (time)
\-----v-----/
interval
Note here that while both the events themselves and the intervals defined by them have extension in the temporal dimension, their edges or boundaries do not. For example, a lecture may last for two hours, but its beginning and end can not.

1.2 Other Notions of Aspect

The usage of the notion Aspect we adopted in the preceding Section is perhaps somewhat unusual in that this term is not frequently used in this manner. Yet even aside from this, the term "aspect" has been used with systematic ambiguity in the literature, referring to number of distinct factors and phenomena in grammar. Two of these notions are worth mentioning here, not so much because they will be necessary to our analysis of tense and temporal reference as because they will be used informally in making certain descriptive generalizations in the course of the discussion. These are the telic vs. atelic distinction and that between perfective and imperfective events.

1.2.1 The Classification of Events

The term aspect has been applied by Vendler (1987a) and many others after him to the classification of predicates along Aristotelian categories of events and states. Only a subset of the distinctions proposed by Vendler is relevant here, namely the telic vs. atelic distinction. While these distinctions are often applied to predicates, we will here
assume that they apply to events. The reason for this derives from the fact that it is not only the predicates which determine the telicity of an event, but also their arguments. Thus (8) a) below it telic, but b) is atelic. As is evident from the examples, the two differ only with respect to their internal arguments.

(8)  
   a) John ate an apple.  (telic)  
   b) John ate apples.  (atelic)

One criterion according to which these two classes of events can be distinguished derives from adverbial modification for temporal duration, as discussed in Chapter One, Section 3.3.1 earlier. Thus the atelic event in (8) b) can be modified by for an hour but not by in an hour, while the reverse is the case for the telic event in a).

Another criterion, proposed by Garey (1957) (who apparently coined the terminology) depends on the answer given to the question in (7).

(7) Telic vs. Atelic Events:  
   Q: If one was verb, but was interrupted while verb, has one verbed?  
   A: If yes, the verb is atelic;  
      If no, the verb is telic.

The class of expressions which are typically telic in this sense includes Vendler's (1967a) classes of achievements and accomplishments; that of atelic expressions, in contrast, comprises the classes of states and activities. Examples are given in (8) and (9), respectively (from Baker (1989), Ch. 17.2).

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2 This distinction is understood in the same way in Kearns (1991) as applying to events under a given linguistic description, which includes that supplied by the predicate (p. 19).
(8) **Telic Events:**
   a) Linda finished her thesis. (Achievement)
   b) Dorothy built a house. (Accomplishment)

(9) **Atelic Events:**
   a) Jonah owned a horse. (State)
   b) Martin wandered around (Activity)

We will not attempt here to give an explanation as to the reason why events should differ in this manner, as this would lead us too far afield. We simply note the existence of these classes as a fact, and proceed to examining what follows from them for our investigation. In that part of the discussion where the telic - atelic distinction is relevant, the following examples will represent the two classes:

(10) a) Mary was a senator. (atelic)
    b) John was elected. (telic)

1.2.2 Perfective vs. Imperfective Aspect

This distinction deserves mention firstly because it is marked overtly in some languages, so for example in the Slavic languages (Russian, eg.) and the Romance languages (eg. in Spanish past tenses). Secondly, and more importantly in the present context, it facilitates the making of certain generalizations concerning the distributions of temporal connectives such as *since, until, and after*, as we will see in Section 2 below.

The imperfective aspect is basically as already defined in (3) above. That is, where an *imperfective*-marked event enters into an ordering relation, it is the *Middle* of the event that is relevant. The perfective, in contrast, concerns *either* the Beginning or the End of an event.
1.2.3 The English Progressive

The English progressive form is analyzed in Woietschläger (1977) in terms of a distinction between phenomenal and structural descriptions of facts about the world. This view has most recently been criticized and rejected by Kearns (1991), who argues for a version of the traditional analysis going back to Jespersen (1932). On this view, the progressive provides a temporal frame for the event.

Whichever view one takes on the nature of the progressive, what is relevant for us is only that it be distinguished from the tenses, as is generally assumed in the literature. This is supported in part by the fact that the progressive form cuts across all three tenses. Having made this assumption, we exclude the progressive form from further consideration. No significance is to be attributed to the use of either a simple or a progressive form in any of our examples, except where explicitly mentioned. For details and discussion of the semantics of the progressive, I refer to the works mentioned above and the references cited there.

1.2.4 The English Perfect

Matters are somewhat more controversial with the perfect form. For many writers, including Huddleston (1989), McCawley (1971), and Baker (1989), the perfect on at least one of its uses has a past-tense-like meaning, while others dispute this (e.g., Darden (1988)). The proponents of either view readily admit that the perfect differs significantly from the simple past tense.

Perhaps the chief factor that distinguishes the perfect from the past tense is the absence of systematic opposition with equivalents of the present and future tenses. For in the
tense system each tense is only meaningful in the context of the tense system as a whole, with its opposition of past, present, and future tenses. The English perfect, in contrast, forms a one-member set. There are no corresponding forms for equivalents of the present and future tenses. Even the absence of perfect marking does not exclusively represent either or both of present and future; for in the absence of perfect-marking the regular tense prevails. Furthermore, the perfect also does not enter into any oppositions with the three basic tenses. Rather, like the progressive in the preceding Sub-section, the perfect freely combines with the basic tenses. Given this, the perfect will also be excluded from further consideration, as it does not patterns with the tenses.

Still, the fact remains that the English perfect often has associated with it a past-tense-like interpretation; and if this is not due to a property which qualifies as tense in a strict sense, then there must be some other explanation for this fact which is not strictly tense-related. Without going in to the details, I would like to point out that a possible explanation of this sort derives from the "time-axis phenomenon" described by Givón (1973). The relevant generalization behind Givón's observation is simply that if the main verb of a sentence is regarded as establishing a time-axis which divides the temporal dimension, then "[p]resuppositions pertain to the time preceding this time-axis, while implications pertain to the time following the time-axis." (p. 890) That is, anything that is presupposed by a given assertion is temporally prior to what is asserted. Now, if this generaliz-

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3 This is in essence the characterization given by Givón (1973). In my view, it seems more plausible to day that it is the event, rather than the verb, which matters here. Even so, the statement given in the text is adequate for getting the point across.
ation can be applied to the English perfect, then the apparent past meaning of the perfect can be said to arise from presupposition rather than tense. Thus in the example in (11), the main assertion spelled out in a) concerns the present time, since sentence (11) is in the present tense (*cum perfect*). The apparent past-time sense conveyed by (11) thus does not derive from tense (which is present here, as just mentioned), but from the presupposition made explicit in b). Since the presupposition must temporally precede the present-tensed assertion, by Givón's generalization, the impression arises that (11) itself contains a kind of past tense.

(11) John has left.
    a) Asserts: John is not here (now).
    b) Presupposes: John left (before now).

If this is correct, then perfect sentences such as (11) represent cases where what is said does not completely match what is asserted. Specifically, such sentences then express two different propositions, one of which is asserted, and the other, presupposed; the latter is understood as obtaining prior to the former.

Note, finally, that relation between (the truths of) the two propositions expressed in (11) above is indeed that associated with presupposition more generally, which Givón (1973) renders as in (12) (p. 891; following Karttunen).

(12) \( \alpha \) presupposes \( \beta \) \iff \[ \text{True}(\alpha) \Rightarrow \text{True}(\beta) \] \& \[ \text{False}(\alpha) \Rightarrow \text{True}(\beta) \]

Thus where \( \alpha \) stands for the (asserted) proposition in (11)a) and \( \beta \) for the (presupposed) proposition in (11)b), \( \alpha \) presupposes \( \beta \) if the latter is true regardless of the truth of the former. This appears to be in accord with our intuitions about sentence (11), which is true regardless of whether
John is presently here or not, so long as he did in fact leave at some earlier point. 4

I will not at this point pursue the analysis of the perfect sketched above since it does not bear on our analysis of tense of later Sections. What will be relevant for our purposes is simply that the perfect is not a tense, at least not in the same sense in which past, present and future are tenses.

1.3 Summary

In summarizing the relevant points from this Section, we note that we understand the terms Initiative, Terminative, and Imperfective Aspect to refer to the Beginning and End points of an event as well as the Middle part between the two. The first two of these comprise the perfective aspects. Furthermore, we are assuming a classification of events into telic and atelic ones. And finally, we have excluded the English progressive and perfect forms from further consideration.

4 That is, John may have left and then come back. So even if he's here when I utter (11) my utterance is still true.
Section 2: The Temporal Conjunctions

2.0 Introduction

In this Section we will take a closer look at the three temporal conjunctions or connectives listed in (13):

(13) before, after, when

Although these connectives also take nominal arguments, we will be concerned here only with cases where both of their arguments are sentences.

Section 2.1 sets up the preliminaries on the basis of which the discussion of patterns will proceed in Sections 2.2 through 2.5.

2.1 Distinguishing the Relevant Cases

We assume at this point the aspectual distinction of telic and atelic events (cf. Section 1.2.1) as well as the three component parts of events, viz. Beginning, Middle, and End which constitute our notion of Aspect (cf. Section 1.1 above). An event thus has the following structure:

(14) Aspects of Events:

- __________:=======event========:__________ - (time)
  \-----\-v-----/
  \ imperfective \
  initiative terminative

Telic events differ from atelic in that their three aspects are temporally non-distinct, i.e. have the same temporal location.
A telic event will be represented as in (15) a), an atelic event, as in b).

(15)  a) \[=\]
       b) \[\overline{====}===\]

The temporal connectives in (13) above basically order events relative to one another in the dimension of time. Since events have the component Aspects shown in (14) above, the connectives necessarily also impose orderings among the aspects of the two events related. In other words, even though syntactically the temporal connectives appear to order events as a whole, we need to distinguish for the purposes of interpretation the different possibilities for ordering the aspects of the two events. Given this, it follows that telic events, having only a single Aspect, will make for simpler patterns of ordering than atelic ones. For with the latter, we have three Aspects that can be ordered differently relative to the aspects of the other event related by the temporal conjunction.

We begin in Section 2.2 hereafter with the simplest case, involving two telic events. Next, Sections 2.3 and 2.4 will lay out the more complicated cases, where one event is telic, and the other, atelic. The most complex case, finally, is that in which both events are atelic, discussed in Section 2.5.

2.2 Conjunction of Two Telic Events

2.2.1 Patterns

As mentioned in the preceding Section, the ordering of two telic events constitutes the simplest case, since each
event has only one Aspect. As a result, we have the only logically possible orderings between two events \( \alpha \), \( \beta \) are the ones illustrated in (16).

\[
\begin{align*}
(16) & \quad \text{Possible Orderings: } \alpha = \text{Telic}, \beta = \text{Telic} \\
& \quad a) \alpha: \quad \overline{\overline{||}} \quad (\text{eg. John was elected}) \\
& \quad \beta: \quad \overline{\overline{||}} \quad (\text{eg. Mary was elected}) \\
& \quad b) \alpha: \quad \overline{\overline{||}} \\
& \quad \beta: \quad \overline{\overline{||}} \\
& \quad c) \alpha: \quad \overline{\overline{||}} \\
& \quad \beta: \quad \overline{\overline{||}}
\end{align*}
\]

In the following we will examine each of the conjunctions listed in (13) above from the point of view of these three orderings. For each connective we will consider whether or not it can be used to describe the three orderings illustrated in (16) a) to c).

2.2.2 Before

An example of two sentences conjoined by before is given in (17).

\[
(17) \quad \text{John was elected before Mary was elected}
\]

The only possible ordering among the ones given in (18) above that can be described by the sentence in (17) is the one in a) where the first event (\( \alpha \)) is anterior to the second (\( \beta \)). The temporal configurations in (18) b) and c), in contrast, cannot be described by the sentence in (17).

2.2.3 After

\[
(18) \quad \text{John was elected after Mary was elected}
\]
Again there is only one pattern in (18) which fits the description given by this sentence, namely c). Both (18) a) and b), on the other hand, are incompatible with (18). The first event (a) must thus be posterior to the second (b).

Note, furthermore, that the two sentences in (17) and (18) are opposites of each other in a sense that is reflected in the symmetry of the configurations in (18) a) and c). Thus (assuming that both John and Mary did in fact get elected), if John was elected before Mary was elected then Mary was elected after John was elected. Similarly for the reverse situation, if John was elected after Mary was elected then Mary was elected before John was elected. This seems intuitively correct: an event a is anterior to an event b just in case b is posterior to a.

2.2.4 When

Consider now the conjunction of sentences with when as exemplified here in (19).

(19) John was elected when Mary was elected.

It is clear from the meaning of this sentence that the only interpretation is one where the two events are (roughly) simultaneous, as illustrated graphically in (18) b), above. In fact, the preferred interpretation for (19) is one where both John and Mary were chosen for office in the same general election-event. This reading is made more salient, perhaps, if we replace John with Dan Quayle and Mary with George Bush. In this case, the election of the two was a package deal; there is no sense in which there was an election event involving Quayle which is separate from that involving Bush. Quayle’s election to the Vice-Presidency is in a sense a contingency of Bush’s election to the Presidency.
In other cases, as has been noted frequently in the literature, the meaning of when is often not one of strict simultaneity of \( a \) and \( b \), but rather one whereby \( a \) "immediately follows" upon \( b \), as illustrated in the following example from Huddleston (1989):

(20) When John came in, Peter stood up.

As in similar examples conjoined by and, which also often have an interpretation as "immediately after", the ordering of events corresponds to the surface order of sentences. Compare the two sentences in (21), for example, which stand in the same relation to each other as (20) stands to (20').

(21) a) John came in and Peter stood up.
    b) Peter stood up and John came in.

(20') When Peter stood up, John came in.

Oftentimes, there are also causal overtones, as in (21) a), where Peter's standing up may well be taken as an indication of respect for John, for instance; in this sense, Peter stood up because John came in. Similarly, both (20) and (20') can convey the impression that the event in the main clause is somehow caused by, or is the result of, the event in the when-clause. Note, however, that this case differs from the one of the election of Quayle and Bush discussed previously in that here we really have two distinct events between a causal relation can be argued to exist. In the earlier case, as we observed above, there is but one election-event.

Likewise in (22) with when, where the reason for discontinuing the production of the Corvair lies in Ralph Nader's devastating criticism. Again, there seems to be a causal connection between the (distinct) events.
Chevy discontinued the production of Corvairs when Nader's *Unsafe at Any Speed* was published.

In some cases, *when* can even take on a purely causal meaning which almost completely suppresses temporal factors, as in the example in (23).

(23) When you signed these papers you entered into a contractual agreement.

We will ignore such cases in the following, since they have no bearing on the issues of temporal interpretation.

Returning to issues of the temporal relation of events conjoined by *when*, the comparison of the above examples is indicative of two cases that need to be clearly distinguished when dealing with this temporal connective. The first of these is illustrated by (22), for example, and perhaps more clearly, by (24) below.

(24) Huddleston's article was published when the first man set foot on the Moon.

It is clear at once that these examples do not really instantiate the pattern of (18)b), repeated here.

(18) b) a: \[ \] b: \[ \]

As a matter of fact, these two events occurred several months apart, as Huddleston's article appeared in the December issue of *Language* while Neil Armstrong's visit to the Moon took place in July. Their simultaneity is thus indirect at best, in virtue of the fact that both events occurred in some common interval, viz. the year 1969.

The second case is the one that truly instantiates (18) b) above. It is illustrated by (20) above, as well as (25) below.
(25) a) I discovered the money when I opened the drawer.
    b) It began to rain when we arrived at the fair.
    c) Mary fell asleep when the movie started.
    d) The movie started when Mary fell asleep.

With or without causal overtones, the interpretation is invariably one of "immediately after" in these cases, with the order sentences reflecting the ordering of events. The reason for this, as noted by Bull (1971), is that strict simultaneity requires temporal extension or duration, which telic events do not have, as noted earlier. The next-best thing to simultaneity is thus the reading whereby event α "immediately follows" event β. Even so, this reading is clearly distinguished from that expressed by after as discussed in 2.2.3 above. In other words, the examples in (25) above are by no means synonymous with analogous examples in which after replaces when. This can be made explicit by means of an added adverbial indicating the duration of the interval that lies between the two events, as in (26).

(26) a) Mary fell asleep (barely an instant) after the movie started.
    b) Mary fell asleep (**barely an instant) when the movie started.

No matter how small we make the interval, the results are the same: the when-clause will not tolerate an intervening segment of time between the two events. Even with immediately, in lieu of barely an instant, which factually denies the existence of an intervening interval, when and after differ in this respect. Thus even on the interpretation of "immediately after" found with telic events, when is not synonymous with immediately after.
2.2.5 Summary

In this Section we examined temporal conjunction of two telic events. Since telic events are conceived as having no temporal extension, and concomitantly, as having no Aspects, the logically possible temporal orderings are exhausted by the patterns repeated here in (18).

(18) Possible Orderings: $\alpha=$Telic, $\beta=$Telic

a) $\alpha$: \hspace{1cm} $\beta$: \\
b) $\alpha$: \hspace{1cm} $\beta$: \\
c) $\alpha$: \hspace{1cm} $\beta$: \\

Summarizing the possibilities for using the temporal conjunctions in describing the temporal relations between two telic events $\alpha$ and $\beta$, we repeat the examples considered in this Section.

(17) John was elected before Mary was elected
(18) John was elected after Mary was elected
(19) John was elected when Mary was elected.

Of the three examples, before in (17) matches (18)a), after in (18) describes (18)c), and when in (18), (18)b). None of the sentences describe any situations other than the ones just mentioned.

Letting "<" and "=" stand for the two primitive ordering concepts of precedence and simultaneity of the meta-language, respectively, and $\alpha$, $\beta$ for two telic events, as above, we can state the meanings of the temporal conjunctions informally as in (27).

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(27) Conjunction of Two Telic Events:
   a) before(α, β) ⇔ α < β
   b) after(α, β) ⇔ β < α
   c) when(α, β) ⇔ α = β

2.3 Conjunction of Telic Event with Atelic Event

Having examined the simplest cases of ordering of events, involving two telic events, we now turn to some more complex cases. As we will see presently, the added complexity here derives from the fact that the event in the (temporal) adverbial clause is atelic, and hence has three aspects, each of which can be ordered separately relative to the (telic) event of the main clause.

2.3.1 Patterns

Two events α, β of which the former is telic and the latter, atelic, can stand in five different relations to each other: The telic event can either precede the beginning of the atelic event, or it can be simultaneous with its beginning as well as its middle and its end, or, finally, the telic event may follow the End of the atelic event. This is shown graphically in (28) a) through e).

(28) Possible Orderings: α = Telic, β = Atelic

   a) α:   |   β: ||   (eg. John was elected)
       |      |   (eg. Mary was a senator)
   b) α:   |   β: ||
   c) α:   |   β: ||
   d) α:   |   β: ||
   e) α:   |   β: ||
Again we will consider each of the temporal connectives given in (13) above in turn, identifying all orderings pictured in (28) with which they are compatible.

2.3.2 Before

Consider first the case of two clauses joined by before illustrated in (29).

(29) John was elected before Mary was a senator.

Of the possible orderings shown in (28) above, a) depicts the only situation that can appropriately be described by sentence (29). All others do not represent instances of telic a before atelic β.

2.3.3 After

In contrast to the above, after conjoining a telic event and an atelic one, as exemplified in (30), admits of more than one possible scenario.

(30) John was elected after Mary was a senator.

Concretely, each of the three patterns in (28) c), d), and e) is adequately described by (30).

(28) c) \[ \begin{align*}
\alpha: & \quad \text{(John was elected)} \\
\beta: & \quad \text{(Mary was a senator)}
\end{align*} \]

d) \[ \begin{align*}
\alpha: & \\
\beta: &
\end{align*} \]

e) \[ \begin{align*}
\alpha: & \\
\beta: &
\end{align*} \]
2.3.4 When

Conjunction of a telic event with an atelic one by *when* as illustrated by (31), next, is compatible only with the situation in (28) c); all others are inappropriate.

(31) John was elected *when* Mary was a senator.

2.3.5 Summary

In the preceding, we surveyed temporal conjunctions of a telic and an atelic event. As we noted in 2.3.1, a telic event can occur in five different locations relative to the three Aspects of an atelic event (ie. its Beginning, Middle, and End), as indicated in (28).

(28) Possible Orderings: α =Telic, β =Atelic

   a) α: ||
      β: ________________

   b) α: | |
      β: __________________|

   c) α: | |
      β: ____________

   d) α: | | |
      β: ____________

   e) α: ________________ |
      β: | |

We then matched the five patterns in (28) to the three examples in (29) through (31) with the three different temporal conjunctions under consideration here, in order to determine which sentences can appropriately describe the five distinct situations above. The results are summarized here after each example, repeated from above.

(29) John was elected *before* Mary was a senator.
[describes (28) a) only]
(30) John was elected after Mary was a senator.
    [describes (28) c), d), e)]

(31) John was elected when Mary was a senator.
    [describes (28) c) only]

Using the same format as in 2.2.6 above, we can summarize these observations more abstractly as in (32), where \( \alpha \) is telic and \( \beta \) atelic; \( B(\beta) \) denotes the initiative aspect of the atelic event \( \beta \) (ie. its Beginning); \( M(\beta) \) is the imperfective Aspect (ie. the Middle), and \( F(\beta) \), the terminative Aspect (ie. the End) of the event. As in (27), "<" represents precedence, and "=" simultaneity.

(32) Conjunction of Telic and Atelic Events:
    a) before(\( \alpha, \beta \)) \( \iff \alpha < B(\beta) \)
    b) after(\( \alpha, \beta \)) \( \iff B(\beta) < \alpha \)
    c) when(\( \alpha, \beta \)) \( \iff \alpha = M(\beta) \)

2.4 Conjunction of Atelic Event with Telic Event

This is basically just the reverse of the pattern discussed in the preceding Section, in that now the main event is atelic whereas that of the adverbial clauses is telic.

2.4.1 Patterns

Accordingly, the patterns here are mirror-images of the ones in (28) in the preceding Section.

(33) Possible Orderings: \( \alpha = \text{Atelic}, \beta = \text{Telic} \)

a) \( \alpha: \) \( \rightarrow \rightarrow \rightarrow \rightarrow \) \( \beta: \) \( \rightarrow \rightarrow \rightarrow \rightarrow \) (Mary was a senator) (John was elected)

b) \( \alpha: \) \( \rightarrow \rightarrow \rightarrow \rightarrow \) \( \beta: \) \( \rightarrow \rightarrow \rightarrow \rightarrow \)

c) \( \alpha: \) \( \rightarrow \rightarrow \rightarrow \rightarrow \) \( \beta: \) \( \rightarrow \rightarrow \rightarrow \rightarrow \)
As is to be expected, the matches between the above patterns and examples conjoined by the individual connectives are basically the reverse of what we found in the preceding Section. Let's examine them in turn.

2.4.2 Before

The sentence in (34) can represent any of (33) a), b), and c).

(34) Mary was a senator before John was elected.

Note that before differs here from before in Section 2.3.2 above, which we found to be compatible only with one situation. Moreover, the three situations compatible with (34) are the mirror-images of the ones that were acceptable in Section 2.3.3 with after. In a sense, this, too, is to be expected in the light of the that fact (34) is practically synonymous with (30), which is repeated here.\(^5\)

(30) John was elected after Mary was a senator.

\(^5\) This is not to suggest that before and after are exact opposites of each other. As we will see in later Sections, the two differ in crucial respects. The near-synonymy holds provided both events actually occurred at some point, and as long as we ignore the fact (observed by Kittredge (1970), Heinämäki (1972), and others) that in all the cases discussed here the first (main) sentence is asserted whereas the second (i.e. the adverbial clause) is presupposed. More importantly in the present context, we will encounter another break-down in the complementarity of these two connectives in the following Section.
2.4.3 After

Given that we just saw how atelic a before telic b (of 2.4.2) is the mirror-image of telic b after atelic a (of 2.3.3), it seems natural to expect matters to be analogous in regard to atelic a after telic b under discussion in the present Section and telic b before atelic a of Section 2.3.2 earlier. That is, since we saw in 2.3.2 that sentence (29), repeated below, is compatible with only one ordering-pattern we would expect the same to hold for (35).

(35) Mary was a senator after John was elected.
(29) John was elected before Mary was a senator.

This is not so, however, since (35) can describe the three possible situations corresponding to (33) c), d), and e).

(33) c) a:        (Mary was a senator)
    β:        (John was elected)

d) a:        
    β:        

e) a:        
    β:        

Of these three situations, (29) is compatible only with (the mirror image of) e), as shown in (28) a) above.

2.4.4 When

Conjunction of a telic event to an atelic main event by means of when, is licit, as shown in (36).

(36) Mary was a senator when John was elected.

As in the reverse situation in Section 2.3.4 above, it can instantiate only one pattern, viz. that of (33) c), repeated here:
2.4.5 Summary

This Section examined temporal conjunctions of atelic and telic events. As we noted in 2.3.1 earlier when we investigated the mirror-image of this configuration, there are five different temporal locations in which a telic event can stand relative to the three Aspects of an atelic event. These are captured in (33), which is repeated here.

(33) Possible Orderings: \( \alpha = \text{Atelic}, \beta = \text{Telic} \)

a) \( \alpha: \quad \beta: \)

b) \( \alpha: \quad \beta: \)

c) \( \alpha: \quad \beta: \)

d) \( \alpha: \quad \beta: \)

e) \( \alpha: \quad \beta: \)

The five situations pictured above match the three different conjunctions in (34) through (38) as indicated after each example repeated here.

(34) Mary was a senator before John was elected.
    [describes (33) a), b), c)]

(35) Mary was a senator after John was elected.
    [describes (33) c), d), e)]

(38) Mary was a senator when John was elected.
    [describes (33) c) only]

Again using the same format as before, we summarize our observations abstractly in (37). [Where \( \alpha = \text{atelic} \) and \( \beta \)...]
=telic; B(\(\alpha\)) =Initiative Aspect of atelic \(\beta\) (ie. its Beginning); M(\(\alpha\)) =Imperfective Aspect (ie. the Middle); F(\(\alpha\)) =Terminative Aspect (ie. the End). As in (27) and (32), "<" represents precedence, and "=" simultaneity.]

(37) Conjunction of Telic and Atelic Events:
   a) before(\(a,\beta\)) \(\iff\) B(\(a\)) < \(\beta\)
   b) after(\(a,\beta\)) \(\iff\) \(\beta\) < F(\(a\))
   c) when(\(a,\beta\)) \(\iff\) M(\(a\)) = \(\beta\)

2.5 Conjunction of Two Atelic Events

Finally, we address the most complicated of temporal orderings of events, where both are atelic. Since each atelic event has three Aspects to be ordered relative to those of the other event, the number of possible distinct orderings is naturally much greater than in any of the cases considered so far.

2.5.1 Patterns

Temporal conjunctions involving two telic events can express thirteen different configurations of relative positions of events. These are pictured in (38) below.

(38) Possible Orderings: \(a\) =Telic, \(\beta\) =Atelic

   a) \(a:\) [---] \(\beta:\) [---]
   b) \(a:\) [---] \(\beta:\) [---]
   c) \(a:\) [---] \(\beta:\) [---]
   d) \(a:\) [---] \(\beta:\) [---]
   e) \(a:\) [---] \(\beta:\) [---]
   f) \(a:\) [---] \(\beta:\) [---]
   g) \(a:\) [---] \(\beta:\) [---]
   h) \(a:\) [---] \(\beta:\) [---]
   i) \(a:\) [---] \(\beta:\) [---]
   j) \(a:\) [---] \(\beta:\) [---]
   k) \(a:\) [---] \(\beta:\) [---]

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Again taking these thirteen situations as a backdrop, we examine the applicability of each of our three temporal connectives in the following sub-sections.

2.5.2 *Before*

Two atelic events conjoined by *before* as exemplified in (39) can describe any of the five configurations given above in (38) a), b), c), d), and i), and none other.

(39) John was a senator *before* Mary was a senator.

Note that in all cases where (39) is appropriate (at least) the Beginning of the main event \(a\) precedes (at least) the Beginning of the event \(B\) described in the *before*-clause.

2.5.3 *After*

In comparison to *before* above, *after* has a somewhat wider domain of applicability which includes the seven situations in (38) e), h), i), k), l), m), and n).\(^e\)

(40) John was a senator *after* Mary was a senator.

Five of the seven cases mentioned represent mirror-images of what we found to be licit with *before* in 2.5.2 above, namely n), m), l), k), and e), [corresponding to a), b), c),

\(^e\)For some discussion of further cases of (38) that might fall under the description in (40), cf. Section 2.8.1.2 below.
d), and i), respectively]. In all these cases $\alpha$ after $\beta$ is equivalent to $\beta$ after $\alpha$. As we noted in 2.5.2 above (though from the opposite perspective), these are all the cases in which (at least) the Beginning Aspect of the event $\beta$ (Mary’s being a senator) in the after-clause precedes (at least) the Beginning of the main event $\alpha$ (John’s being a senator).

As for the remaining two situations in (38) h) and i), repeated below, the generalization just made obviously does not apply, in the former case because the Beginnings of the two events are simultaneous, and in the latter, because their temporal ordering is the reverse of what the generalization predicts.

(38) h) $\alpha$: $\rule{2cm}{0.25mm}$ $\beta$: $\rule{1cm}{0.25mm}$

i) $\alpha$: $\rule{3cm}{0.25mm}$ (John was a senator)
$\beta$: $\rule{1.5cm}{0.25mm}$ (Mary was a senator)

If we reflect for a moment on what about (38) h) and i) it is that makes (40) an appropriate description of these two situations, we observe that in both cases this is so not in virtue of the relative ordering of the Beginnings of the two events, but in virtue of that of their End points, or Terminative Aspects! In other words, $\alpha$ obtains after $\beta$ in (38) h) and i) because its End is after that of $\beta$. It is thus precisely in this regard that after differs from before. For as we saw above, the latter invariably orders the Beginnings of events.

Finally, note in this context also the peculiar status of (38) i), which fits both the description in (39) (John was a senator before Mary was a senator) and that in (40) (John was a senator after Mary was a senator). In other words, the conjunction of these two sentences does not result in a contradiction, and (41) is well-formed.
(41) a) John was a senator after Mary was a senator and
    John was a senator before Mary was a senator.
  b) *Mary was a senator before John was a senator and
    Mary was a senator after John was a senator.

In contrast to a), (41) b) is ill-formed. Note, however, that the reason for this lies not in contradiction; this sentence is no more contradictory than the one in a). Rather, the cause of the inappropriateness of the (and-) conjunction here is solely a result of the fact that the clause preceding and simply fails to describe the state of affairs depicted in (38) i). That is, we cannot say Mary was a senator before John was a senator simply because the termination of the senatorship antedates the termination of John's senatorship. As noted at the end of the preceding paragraph, therein lies precisely the difference between before and after.

2.5.4 When

Focussing now on conjunction with when, we find here certainly the most prolific applicability of the example in (42). No less than nine of the thirteen situations depicted in (38) can be appropriately described by this sentence. They are: c), d), e), f), g), h), i), k), and l).

(42) John was a senator when Mary was a senator.

Given the width of its distribution, when-conjunction is perhaps more easily characterized in terms of the patterns to which it does not apply, which are (38) a), b), m), and n). What these have in common, as the graphics given earlier make clear, is that there is no real overlap of the two events. Inversely, then, conjunction of two atelic events by when is licit in case their Middles overlap, i.e. are simultaneous
### 2.5.5 Summary

In this Section we examined temporal conjunction of two atelic events. Since each atelic event has three Aspects, we distinguished thirteen possible orderings of the two events, as shown in (38) above.

(38) **Possible Orderings: a =Atelic, β =Atelic**

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Each of these thirteen orderings is in turn captured by (at least) one conjunction of the sentences describing these events by means of the three temporal connectives before, after, when, while, since and until. The examples considered are repeated here, matched to the configurations they are compatible with.

(39) John was a senator **before** Mary was a senator.
    [describes (38) a), b), c), d)]

(40) John was a senator **after** Mary was a senator.
    [describes (38) a), b), c), d), e), f), i)]

(42) John was a senator **when** Mary was a senator.
    [describes (38) c), d), e), f), g), h), i), k), l)]
The observations made in this Section can be summarized abstractly as in (43), again using the same notation as before.

(43) **Conjunction of Two Atelic Events:**
a) before(α, β) <=> B(α) < B(β)
b) after(α, β) <=> [B(α) < B(β)] v [F(α) < F(β)]
c) when(α, β) <=> M(α) = M(β)

**2.6 Summary & Generalizations**

We have now considered all possible conjunctions of telic and atelic events from the point of view of their relative ordering in time. We can proceed now to making generalizations covering all cases considered, so as to arrive at a common denominator for each temporal connective. We will do so below by considering each temporal conjunction in turn. Some more general comments pertaining to the comparison between the approach presented here and the one standardly taken will then follow in the latter part of this Section.

**2.6.1 Summary of Cases Considered**

**2.6.1.1 Before**

As we observed above, the temporal conjunction *before* has no selectional restrictions as to the telicity of either of its arguments, the resulting conjoined structures being well-formed in all cases. The four different cases of conjunction with *before* are repeated here side by side.

(27)a) [α =telic, β =telic]  
before(α, β) <=> α < β

(32)a) [α =telic, β =atelic]  
before(α, β) <=> α < B(β)

(37)a) [α =atelic, β =telic]  
before(α, β) <=> B(α) < β
(43a) [α = atelic, β = atelic]
before(α, β) \iff B(α) < B(β)

Assuming that telic events can be said to vacuously have a Beginning Aspect as well, we can generalize over the four cases above by stating that before invariably orders the Beginning of the main event before the Beginning of the event described in the before-clause, as expressed in (44).

(44) (∀α) (∀β) [before(α, β) \iff B(α) < B(β)]

2.6.1.2 After

Like before above, conjunction with after is indifferent with respect to the telicity of the two events. Consequently, all four combinations are attested, as we saw.

(27b) [α = telic, β = telic]
after(α, β) \iff B(β) < B(α)
(32b) [α = telic, β = atelic]
after(α, β) \iff B(β) < B(α)
(37b) [α = atelic, β = telic]
after(α, β) \iff B(β) < B(α)
(43b) [α = atelic, β = atelic]
after(α, β) \iff [B(α) < B(β)] \lor [F(α) < F(β)]

Unlike before, however, after may involve the ordering of either Beginnings or Ends of events, so long as the same Aspects of both events are related. Making the same assumption as above, that telic events can be said to have Aspects as well, albeit non-distinct ones, we can generalize the four cases as in (45).

(45) (∀α) (∀β) {after(α, β) \iff [B(α) < B(β)] \lor [F(α) < F(β)]}

7 What is meant here is that the Beginning of a telic event is non-distinct from its (Middle and) End.
It is perhaps tempting at this point on the basis of the logical truth of \( P \Rightarrow (P \lor Q) \) to expand (45) to (46)

\[
(48) \quad [B(\alpha) \land F(\beta)] \lor [F(\alpha) \land F(\beta)] \lor [M(\alpha) \land M(\beta)]
\]

and then to get rid of the disjunction by quantifying over Aspects in the manner suggested in (47).

\[
(47) \quad \text{after}(\alpha, \beta) \iff (\exists A : A \in \{B, M, T\}) \ [ A(\alpha) < A(\beta) ]
\]

However, this is somewhat problematic from the point of view of empirical coverage, since we admitted in Section 2.5.3 above only those cases where the ordering expressed by after involved Beginnings and Ends of events. However, if we now make the step from (45) to (48), then we are in effect also admitting the cases illustrated in (38) c), d), f), and g) under the description of (40), repeated here.

\[
(40) \quad \text{John was a senator after Mary was a senator.}
\]

\[
(38) \quad \begin{align*}
c) \quad & \alpha: \quad \rule{2cm}{.4pt} \quad (\text{John was a senator}) \\
& \beta: \quad \rule{2cm}{.4pt} \quad (\text{Mary was a senator}) \\
d) \quad & \alpha: \quad \rule{1.5cm}{.4pt} \\
& \beta: \quad \rule{1.5cm}{.4pt} \\
f) \quad & \alpha: \quad \rule{1cm}{.4pt} \\
& \beta: \quad \rule{1cm}{.4pt} \\
g) \quad & \alpha: \quad \rule{2cm}{.4pt} \\
& \beta: \quad \rule{2cm}{.4pt}
\end{align*}
\]

In all these cases, there is some Middle portion of event \( \alpha \) which follows some Middle portion of event \( \beta \). Hence they fall under (48) and (47), but not under (45).\(^8\)

---

\(^8\) Incidentally, the same class of case would be admitted if we dropped the requirement that after order the same Aspect in both events, i.e. if we had (47') instead of (47).

\[
(47') \quad \text{after}(\alpha, \beta) \iff (\exists A_1 \exists A_3) [ A_1(\alpha) < A_3(\beta) ]
\]

In this case, (38) c) would be allowed in by virtue of the fact that \( F(\alpha) \) is after \( B(\beta) \).
Let us then consider the question whether (38) c), d), f), and g) really do fall under the description of (40). At first blush, the answer would seem to be negative, which is why we excluded these patterns in Section 2.5.3 above. However, at least for the case illustrated in c), an argument has been made by Anscombe (1964) in the context of an example which is practically identical with (40), namely (48).

(48) I was a Boy Scout after you were one.

According to her judgments, (48) "... can be true even if I started and stopped being a Boy Scout before you did, so long as my leaving off followed your joining .." (quoted from Higginbotham (1988a), fn. 3, p. 224).

If this is correct, then it appears to be the case that our first intuition, which excluded this case, gives way, upon careful reflection, to perhaps somewhat reluctant agreement with Anscombe. Indeed, if we contemplate the case at hand long enough, we can convince ourselves that she is right in virtue of the fact that after all, some period of my being a Boy Scout followed some period of your being a Boy Scout.

Upon further reflection, we can also convince ourselves by the same reasoning that the same is true of the situation depicted in (38) d), which differs minimally from c), in ways that do not concern the meaning of after. And having made this move, there is nothing that prevents us from applying the same reasoning to f) and g) as well, although these cases are increasingly counter-intuitive even above and beyond the extent to which this is so for c) and d).

Having acknowledged that we can convince ourselves, with sufficient effort, to regard the patterns under discussion as falling under the descriptions of (40) or (48), we have to wonder, however, whether we have not fooled ourselves in the
process. For if we admit the four patterns repeated above in addition to the seven discussed in Section 2.5.3 earlier, we end up with the curious result that after can be used to express eleven out of thirteen logically possible orderings of events. As a consequence, the meaning of after now properly includes the meaning of when and while (cf. 2.5.4 and 2.5.5 above), which is even more counter-intuitive. If this is correct, however, then we have a way of testing the validity of extending the analysis on after so as to include the four patterns in (38) c), d), f), and g). This test takes the form of syllogisms like the ones in (49) through (52) corresponding to the patterns under consideration. In each argument, the conclusion in a) ought to follow from the premisses just like the one in b).

(49)  I joined in 1968 and left off in 1972. 
You joined in 1970 and left off in 1978.  
-----------------------------------------------
   a) ??? Therefore, I was a member after you were one. 
   b) Therefore, I was a member when you were one.

(50)  I joined in 1968 and left off in 1975. 
You joined in 1970 and left off in 1975. 
-----------------------------------------------
   a) ??? Therefore, I was a member after you were one. 
   b) Therefore, I was a member when you were one.

(51)  I joined in 1970 and left off in 1975. 
You joined in 1970 and left off in 1978. 
-----------------------------------------------
   a) ??? Therefore, I was a member after you were one. 
   b) Therefore, I was a member when you were one.

(52)  I joined in 1970 and left off in 1975. 
You joined in 1970 and left off in 1975. 
-----------------------------------------------
   a) ??? Therefore, I was a member after you were one. 
   b) Therefore, I was a member when you were one.

As is evident, there is a considerable difference between the two conclusions in a) and b) for each argument above. It is less clear, however, whether the marked oddness of a) indicates non sequitur. For one might try now to explain the
difference in acceptability between the a)-conclusions and the b)-conclusion in terms of Gricean maxims of conversation. By hypothesis after does not require any specific Aspects to be ordered (cf. (47) above); when, however, invariably orders Middle Aspects of events (cf. 2.6.1.4 below). Hence in the cases at hand, by using after rather than when, a speaker says less than he actually knows, thereby violating the Gricean maxim that tells him not to do so.

As a final testing ground for the assessing the appropriateness of after-conjunctions in the four cases under discussion, let us consider the question whether (53) is a contradiction in the four situations.

(53) I was a member after you were one and you were a member after I was one.

Given the premises described in (49) through (52) above, the conclusion (53) seems to me to be contradictory even if I convince myself that each conjunct taken individually is appropriate. Consider the following illustrations:

(54) I joined in 1968 and left off in 1972.
    You joined in 1970 and left off in 1978.
    --------------------------------------------------------
    ?? Therefore, I was a member after you were one
    and you were a member after I was one.

9 Note that this case is crucially different from the one in (i), discussed in Higginbotham (1988a) and (1990), in that we are here concerned with a single atelic event whereas (i) involves multiple telic events.

(i) I went there after you went there and you went there after I went there.

10 In (54), (55), and (56) the appropriateness of the second conjunctions of the conclusion is noncontroversial. In these situations, mutatis mutandis, these represent instances of (38) 1), k), and h), respectively. The first conjunctions, on the other hand, are the questionable cases under discussion. In (57) both conjunctions are of this type.
I joined in 1968 and left off in 1975.  
You joined in 1970 and left off in 1975.

Therefore, I was a member after you were one 
and you were a member after I was one.

I joined in 1970 and left off in 1975.  
You joined in 1970 and left off in 1978.

Therefore, I was a member after you were one 
and you were a member after I was one.

?? Therefore, I was a member after you were one 
and you were a member after I was one.

An even bizarrer version of (57) is this:

We both joined in 1970 and left in 1975.

Therefore, I was a member after you were one 
and you were a member after I was one.

All of (54) through (58) seem to have an air of contradic-
tion about them that makes it doubtful whether they 
should rightly be included among the situations that can be 
appropriately described by after-conjunction. They differ in 
this respect from (38)e), repeated below, which does not 
seem contradictory in this manner when described as in (53).

\[
\begin{align*}
\alpha: & \quad [\square] \\
\beta: & \quad [\square] \\
\end{align*}
\]

(I was a member)  
(you were a member)

We will not pursue this question any further here, as not 
much hinges on it that is of consequence to the rest of this 
research project. The two options available are clear: Either 
we let matters stand as in (45), with the (admittedly somew- 
what inelegant) disjunction of Beginning and End Aspects, or 
we generalize so as to include the Middle Aspects as well as 
possible relata of after.

\[
\begin{align*}
(45) \quad \after(\alpha, \beta) & \iff [B(\alpha) < B(\beta)] \lor [F(\alpha) < F(\beta)] \\
(47) \quad \after(\alpha, \beta) & \iff (\exists \theta : A\in(B,M,F)) \quad [A(\alpha) < A(\beta)]
\end{align*}
\]
In the former case, the four controversial cases examined in the preceding are not included among the ordering patterns covered by after. In the latter case, by contrast, they are included. Either way, as I think the foregoing discussion served to make evident, the question which solution is correct depends on very subtle judgments, and hence is difficult to resolve. My own feeling is that the cases in (38) c), d), f), and g) do not fall under after and hence ought to be excluded. I would not be surprised, however, if there were variation among speakers in these cases; it is true to some extent that if we consider such cases long enough we can eventually convince ourselves of their appropriateness. I am less sure, however, whether this is a matter of grammar.

2.6.1.3 Before and After

Whichever way after is analyzed in the preceding Section, it is clear in either case that it is not the opposite of before (cf. 2.6.1.1 above), which invariably relates only Beginning Aspects of events. For this reason, as we observed in 2.2.5.3 above, (53) (repeated here) is an appropriate description of the situation depicted on the preceding page in (38)e), whereas (59) is not.

(53) I was a member after you were one and you were a member after I was one.

(59) **You were a member before I was one and I was a member before you were one.

If we compare the overall behavior of before- and after-conjunctions across the four possible combinations of telic and atelic events discussed in Sections 2.2 through 2.5 above we can make an interesting generalization concerning the equivalence before(a, b) \equiv after(b, a).

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First, the equivalence holds true if both $\alpha$ and $\beta$ are telic, as is the case for (80) a) and b) in the situation shown in (81) (cf. Section 2.2 above).

(80)  a) Mary was elected before John was elected.
      b) John was elected after Mary was elected.

(81)  $\alpha$:  
      $\beta$:  

Second, the equivalence of before and after also holds in (82) a) and b), where $\alpha$ is atelic and $\beta$ is telic, as illustrated in (33) a), b), and c). (Recall from Section 2.4.3 that these are the only situations to which (82)a) is appropriate, and from 2.3.3 that they apply to (82)b) as well.)

(82)  a) Mary was a senator before John was elected.
      b) John was elected after Mary was a senator.

(83)  a) $\alpha$:  
      $\beta$:  
      b) $\alpha$:  
      $\beta$:  
      c) $\alpha$:  
      $\beta$:  

Third, the equivalence before($\alpha$, $\beta$) $\equiv$ after($\beta$, $\alpha$) does not hold in (84), however, which is the inverse of the preceding. Here $\alpha$ is telic and $\beta$ is atelic.

(84)  a) John was elected before Mary was a senator.
      b) Mary was a senator after John was elected.

Here (84)a) applies only to (85) a), whereas (84)b) applies to b) and c) in addition. (cf. Sections 2.3.2 and 2.4.3 above.)

(85)  a) $\alpha$:  
      $\beta$:  
      b) $\alpha$:  
      $\beta$:  
      c) $\alpha$:  
      $\beta$:  
      d) $\alpha$:  
      $\beta$:  

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Finally, no equivalence of before and after obtains also in the fourth case (cf. Section 2.5), illustrated here by (68).

(68)  a) John was a senator before Mary was a senator.
       b) Mary was a senator after John was a senator.

(68)a) applies only to the situations in (67):

(67)  a)  \[ \alpha: \quad \beta: \]
       c)  \[ \alpha: \quad \beta: \]
       d)  \[ \alpha: \quad \beta: \]
       e)  \[ \alpha: \quad \beta: \]

In addition to the patterns in (67), (68)b) also applies to the ones in (68):\footnote{Depending on how we choose to treat the cases discussed in the preceding Section 2.6.1.2, we would also include the four patterns in (i) under (66) b), but not a). Here a) represents Anscombe’s example from above.}

(68)  a)  \( (\forall \alpha) (\forall \beta) [ \text{before}(\alpha, \beta) \rightarrow \text{after}(\beta, \alpha) ] \)
       b)  \( (\forall \alpha) [ \forall \beta : \text{telic}(\beta) ] [ \text{after}(\beta, \alpha) \rightarrow \text{before}(\alpha, \beta) ] \)

Given the distributions of before–conjunction and after–conjunction, the following generalizations can be made. (i) Where (at least) the event \( \beta \) is telic, before(\( \alpha, \beta \)) is equivalent to after(\( \beta, \alpha \)). (ii) Otherwise, before(\( \gamma, \beta \)) entails after(\( \beta, \alpha \)), though the reverse is not the case. This is expressed more formally in (89).

(89)  a)  \( (\forall \alpha) (\forall \beta) [ \text{before}(\alpha, \beta) \rightarrow \text{after}(\beta, \alpha) ] \)
       b)  \( (\forall \alpha) [ \forall \beta : \text{telic}(\beta) ] [ \text{after}(\beta, \alpha) \rightarrow \text{before}(\alpha, \beta) ] \)
The reason why the implication goes both ways only for telic events follows from our analysis of before and after in conjunction with the Uncertain Future Principle of Woisetschläger (1977):

(70) Uncertain Future Principle: Woisetschläger (1977)
\[ (\forall a) \left\{ [F(a) \Rightarrow M(a)] \land [M(a) \Rightarrow S(a)] \right\} \]

Consider first the case where the implication goes both ways, and assume that \( a \) is telic. Then by our earlier assumption, its Beginning and End are simultaneous, as stated in (71) a). The meanings of before and after are as in b) and c), respectively (cf. above). Given a), c) implies d), which says that either the Beginning or the End of atelic \( a \) precede the telic event \( a \), and hence the Beginning of \( a \). Furthermore, the Uncertain Future Principle in e) states that if an (atelic) event \( a \) has an End, then it has a Beginning as well, with the Beginning necessarily preceding the End, given the directionality of Events in f). Now, if the Beginning of \( a \) precedes the End of \( a \), and the latter precedes the Beginning of \( a \), then the former also precedes the Beginning of \( a \), as stated formally in g). The combination of the directionality of events and the second disjunct in d) thus yields the equivalent of the first disjunct in d). Hence d) in conjunction with yields h), which says that in all cases in which atelic \( a \) temporally precedes telic \( a \), the Beginning of \( a \) precedes the Beginning of \( a \), which is what b) requires for before. Therefore, given that the right-hand side of h) is equivalent to that of b), the equivalence before(\( a, a \)) \( \equiv \) after(\( a, a \)) obtains here.
Therefore, after(α,β) <=> before(α,β)  \[ q.e.d. \]

For the alternative case, where the implication goes only in the direction indicated in (69)a) above, the analogous premises are given in (72) a) to c). Again, d) follows from a) and c). The Uncertain Future Principle in e) holds here as well, as does the ordering of Aspects of the atelic event α in f). However, the step in g) fails here since no valid inference as to the ordering of B(α) and B(β) can be made from the antecedent. Given this, the argument cannot be completed.

Since the disjunction in the meaning of after in c) above is not eliminable,\(^{12}\) the inverse of the implication in (69)s) holds only for those orderings of events that fall under the first disjunct of c); those that fall under the second di-

\(^{12}\) The disjunction can be concealed by the terminology if the relevant generalization is stated using the term perfective aspect. However, since we defined this notion in Section 1.2.2 above as the disjunction of Initiative and Terminative Aspects, it is clear the we are not thereby eliminating the difference between before and after. At any rate, the generalization covering the appropriateness of before cannot be stated correctly in terms of the notion perfective aspect, since this allows in ordering relations between the Ends of events, which is wrong, as we have seen.
junct (which orders the final Aspect) are not equivalents of \( \text{before}(a, b) \).

As demonstrated, the theory presented here nicely captures the differences between \textit{before} and \textit{after} without ad hoc stipulations, and with a minimum of theoretical primitives, all of which are motivated on independent grounds.

2.6.2 General Comments

The patterns of orderings of events which we surveyed in this section demonstrate unequivocally that the generalizations which govern the usage of the temporal connectives are best stated in terms of Aspects as we defined them in Section 1.1 above. The advantages of formulating these generalizations in the manner proposed here are two-fold: Firstly, this allows for a complete characterization of all ordering possibilities for events, including ones with partial overlap. And secondly, it makes for a maximally simple theory.

Regarding the descriptive adequacy of the view suggested above, first, there is no question that the theory can handle all possible relative ordering relations between events, since every one can be described by at least one temporal connective. Moreover, it does not admit any orderings other than the ones we actually distinguish. Our account in terms of Aspects of events differs in both respects from the standard analysis of temporal connectives, which orders times. For example, Heinämäki (1972), following Anscombe (1964), assumes that \( S_1 \) occurred \textit{before} \( S_2 \) is true just in cases "there is at least one time point \( t_1 \), such that \( S_1 \) is true then, and \( t_1 \) precedes every \( t_j \) at which \( S_2 \) is true" (p.140). Our view is more precise here, since it is not just any old time point associated with \( S_1 \) which must precede \( S_2 \). As we
observed above, it is crucially the first such time point, i.e. the Beginning of the event. And what it must precede is again only the first time point of $S_2$; all others are irrelevant. In this sense, the standard account is too expressive, in that it allows (at least in principle) distinctions that are much more fine-grained than what is called for by the complexity of the data.

Furthermore, the standard view fails to capture all possible readings for after, which can be defined in analogous fashion by reversal of the precedence relation. This alone will obviously not do, since as we noted the distribution of before and after is not symmetrical. After has a wider range of distribution than before and hence ought to have less restrictive conditions imposed. Replacing universal quantification over time points $t_j$ of $S_2$ with existential quantification improves this situation to some extent, though this may create other problems as it admits all ordering patterns in which two events overlap at least partially. That is, it commits us to accepting the controversial patterns discussed in Section 2.6.1 above. The distribution is thus equivalent in our terms to that which we obtained if we allowed after to order Middles of events in addition to Beginnings and Ends. And as we noted in the context of the discussion in the preceding Section, the set of possible orderings of events which can be described by conjunction with after properly includes that of orderings expressible with when in this case. On the other hand, if we want to exclude the questionable patterns discussed in the preceding Section, then the standard view is clearly inadequate since it cannot capture that it is the Beginnings and Ends of events, in particular, which are relevant to stating the correct generalization which governs the use of after.
Finally, we should also note that the view suggested here works with a minimal number of theoretical primitives. In addition to the primitive ordering relations BEFORE, AFTER, and WHEN familiar from Section 3 of Chapter One the only other concepts we need are the three Aspects of events, which basically amounts to the assumption that events have boundaries. As I argued in Section 1.1 above, the concept of a boundary is unproblematic in respect other entities, and there is no reason why it should be problematic with events. The metaphysics of our view is thus maximally simple, quite in contrast to that of the standard theory, which employs abstract times or time points, the metaphysical status of which is far from clear.
Section 3: The Standard Analysis of Tense

3.0 Introduction

The view on tense that is most often called the standard analysis in the philosophical and semantic literature ultimately derives from tense logic (cf. Prior (1967)) and has been introduced into linguistics primarily via its adoption by model-theoretic semantics. Perhaps its most well-known version is that of Montague (1974), although the view advanced there has received numerous adaptations and modifications. (For a brief introduction that is not too technical, cf. Dowty, Wall & Peters (1981), Ch. 5.)

Common to all these approaches is the view that the denotations of expressions in the language are relative to possible worlds and times.\(^{13}\) That is, such non-logical expressions are thought to have intensions, which are conceived of as functions from times (and possible worlds) to the extensions of those expressions, i.e. their denotations, at that time (and in that world).\(^{14}\) The function of the tenses, now, is to provide for each sentence the temporal index relative

\(^{13}\) Not all expressions are interpreted relative to possible worlds and times. For instance, logical constants (such as \textit{and}, \textit{or}, negation, etc.) and non-logical constants (i.e. functional elements such as determiners, etc.) remain invariant across worlds and times, of course. Further exceptions are the so-called rigid designators (cf. Quine (1980), Kripke (1972/80), and references cited there), such as \textit{names} and \textit{pronouns}, whose denotations are also thought to remain invariant across different times and possible worlds. Also, cf. Enç (1986) for arguments that only predicates of individuals are interpreted relative to a given time.

\(^{14}\) Since we are here primarily interested in temporal considerations, we will ignore the sensitivity of expressions to possible worlds in the following.
to which the time-sensitive expressions contained in that sentence are to be interpreted.

The time relative to which a sentence is to be interpreted can be specified in two distinct ways: Either this is done in a semantic model of the meta-language, as proposed by Montague (1974) and others, or this is done directly in the object-language as in the analysis presented by Dowty (1979).

3.1 Montague (1974)

On a model-theoretic account such as that of Montague (1974) the temporal model with respect to which times are interpreted consists of (i) a set of time points which is (ii) linearly ordered by the primitive notion precedence (\(\prec\)), and (iii) a function that assigns each expression a denotation relative to a point of time. Given this, the past and future tenses are treated as semantic operations which "shift" the interpretation of sentences backwards or forwards in time. That is, where a present tense sentence is regarded basically as a tenseless sentence which is true or false at the time it is uttered, the truth of falsehood of a past or future sentence is interpreted relative to a point in time before or after the time of utterance, as in (73).

(73) a) PAST: \(\text{PAST}(\wp)\) is true at time \(t_1\) iff there is a time \(t_j\) such that \(\wp\) is true at \(t_j\) & \(t_j < t_1\)

b) FUTURE: \(\text{FUTURE}(\wp)\) is true at time \(t_1\) iff there is a time \(t_j\) such that \(\wp\) is true at \(t_j\) & \(t_1 < t_j\)

c) PRESENT: \(= \text{no TENSE}\) (i.e., no shift in evaluation time)

Thus, in the unmarked case of (73)c), i.e. in the absence of a tense function, a sentence such as (74) below is inter-
preted relative to the current temporal index, i.e. the time of its utterance. That is, the sentence is true just in case Mary is in the set of happy people at the present moment.

(74) Mary is happy.

In contrast, the past-tensed sentence in (75) below contains a past tense function which shifts the evaluation time of Mary's happiness into the past. In accordance with (73) a) above, the sentence is true at some point in time \( t_1 \), say now, if and only if there was some earlier time \( t_j \) at which it is true that Mary is in the set of happy people (at that time \( t_j \)).

(75) Mary was happy.

Similarly, the future-tensed sentence in (76) is true now (or at some other point \( t_1 \)) just in case there is some future time \( t_j \) at which it is true that Mary is in the set of happy people (at that time \( t_j \)).

(76) Mary will be happy.

As the definitions given in (73) above suggest, the two tenses (i.e. past and future) are in effect treated as sentential operators having scope over un-tensed sentences. The three examples in (74) through (76) can thus be thought of as having the structures shown in (77) below, where the italicized phrases represent the tense operators.

(77) a) \((it \ is \ the \ case \ that) \ [ \ Mary \ be \ happy ]\)
b) \(it \ will \ be \ the \ case \ that \ [ \ Mary \ be \ happy ]\)
c) \(it \ was \ the \ case \ that \ [ \ Mary \ be \ happy ]\)

This also illustrates the fact that in contrast to b) and c), the present tense in a) makes no contribution to the interpretation of the sentence \( Mary \ be \ happy \), since the time relative to which it is interpreted is not affected. As stated in
(73)c), the evaluation time is not shifted; hence the present tense does not represent a tense function, and the parenthetical operator in (77)a) is non-existent.

3.2 Dowty (1979)

As we mentioned earlier, in Montague's (1974) analysis, as in many others, the interpretation relative to time is effected via the manipulation of times in the representations of an interpretive meta-language. However, as we also mentioned, this is not a necessary ingredient of the standard approach. Alternatives have been proposed which differ from Montague's in this respect. In particular, Dowty (1979), Ch. 7, presents a variant of Montague's framework in which the operations on temporal indices of the meta-language are replaced by explicit quantification over times in the object language.\(^\text{15}\)

On Dowty's view, each sentence thus contains an existential quantifier over times plus a relation AT which ensures that the sentence is interpreted at the time given by the

\(^{15}\) Without going into the details, the reason for this derives from the fact (among others) that Montague's framework has difficulties dealing with sentences containing temporal adverbs. For a sentence such as (i), Montague predicts the two permutations of sentential operators shown here:

(i) Mary was happy yesterday
   a) yesterday [ PAST [Mary be happy] ]
   b) PAST [ yesterday [Mary be happy] ]
According to a), Mary was happy at a time earlier than yesterday, and b) says that she was happy the day before some time in the past. Neither of these two options captures the correct reading of (i), which asserts that Mary was in fact happy the day before today. Dowty's theory overcomes these problems rather elegantly by rendering (i) as in c) (cf. Dowty (1979), (1982) for details):

   c) there is a past time \( t \) & Mary is happy AT \( t \)
   & \( t \) is included in yesterday

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quantifier. The tenses are then treated as simple predicates of these times. More concretely, our earlier sentences (75) and (76), repeated below, as rendered as in (78) a) and b) respectively.

(75) Mary was happy
(76) Mary will be happy

(78) a) (∃t) [ PAST(t) & AT(t, happy(Mary)) ]
b) (∃t) [ FUTURE(t) & AT(t, happy(Mary)) ]

Even though on Dowty's analysis it is not the tenses themselves that are the operators, his framework, like that of Montague (1974), must be considered a version of the scope-analysis of temporal reference, since it, too, fixes the times relative to which sentences are interpreted by means of sentential operators having scope over the entire sentence. The criticisms made against one thus largely carry over to the other, as we will see in the following sub-section.

Incidentally, another point of difference between Montague and Dowty concerns the fact that the latter takes quantification over times to involve intervals, rather than points, in time.\(^1\) The motivation for this derives from the observation that sentences can be true at an interval without being true at each moment contained in it. This is so, in particular, with Accomplishments (in the sense of Vendler (1967a). Thus, it may be the case that *John ate an apple* during some interval; however, it is not true in this case that *John ate an apple* at each moment contained in that interval.

\(^1\) Intervals are defined in terms of instants, as proposed by Bennett & Partee (1978). That is, an interval is considered a set of points without intervening points that are not part of the set.
Further modifications to the scope-analysis of temporal reference have been proposed in answer to problems pointed out by Ladusaw (1977), Dowty (1982), and others. The two papers cited, specifically, note problems in regard to the treatment of tense in embedded sentences, which we will address in Sections 2 and 3, and again in Chapter Five below.

3.3 Problems with the Scope-analysis of Tense

Problems associated with the scope analysis of time and tense have been noted frequently. A number of serious objections to the scope analysis of tense and temporal reference have been raised by Mürvet Enç in a series of papers. Thus, Enç (1987) claims that this view makes the wrong predictions for tense in embedded sentences, and in particular, with regard to the so-called "sequence of tense" rule\textsuperscript{17}, which she tries to eliminate. Related to this is the claim Enç makes in (1990), that the standard analysis fails to capture certain asymmetries between the past and the future tenses, which she illustrates with the following examples, among others:

(79)  
\begin{enumerate}
  \item Mary interviewed the man who is speaking \item Mary will interview the man who is speaking
\end{enumerate}

Here, the sentence in b) is ambiguous between a reading in which the man who is to be interviewed at some future time is speaking now, and a reading where the man will be speaking in the future. The sentence in a), in contrast, is unambiguous, having only one reading on which the man interviewed in the past is presently speaking. Facts such as these, Enç con-

\textsuperscript{17} This will be discussed in detail in Chapter Five.
tends, can be captured in the standard theory only by means of arbitrary stipulation.\textsuperscript{18}

More importantly in the present context, Enç (1986) gives convincing arguments against the standard view on tense on the basis of examples in which the temporal interpretation of parts of the sentence differs from that of the main predicate. This is somewhat surprising, for the standard view, which treats the tenses as quantification operators with sentential scope, as mentioned above, appears to have the prima facie advantage of providing an easy account of certain ambiguities in the interpretation of NPs such as \textit{all congressmen} in (80) below. That is, the sentence can either be about past congressmen or about current congressmen. This ambiguity can be captured, under an analysis of tenses as operators, in terms of scope. Thus (80) has the two readings in a) and b).

\begin{align*}
(80) & \quad \text{All congressmen were fools.} \\
& \quad \text{a) } (\forall x) [ \text{congressman}(x) \rightarrow \text{PAST fool}(x) ] \\
& \quad \text{b) } \text{PAST } (\forall x) [ \text{congressman}(x) \rightarrow \text{fool}(x) ]
\end{align*}

On the first reading, the sentence says that every man who is now in congress was a fool in the past; on the second reading it says that at some point in the past, all men who were then in congress were fools at the time.

However, this apparent advantage turns into a disadvantage when further examples are considered, as pointed out by Enç (1986). Specifically, the standard analysis makes the wrong predictions for a time-relative interpretation of nominals in a number of cases, including the following:

\begin{itemize}
\item[18] For the details of these arguments, as well as additional arguments Enç advances, I refer to the papers cited. Some related discussion can also be found in Enç (1981).
(81) All rich men were obnoxious children.
   a) (Vx) [ rich.man(x) --> PAST obnoxious.child(x) ]
   b) PAST (Vx) [ rich.man(x) --> obnoxious.child(x) ]

Here, the a)-reading is about men who are presently rich, who
were obnoxious during their childhood earlier. The reading in
b), however, is somewhat of a contradiction: it says that
there was a time in the past when every rich man was simul-
taneously an obnoxious child. To the extent that our view of
the world dictates that an individual is either a child or a
man, but that he can not be both at the same time, this read-
ing is unavailable. Moreover, there appears to be no way of
giving the sentence in (81) the perfectly normal reading
whereby it makes a statement about the childhood of rich men
of the past.

Basically the same point is driven home, perhaps more
forcefully, by the following example in (82), where this
analysis only produces interpretations that are not very
salient. As Enc observes, the options here are either to give
every hostage scope over the future tense operator, as in
a), or to give tense scope over the QNP, as in b). On the
former reading, the sentence talks about present hostages in
a future event; on the latter, about future hostages in a
future event, neither of which is a very salient reading of
this sentence.

(82) John will meet every hostage at the president’s party
   a) (Vx) [ hostage(x) --> FUTURE [John.meet(x)] ]
   b) FUTURE (Vx) [ hostage(x) --> John.meet(x) ]

The most natural interpretation, however, where we are
talking about former hostages, cannot be expressed on the
standard analysis. As shown in c) below, this reading would
require that we permit the NP to have its own past tense
operator.

   c) (Vx) [ PAST[hostage(x)] --> FUTURE John.meet(x) ]
By the same token, the sentence in (83) below (also from  
Enç (1988)) ought to express a contradiction on the analysis 
under discussion, as both the subject NP and the main event 
are interpreted relative to the same tense, namely the pre-
sent. That is, the sentence ought to say that present fugi-
tives are presently in jail, as shown in b). There is no way, 
however, of capturing the most natural reading of (83) shown 
as a), which talks about past-time fugitives in a present-
time situation.

(83) every fugitive is now in jail
    a) (∀x) [ PAST [fugitive(x)] --> in.jail(x) ]
    b) (∀x) [ fugitive(x) --> in.jail(x) ]

Further arguments of this sort are found in Enç (1981). Ch. 2 
especially.

Enç’s examples should make two things clear: First, any 
analysis which as a matter of course interprets NPs as rela-
tive to the time of the main event makes the wrong predic-
tions in case such as (81) to (83) above. Whatever assigns a 
temporal value to the sentence does not also automatically 
determine the time relative to which NPs contained in that 
sentence are to be evaluated. Second, as cases such as (82) 
and (83) suggest, to the extent that an NP is evaluated at a 
definite point in time, it must be assigned a temporal value 
by something other than that which assigns such a value to

19 Recall that under most versions of the standard 
analysis present tense sentences are regarded as tenseless, 
since the evaluation-time is not shifted with respect to the 
speech time (or the time given by a c-commanding operator, 
as the case may be). Note, though, that even if the present-
tense were represented by an operator, the problem mentioned 
in the text would persist, as (i) and (ii) below make clear. 
The only difference is that now we have two incorrect and 
unwanted logical forms, instead of just one.

   (i) (∀x) PRESENT [ fugitive(x) --> in.jail(x) ]
   (ii) (∀x) [ fugitive(x) --> PRESENT [in.jail(x)] ]
the sentence. It is clear, finally, that the above deficiencies of the tense-as-sentential-operator view are not wedded to the model-theoretic approach. These problems arise more generally for any analysis which treats tense as a sentential operator.

Most recently, Hornstein (1990b) has presented convincing arguments of a different sort against the scope analysis of tense. The evidence, some of which is also discussed in Enç (1987) and Dowty (1982), makes clear that the behavior of tense-operators is quite unlike that of established quantificational operators.

Firstly, Hornstein points out (p. 146, 166) that tenses are not subject to island constraints. For instance, in (79) a), repeated here as (84) a), the present tense of the relative clause is interpreted with wide scope, as shown in (84) b). The present tense of the relative clause must have wider scope than the matrix past tense, since it is interpreted as being present with respect to the moment at which a) is uttered.

(84) a) Mary interviewed the man who is speaking.
   b) PRESt· PASTt [s . . . s . . . s . . . s . . . .  
   c) * PASTt [s . . . AT t [NP . . . s PRESt· [s . . . AT t' . . .

If the present tense of the relative clause were interpreted in the scope of the matrix past tense as illustrated in c), then it ought to express a present tense relative to the time of Mary's interview (which is prior to the moment of utterance). Such a reading is not available for a), however.

Tense differs sharply in this respect from established quantifiers such as everyone in (85) (also from Hornstein

20 Cf. Ross (1988). This fact is also noted in Enç (1987) and Dowty (1982).
(1990b), p. 223). As indicated, this sentence is ungrammatical with co-indexing, the reason being that in order to bind the pronoun him the quantifier everyone would have to c-command it. However, QR out of the relative clause is impossible, as this would violate the NP-island constraint. The sentence thus cannot mean that everyone was met by a man who annoyed him.

(85)  

\[ \text{a) * A man who met everyone, annoyed him.} \]

\[ \text{b) * every_{x} [s \ [\text{NP many} [s \ y \ \text{met} \ x]] \ y \ \text{annoyed} \ x \ldots] \]

More generally, in embedded clauses to which no island-constraints apply tense always has either the widest or the narrowest possible scope. Unlike regular quantifiers, tense never takes intermediate scope. Consider for example the complex sentence in (86), which is multiply ambiguous (from Hornstein (1990b), p. 145). Let us assume that the scopes of the tenses in the a) and b) clauses are as shown on the surface: then the time \( t_{a} \) of the a)-clause is seven days prior to the moment of utterance, and that of the b)-clause, \( t_{b} \), is three days after that (and hence four days prior to now).

(86)  

\[ \text{a) John said a week ago ...} \]

\[ \text{b) that Frank would believe in three days ...} \]

\[ \text{c) that Sam \{i. would\} be in London in two days. \}

Consider now the tense of the most deeply embedded clause c): The first option (i.) is for the future tense \( t_{c} \) to be interpreted with narrowest scope, as shown more abstractly in (87) a). In this case, \( t_{c} \) is two days later than the time \( t_{b} \) of the next-higher clause b). Alternatively, (86)a) ii. expresses an option whereby the most deeply embedded future tense of clause c) takes widest scope, as illustrated in (37) b). Since here the tense-operator is not in the scope of the two superordinate tenses, it is interpreted relative.
to the moment of utterance. Sam will thus be in London two days after now.

(87)  a) [ PASTa ..AT ta [ FUTb ..AT tb [ FUTO AT to ...
    b) FUTO [ PASTa ..AT ta [ FUTb ..AT tb [ ..AT to ...
    c) * PASTa ..AT ta [ FUTO [ FUTb ..AT tb [ ..AT to ...

Note, however, that there is no way of expressing the scope relations shown in (87) c) above, where the most deeply embedded tense takes intermediate scope. That is, the tense which determines to can not be construed as being in the future relative to ta. Sentence (86) cannot express a reading that places Sam in London five days before the moment of speech.

In sum, evidence of the sort illustrated led Hornstein (1990) (especially Sections 4.4 and 5.1) to the conclusion that the semantic and syntactic behavior of the tenses is quite unlike that of scopal elements such as quantifiers. Any theory which gives tenses (or times) quantificational scope predicts interpretive options which are not attested in natural languages.

3.4 Summary

In the light of the difficulties which the standard scope theory of tense faces vis-à-vis problems such as the ones mentioned above led both Enç and Hornstein to rejecting this analysis. Both researchers suggest alternatives, which we will consider after we examined the full range of phenomena found with embedded tenses, in Sections 2 and 3 below.

For further details of the various versions of the standard approach to tense, I refer the reader to the reference cited above. For criticism and alternative analyses, I refer
to the work of Mürvet Enç, especially her (1981); but cf. also her (1986), (1987), and (1990); Hornstein (1990a,b), Oghihara (1989, 1990), and references cited there.
Chapter Three: Tense Phenomena

0. Introduction

In the final Section of the preceding Chapter we briefly examined the standard scope analysis of tense and noted some objections that have been raised against it. In this Section we want to examine the entire range of tense phenomena, so we can get an idea of what a theory of tense and temporal reference should be able to account for. Thus before we can go on to developing an alternative analysis of tense in natural language we need to get a better idea of the range of tense phenomena we want the theory to be able to account for. In particular, we need to examine patterns of embedded tense, since it is mainly there that different analyses make different predictions. As we noted earlier, most analyses can handle the simple cases of matrix tense equally well.

Section 1: Tense in Simple Sentences

Having come to a working understanding of the factors involved in temporal adverbial modification, we can turn to investigating the question to what extent these same factors play a rôle in the other area of grammar where the notions time and events meet, viz. tense. An answer to this question is necessary, of course, for the evaluation of our claim that the analysis of tense-phenomena can be subsumed under an extension of the Davidsonian Event-Hypothesis.
The general direction in which I want to go from here is reasonably clear now: we are trying to analogize tense to adverbial modification by treating the three basic tenses as (two-place) predicates whose one argument is the event. The other argument of the tense-relation is the temporal anchoring point, which is typically (though not necessarily; cf. Section 2 below) situated in the speech act.

Characteristicly, time enters into simple matrix clauses is by virtue of the fact that we can locate events relative to the time that we talk about them. Thus, we can talk about events that happened before we talked about them, or that are happening at the same time as we speak, or that (we expect or predict) are going to happen at some time yet to come. Logically, there are three possible forms this relation can take: (i) either the situation described in the sentence obtains before the utterance event, or (ii) vice versa, or (iii) the two events are simultaneous. Accordingly, there are three tenses, viz. past, future, and present. These three possibilities are illustrated in this order in (1).

(1)   a) John was sick on January 1st, 1991  
      b) John will be sick on January 1st, 1991  
      c) John is sick on January 1st, 1991

In all three cases, the event or situation described is the same, namely John's being sick on New Year's Day of this year. In a) I am talking after the fact, as I might be right now, in August, when telling you what happened to John at that time. In contrast, b) described that same situation before it was realized, as might have been the case on New Year's Eve, as a comment on the amount of champagne John has been drinking at the party. In c), finally, the utterance of the sentence takes place simultaneously with the event. Thus, the three logical possibilities for ordering event and utter-
ance are just the ones we saw earlier in the context of ad-
verbial modification.

Note that there is nothing intrinsic to the event which
makes it past, present, or future. There is nothing that
changes in the event in (1) as it moves through time, turn-
ing from a past event into present and future events. What
changes here is not the event itself, but rather the way we
look at it. Thus, whatever property it is that the tenses
express, it is not a property of events qua events, but
rather a property of our personal perspective on an event.
The importance of this observation should not be underesti-
mated, for it is at the core of what distinguishes our ap-
proach from that of other researchers in the area. In parti-
cular, if a tense denoted a time (point or interval), then
that time would be an attribute of whatever event takes place
at that time. Hence it should remain the same throughout.¹
We will return to this in Chapter Four when we discuss our
analysis of tense in greater depth.

Accordingly, we can distinguish the three tenses past,
future, and present in the manner illustrated in (2). The
axis point \( u \) of each tense refers to the event of the utter-
ance, while \( e \) stands for the event of the sentence being mo-
dified by the tense. The present here is a real tense func-
tion, not merely the absence of one, as is the case in the
standard analysis (on which cf. Section 3 of Ch. Two).

¹ An example makes this clearer: if the tenses denoted
times, then they should behave like overt expressions de-
noting time. For instance, in the sentence

(i) \( \text{at } 2 \text{ o'clock(} \text{leave}(\text{John}) \text{)} \)

we have such a time, which is predicated of the sentence
\( \text{leave}(\text{John}) \). This does not change regardless of whether the
event actually occurs in the past, present, or future. And
indeed, the sentence in (i) does not tell us at all whether
we are looking at the event from the perspective of a vantage
point which precedes or follows the event in time.
(2)  

a) PAST: \[ u \text{ AFTER } a \]  
b) FUTURE: \[ u \text{ BEFORE } a \]  
c) PRESENT: \[ u \text{ WHEN } a \]  

The utterance situation \( u \) is consistently the first argument of this relation, and the sentential event \( a \) is consistently its second argument. This choice may appear somewhat arbitrary at this point. However, as we will see in Chapter Four below, there are a number of reasons for doing it this way.

In (2) above, I do not mean to suggest, of course, that the tenses simply \textit{are} the temporal connectives \textit{before} and \textit{after} which we discussed in Section 2 above. Rather, they are instances of the same basic relations BEFORE, AFTER, and WHEN which we encountered in Section 3 of Chapter One. Note that tense most certainly is a functional, not a lexical, notion. And the same is arguably the case for the temporal connectives, which have all the signs of functional elements: they constitute a closed class, which a highly systematic distribution of the meanings of the individual elements in the class, etc. Furthermore, a great many languages appear to have them in the same form.\(^2\) In short, I submit that both the tenses and the temporal connectives derive from the same underlying primitive relations, which are given by virtue of universal grammar.

Finally, one may wonder exactly how \textit{time} enters into the picture of tense sketched here. Tense, after all, does have to do with time. On the analysis proposed here the tenses are relations between events that impose some kind of ordering on

\(^2\) Ken Hale (p.c.) has pointed out to me that some languages lack an equivalent of \textit{before}. Instead, they use \textit{not until} to express this ordering relation.
That ordering is obviously temporal in nature, and not, say, spatial. Time, so I claim, thus comes into the picture by virtue of the three relational predicates given in (2) above. **WHEN** is an inherently temporal notion, and so are **BEFORE** and **AFTER**. Given this, the only two ways in which time ever enters into language are (i) via the lexical temporal expressions referring overtly to time points or intervals (typically NPs), and (ii) via particular instances of the basic temporal relations **BEFORE**, **AFTER**, and **WHEN** (as temporal connectives, prepositions, or tenses).

If we compare tense with temporal modification by means of adverbials we notice that considerations pertaining to the **temporal duration** of an event are curiously absent in this area. That is, there are not tense phenomena that correspond to the specification of duration in terms of the basic relations **FOR** and **IN** as discussed in Chapter One, **Section 3.3.2** above. Rather, Tense is concerned exclusively with the **temporal location** of events, and more specifically, with the ordering relations **BEFORE**, **AFTER**, and **WHEN**. Temporal specification by means of Tense thus appears to constitute only a sub-set of what can be achieved by means of temporal modification.

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3 Cf. Grünbaum (1970) for an argument that these relations exist in the world quite independently of human language and existence.
Section 2: Tense in Embedded Sentences

2.0 Introduction

In the preceding Section, we discussed the workings of tense in simple matrix sentences. Here, we will be considering the same problem with respect to complex sentences. Specifically, the question now is in what manner the simple tense pattern observed in matrix sentences carries over to embedded sentences. For the most part, we will limit our attention to the interactions between verbs and their complements.

As we just saw, tenses in matrix clauses impose a temporal ordering relation between, on the one hand, the events described by the sentences, and on the other hand, the situations of their utterances. That is, a sentential event \( a \) is ordered relative to another event, which serves as a temporal axis of orientation, and in the case of matrix clauses, this temporal reference point is the utterance of the sentence.

Assuming, as seems reasonable, that this pattern generalizes to embedded sentences as well, the question is, What is an embedded event ordered relative to by its tense. A priori, there appear to be two possibilities: (a) an embedded event can be ordered by its tense either relative to the event of the matrix sentence, or (b), relative to the actual utterance, as is the case for matrix clauses. I will refer to the former pattern as one of **Serial tense** for the embedded clause, because the event of the complement clause is ordered relative to the matrix event, which in turn is ordered relative to the utterance. The two tenses thus impose a **series** of ordering relations. The latter pattern I will call that of **Parallel tense** for the embedded sentence, since tense here establishes an ordering of the embedded event directly with
the utterance, independently of, and in parallel with, the ordering between utterance and matrix event imposed by the matrix tense.

Schematically, we can represent this difference as in (3) and (4):

(3) Parallel Tense:

\[
\text{Utterance} \quad \text{Matrix Event} \quad \text{Embedded Event}
\]

(4) Serial Tense:

\[
\text{Utterance} \quad \text{Matrix Event} \quad \text{Embedded Event}
\]

As I will demonstrate shortly, both possibilities are found in languages. The Serial tense pattern for embedded clauses will be discussed in Section 2.1 for Hebrew. As the English translations will make clear, this pattern is of course not restricted to this language. Next we will turn to Latin, in Section 2.2, where both Serial and Parallel tense patterns will be discussed. Latin is perhaps uniquely suited for this since the two patterns are distinguished overtly in the morphology. After this, Section 2.3 will attempt to make sense of the English tense system. Finally, Section 2.4 will close the discussion with some more general comments regarding the two patterns for embedded tense observed in the preceding Sections.

2.1 Embedded Tense in Hebrew

According to the description of facts given in Cole (1974), the tenses of subordinate clauses in Hebrew are temporally anchored in the matrix event, and hence exhibit a Serial tense pattern. Thus in (5) a), the Present tense
expresses simultaneity of my going home with Miriam’s thinking, not the moment of utterance. Similarly, the embedded past in b) signals that the going home took place prior to Miriam’s thinking, not merely in the past relative to the utterance. In c), finally, the interpretation is such that my going home follows Miriam’s thinking, though both events may well be understood as being past relative to the utterance.

\begin{align*}
(5) & \quad \text{Miriam} \quad \text{bashva} \quad \text{she} \quad \ldots \quad \text{Miriam thought that} \ldots \\
& \quad \text{Miriam} \quad \text{think (PAST)} \quad \text{that} \ldots \\
& \quad \ldots \quad \text{ani} \quad \text{holex} \quad \text{habaita} \quad \text{I walk (PRESENT) homeward} \quad \ldots \quad \text{I was going home} \\
& \quad \ldots \quad \text{Ø} \quad \text{halaxti} \quad \text{habaita} \quad \text{(I) walk (PAST) homeward} \quad \ldots \quad \text{I had gone home} \\
& \quad \ldots \quad \text{ani} \quad \text{elek} \quad \text{habaita} \quad \text{I walk (FUTURE) homeward} \quad \ldots \quad \text{I would go home} \\
\end{align*}

An analogous pattern obtains for matrix future tense in (6). With embedded present tense in a), the going is simultaneous with the thinking; with an embedded past, in b), the former is prior to the latter; and with an embedded future, going follows thinking, in c).

\begin{align*}
(6) & \quad \text{Miriam} \quad \text{taxshov} \quad \text{she} \quad \ldots \quad \text{Miriam will think that} \ldots \\
& \quad \text{Miriam} \quad \text{think (FUTURE)} \quad \text{that} \ldots \\
& \quad \ldots \quad \text{ani} \quad \text{holex} \quad \text{habaita} \quad \text{I walk (PRESENT) homeward} \quad \ldots \quad \text{I am going home} \\
& \quad \ldots \quad \text{Ø} \quad \text{halaxti} \quad \text{habaita} \quad \text{(I) walk (PAST) homeward} \quad \ldots \quad \text{I will have gone home} \\
& \quad \ldots \quad \text{ani} \quad \text{elek} \quad \text{habaita} \quad \text{I walk (FUTURE) homeward} \quad \ldots \quad \text{I will go home} \\
\end{align*}
Hebrew tenses, when embedded under past, as in (5) above, or under future, as in (6), thus seem to express the relative temporal ordering of subordinate and superordinate events, as shown schematically in (4). The alternative possibility shown in (3) —for the embedded event to be related to the utterance directly— is apparently impossible, as the two sentences in (7) and (8) seem to show. That is, in the former, Miriam’s thinking is in the past, Hannah’s saying is prior to that, and Shmuel’s deciding is prior again. My going home, now, is simultaneous with Shmuel’s deciding, not the time of the utterance.

(7) Miriam xashva she .. 'Miriam thought (PAST) that ..
.. Xana amra she .. Hannah said (PAST) that ..
.. Shmuel hekhit she .. Shmuel decided (PAST) that ..
.. ani holex habaita .. I walk (PRESENT) homeward
'Miriam thought that Hannah said that Shmuel decided that I was going home.'

And similarly for the future tenses in (8). Each embedding places an event further into the future: The utterance is temporally ordered before Miriam’s thinking, which occurs before Hannah’s saying, which is before Shmuel’s deciding. But again, my going home, bearing present tense, is contemporaneous with the event in which it is immediately contained, not the utterance.

(8) Miriam taxshov she .. 'Miriam will think (FUTURE) that ..
.. Xana tagid she .. Hannah will say (FUTURE) that ..
.. Shmuel yaxlit she .. Shmuel will decide (FUTURE) that ..
.. ani holex habaita .. I walk (PRESENT) homeward
'Miriam will think that Hannah will say that Shmuel will decide that I am going home.'

Further evidence pointing to the conclusion that embedded tenses in Hebrew relate embedded events to embedding events, rather than the utterance directly, derives from co-occu-
rence restrictions of tenses and temporal adverbials. For example, in simple sentences the future time adverb meaning tomorrow is incompatible with the past tense, as (9) shows.

(9) Ø xazarti miChicago etmol / *maxar
    (I) return (PAST) from-Chicago yesterday / *tomorrow
    'I came back from Chicago yesterday'
    *'I came back from Chicago tomorrow'

However, this is different in embedded clauses, as demonstrated in (10). Here, the same adverb presents no problem in conjunction with a past tense.

(10) lifne shavua amarti leMiriam she ..
     before week (I) said (PAST) to-Miriam that ..
     .. ani axzor miChicago maxar / etmol ..
     .. I return (FUT.) from-Chicago tomorrow / yesterday ..
     .. aval basof lo yaxolti
     .. but in the end (I) not could (PAST)
     'A week ago I told Miriam that I would come back from Chicago tomorrow/yesterday, but in the end I wasn't able to.'

These facts, too, seem to support the conclusion that tense in embedded sentences in Hebrew relate the event to the superordinate event, rather than the utterance.4

The case is slightly different, however, with restrictive relative clauses. Here, the "most common" interpretation of tense is relative to the utterance, as Cole (1974) reports (on p. 81), although an interpretation relative to the event

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4 Cole (1974) uses the data discussed here to argue for the "performative hypothesis" of Ross (1970). He thereby generalizes all Hebrew tenses to relations between clauses. In embedded sentences, this is the relation between sub- and super-ordinate clause; in "matrix" clauses, the relation between the overt sentence and an implicit "hypersentence" containing a performative verb, a first person subject, and a second person object.
of the containing sentence is also available. These are translated in a) and b), respectively.

(11) Miriam xashva [ she Daniel amar [ she ... Miriam thought (PAST) that Daniel said (PAST) that ...

.. haish she oved alyadi meshuga ] ] ]
.. the man that works (PRESENT) next to me crazy

a) 'Miriam thought that Daniel had said that the man who works next to me was crazy.'

b) 'Miriam thought that Daniel had said that the man who worked next to me was crazy.'

On the reading translated as a), the tense of the relative clause is interpreted as relative to the utterance. On this reading, the man "... may work next to me now, but may not have worked next to me at the time craziness was attributed to him." (Cole (1974), p. 81). On the reading translated in b) above, in contrast, the present tense of oved 'work' is understood as expressing simultaneity with the event of saying.5

Finally, in non-restrictive (appositive) relative clauses tense can apparently only be relative to the utterance, as shown in the translation of (12). That is, the past tense of raiti 'I saw him' expresses the fact that the seeing is temporally prior to the utterance, though not necessarily to the event of saying.

5 Cole (1974) subsequently argues that the two different interpretations of the tense in the relative clause in a) and b) correlate with referentially transparent vs. opaque readings of the head NP, respectively.
(12) Miriam xashva [ she Daniel amar [ she .. [same as (11) above] .. Yoxanan, she la raiti oto kvar shvuaim, .. .. John, that not I saw him (PAST) already two weeks, .. oved beTel Aviv. .. works (PRESENT) in Tel Aviv.

'Miriam thought that Daniel had said that John, whom I haven't seen for two weeks, worked in Tel Aviv.'

As the data presented make clear, the embedded tenses are here interpreted relative to the matrix event, not the moment of speech.

2.2 Embedded Tense in Latin

As we just saw, tense in complement sentences in Hebrew is interpreted relative to the time of the containing event. In relative clauses, on the other hand, we found variation between Serial and Parallel tense patterns. The same appears to be true more generally, so for instance in Latin, which differs from Hebrew in an interesting respect. That is, the Serial and Parallel patterns can be distinguished in Latin on the basis of verbal inflection: Where tense relates an embedded event to the utterance, the verb appears with indicative morphology; by contrast, where an embedded tense relates an event to the next-higher event, as it does in Hebrew complement clauses, the lower verb displays subjunctive morphology. This latter case (of Serial embedded tense) gives rise to the crux of all students of Latin, the Consecutio Temporum (Sequencing of Times\textsuperscript{8}). Serial Tense also manifests itself in

\textsuperscript{8} This is not to be confused with the Sequence of Tense (SOT) phenomenon in English discussed in Costa (1972), Comrie (1985, 1986), Enç (1987), Abusch (1988), Green (1989), Ogi-hara (1989), Higginbotham (1990), and Hornstein (1990a,b). This will be the topic of Chapter Five below.
non-finite clauses. We deal with each of these two cases in turn in the next three sub-sections.

Before doing so, however, we ought to clarify the distribution of morphological affixes and semantic functions. Firstly, Latin tense morphology expresses not only temporal but also aspectual functions. The latter will be ignored here wherever possible. Secondly, subjunctive affixes in Latin serve to indicate mood as well as tense. In the former capacity, Latin subjunctive is as in English, expressing irrealis situations; this is the only function it can express in matrix clauses. Aside from this, however, it also has the purely temporal (non-modal) function of indicating Serial Tense (Consecutio Temporum) in embedded contexts. This is what we are exclusively concerned with here.

2.2.1 Latin Indicative Tense:

Indicative tense, first, is found in matrix and complement clauses as well as relative and adverbial clauses, and others which are clearly subordinate to the matrix from the point of view of syntax, though not from that of semantics. In traditional grammar, such constructions are sometimes called external dependencies. (13) below provides two representative cases (from Habenstein & Zimmermann (1971), p. 115):

---

7 Non-finite sentences include infinitival and adjectival (participial and gerundive) clauses. Finiteness in Latin depends not on tense, but on (i) mood and (ii) agreement with the subject, i.e. person features. Any predicate lacking these two categories is considered non-finite. Whereas finite forms have mood, non-finite forms have case.
(13)  

a) pater valde dolebat, ...
father very be.sad
... quod filius eum decipere conatus erat
because son him\textsubscript{Acc} to.deceive tried was
'the father was very sad; for his son tried to
deceive him'

b) equites, qui hostes persecuti erant, reverterunt
horsemen who enemies pursued were turned.around
'the horsemen, who pursued the enemies, returned'

In both cases, each of the two clauses is a main clause, describing an event which is independent of the other, except for the fact that one of the sentences is syntactically subordinated to the other. (The relative in b) is thus presumably of the non-restrictive or appositive variety, though this is a matter of interpretation, since these are not easily distinguishable from restrictive relatives.) The mutual independence of the two events in these constructions is evident from the fact, among others, that the syntactic subordination might as well be the reverse, as shown in (14), without effects on the interpretation of either of the two events, or the relation between them.

(14)  

a) filius patrem decipere conatus erat, ...
... itaque (is)\textsuperscript{a} valde dolebat
'the son tried to deceive the father,
... and so he was very sad'

b) equites, qui reverterunt, hostes persecuti erant
'the horsemen, who returned, pursued the enemies'

Indicative tense on all the verbs in (13) and (14) signals the fact that each event is temporally evaluated relative to the utterance. Indicative tense thus never indicates Serial tense, and is never subject to Consecutio Temporum; an event in an indicative-marked sentence can never be related to another sentential event.

\textsuperscript{a} Latin is of course a (subject) pro-drop language.
2.2.2 Latin Subjunctive Tense:

Second, contrasting with indicative tense, we have subjunctive tense, indicating Serial embedded tense, which is subject to the Consecutio Temporum. In this function, subjunctive marking occurs only in embedded clauses, of course. In addition to being syntactically embedded, and in contrast to the indicative subordinates, the sentences so marked characteristically also stand in some sort of semantic dependency to the governing predicate. This semantic dependency may take the form of a thematic relationship, as in the case of complement or subject clauses, or it may be one of rationale, purpose, result, causation, condition, concession, opposition, comparison, or sequence of events, etc., with adjunct clauses. At any rate, the semantic relationship between sub- and superordinate clause typically induces an asymmetry, thus precluding the possibility of inversion shown in (13) vs. (14) for the indicative. Because of this intimate semantic relationship between the two clauses, this form of subordination is called internal dependency in traditional grammar.†

† The intimate internal dependency of embedded subjunctive clauses on their containing sentences is also revealed by the fact that they support long distance anaphora, as (15) illustrates, which is not possible for embedded indicatives. In the subjunctive clause in (15) the reflexive can be anteceded either by its own subject filius ‘son’ or by that of the next higher clause, pater ‘father’. By contrast, the indicative subordinate in (15)b) requires a true pronoun for coreference with the next-higher subject; as (i) shows, an anaphor in an indicative sentence allows only an antecedent in its own clause (Habenstein & Zimmermann (1971), p.20, 115) (i) pateri valde dolebat, ...

... quod filius; esse dicitur decipere conatus erat
‘the father was very sad,
because the son tried to deceive himself/*him’
Comparing (13)a) above with (15) below (from Habenstein & Zimmermann 1971:115), external dependency in the former conveys information about two separate main events, joined by a causal conjunction: the father was sad and the son was deceptive, and the former is because of the latter. In the sentence below, however, one event is contained in the other. The main event is that of the father’s being sad, and his son’s attempted deception is internally dependent on it. (15), but not (13)a), can be paraphrased as "the father was sad about his son’s deception" or "the father was saddened by the fact that his son tried to deceive him".

(15) pater valde dolebat, ...
father very be.sad
... quod filius se decipere conatus asse\textit{t}
because son him to.deceive tried was (past SUBJ.)
'the father was very sad because (his) son tried to deceive him'

The distribution of tenses in internally dependent subjunctive clauses is governed by Consecutio Temporum, meaning that embedded tense indicates whether the containing event takes place before, after, or simultaneous with the embedded event. Illustrations of this are given in (18) for the primary tenses and in (17) for the secondary tenses.\textsuperscript{10} (Habenstein & Zimmermann (1971), pp. 118-7.)

\textsuperscript{10} The distinction of primary and secondary tenses is an aspectual one, representing incomplete and completed action, respectively. It is of no relevance here. The former are also referred to as the "principal" or "incomplete action" tenses of Latin, the latter as "historical" or "completed action" tenses. It is determined by the main verb; the lower verb agrees with the higher verb w.r.t. this distinction.
In all these cases, tense in the embedded clause relates to the containing event, not the utterance. Similarly, subjunctive tenses in relative clauses follow the Serial Tense, as shown in (18). Thus, in a) the imperfect subjunctive form *prohiberent* expresses simultaneity of the event of preventing with the event of following in the perfect indicative form *secutae sunt*. (From Habenstein & Zimmermann (1971), p.121)

> (18) *secutae sunt tempestates,...*  
> followed are storms  
> *... quae hostem a pugna prohiberent*  
> which enemy from battle prevented  
> (SUBJ.)

> 'Storms followed which prevented the enemy from (engaging in) battle'
2.2.3 Latin Infinitive Tense

A somewhat simpler version of the same pattern of Serial tense (with Consecutio Temporum) obtains for non-finite (participle and infinitival) clauses. It is simpler because primary and secondary tenses are not distinguished, and no mood distinctions are made. Infinitival clauses, in particular, occurring in the Accusativus cum Infinitivo (ACI) construction, are probably the most frequent type of clausal complement in Latin. In most cases where English has a that-complement, Latin has an ACI instead; so for example in reported (indirect) speech. Furthermore, ACIs can occur as subject clauses in certain impersonal constructions, and a very similar construction, the Nominativus cum Infinitivo, occurs in the subject position of certain raising verbs.

Due to the fact that ACI clauses occur in argument positions, infinitivals are internally dependent on their containing sentences, like the subjunctive subordinate clauses. This internal dependency is once again evident not only from Serial Tense, but also from the fact that they permit long-distance anaphora, again like the subjunctives and unlike the indicatives, as (19) shows (from Habenstein & Zimmermann (1971), p.94). Here, the event in the complement takes place in the future from the point of view of the matrix clause, not the speaker. This tense relation is expressed by the future infinitive, as in the right-most column of (20) below. (The copula can be dropped.)

(19) Milites [Caesarem sibi temperaturum (esse)] sperabant
soldiers Caesar acc SELF (to.be)going.to.spare hoped
'The soldiers were hoping that Caesar would spare
them/himself'

Regarding their temporal interpretation, infinitival tenses behave like subjunctive tenses and unlike those of the
indicative in that the tense functions are relative to the next-higher clause, rather than the time of utterance. Embedded present is expressed by the present infinitive, embedded past by the perfect infinitive, and embedded future by the future infinitive, as summarized in (20):

<table>
<thead>
<tr>
<th>MAIN CLAUSE: ((S_1))</th>
<th>SUBORDINATE CLAUSE: ((S_3)) (Acc. cum Inf.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Imperfect) putabat ... 'he thought'</td>
<td>(e_1) after (e_3)</td>
</tr>
<tr>
<td>(Perfect) putavit ... 'he has thought'</td>
<td>(e_1) when (e_3)</td>
</tr>
<tr>
<td>(Pluperf.) putaverat ... 'he had thought'</td>
<td>(e_1) before (e_3)</td>
</tr>
<tr>
<td>(Present) putat ... 'he thinks'</td>
<td>(\ldots) sororem mihi litteras scripsisse</td>
</tr>
<tr>
<td>(Future I) putabit ... 'he will think'</td>
<td>(\ldots) sororem mihi litteras scribere</td>
</tr>
<tr>
<td>(Future II) putaverit ... 'he will have thought'</td>
<td>(\ldots) sororem mihi litteras scripsuere case</td>
</tr>
</tbody>
</table>

(Perfect Infinitive) | (Present Infinitive) | (Future Inf.) (= Participle Future Active + Inf. of \(ba\))

| \(\ldots\) that my sister wrote me a letter' | \(\ldots\) that my sister is/was writing me a letter' | \(\ldots\) my sister will/would write me a letter' |

2.2.4 Summary of Latin Tense:

Disregarding aspeotual distinctions, the situation of the Latin tense system can be summarized thus:

(A) Irrealis events always occur with subjunctive marking, both in matrix and embedded sentences.

(B) All cases where an event is temporally related to an utterance are marked indicativa, and all instances of indicative marking relate realis events to utterances. This is the case in matrix and externally dependent clauses, in particular, in certain (non-restrictive?) relatives and adjunct clauses introduced by certain subordinating conjunctions.

(C) Wherever the event of a finite clause is related to a superordinate event by its tense, we find subjunctive tense markers. This pattern obtains only if the subjunctive clause is internally dependent on the containing
sentence, as in (some) argument clauses, (some) restrictive relatives, and adjunct clauses introduced by certain subordinating conjunctions. However, since in some cases subjunctive marks irrealis events, not all instances of the subjunctive express tense relations to a superordinate event.

(D) Finally, wherever the event of a non-finite clause is related to a superordinate event by tense, we find infinitival (or participial) tense-marking. Such clauses are always subject- or object-clauses, and are always internally dependent. Here, the inverse holds, too: all infinitival tenses relate to the superordinate event.

The latter two cases represent the Consecutio Temporum.

Admittedly, this is not a complete account of Latin tense. The burden of accounting for the distribution of these two tense patterns now lies on the notion of internal vs. external dependency of clauses. Solving for this variable would lead us too far afield, however. Even so, the preceding discussion should suffice to give us an intuitive understanding of the difference between the two which is all we need here. Besides, the obvious differences in the morphological marking of these two tense patterns alone should serve to establish their factual reality. What matters most, for our purposes, is that both patterns can be accounted for in the same manner in terms of the primitive temporal ordering relations.

What distinguishes Latin tense from Hebrew it thus not so much how tense functions, but how tense is marked morphologically. (This is also the main difficulty for the student learning Latin.) For there are different tense markers, depending on the temporal reference point. If the reference point or axis of orientation is the utterance, we find indicative markers. On the other hand, if the anchor is a superordinate event, we get infinitival tense marking if the sentence is non-finite, and subjunctive tense marking if it is finite. On top of this, there is the added difficulty presented by the fact that the embedded tense markers for finite
clauses double as markers for modality (or vice versa). Add to this the aspectual distinction of primary and secondary tenses, and the tense system gets really quite complex. As a result of all this, the morphological affixes are distributed quite unevenly over the semantic functions. The indicative, which should be the least marked form, occurs only in a limited set of contexts. From this point of view, indicative tense marking is the exception rather than the norm. The subjunctive pattern, on the other hand, is used with great frequency, as it covers several different functions. As we will see in Section 3 below, this system is greatly simplified in the modern Romance languages.

In spite of all the extraneous problems pertaining to morphological marking of aspect, modality, etc., it is evident that Latin exhibits two distinct patterns for embedded tenses. Embedded indicative tenses exhibit the pattern we dubbed Parallel embedded tense in Section 2.0 above. Contrasting with this, embedded subjunctive and infinitival tenses follow the pattern for Serial embedded tense.

2.3 Two Patterns for Embedded Tenses

In Section 1 above we noted that in simple matrix clauses tense establishes an ordering relationship between the event of the sentence and the moment of utterance, which we summarized in (2), repeated here as (21):

(21) a) PAST: u AFTER a  
   b) FUTURE: u BEFORE a  
   c) PRESENT: u WHEN a  

As regards tense in embedded clauses, on the other hand, we assumed in Section 2.0 above that the same ordering relations show in (21) are at work in embedded tenses as well.
We noted the two theoretical possibilities of ordering an embedded event-argument either in relation to the moment of utterance or in relation to the event of the superordinate sentence. These two possibilities, which we called Parallel and Serial embedded tense, respectively, are illustrated schematically in (22) and (23) (repeating our earlier examples (3) and (4)).

(22) Parallel Tense:

\[
\text{Utterance} \quad \text{Matrix Event} \quad \text{Embedded Event} \\
[\text{MATRIX=TENSE}] \quad \text{[EMBEDDED=TENSE]} 
\]

(23) Serial Tense:

\[
\text{Utterance} \quad \text{Matrix Event} \quad \text{Embedded Event} \\
[\text{MATRIX=TENSE}] \quad [\text{EMBEDDED=TENSE}] 
\]

Subsequently, we found evidence from natural languages for both patterns. Latin, in particular, distinguishes these two patterns overtly in its morphological marking. In other languages, however, no morphological marking distinguishes the two patterns; hence it is not immediately clear whether they indeed exist in these languages. The English language, for instance, represents such a case; we will examine it more closely in Section 2.4 below.

In the meantime, however, it is important that we gain clarity on the different orderings established by the two patterns of embedded tense. To this end I want to briefly discuss the two options independently of any specific data so that we may sort out their respective predictions.

Suppose then that we have a sentence $S_1$ containing a complement clause $S_2$. Suppose first that the matrix verb is in the present tense. In this case, the two possibilities illustrated in (22) and (23) above make exactly the same predictions. That is to say, since the matrix event is simultaneous with the utterance, it makes no difference whether the
temporal anchor for an embedded tense is the matrix event or the utterance. Thus, as is shown in (24), if the matrix S₁ has present tense and the subordinate S₂ past tense, as in a), then e₁ is simultaneous with the utterance u, and either of u and e₁ is after e₂. As shown on the right of (24)a), the time t(e₂) of the embedded event e₂ precedes both the time t(e₁) of the matrix event e₂ and that of the utterance u, t(u). And similarly for embedded present and future in b) and c).

(24) a) [s₁ PRESENT [s₂ PAST ] ]
    = (u WHEN e₁) & (u=e₁ AFTER e₂)
    t(e₂) < t(e₁) = t(u)

b) [s₁ PRESENT [s₂ PRESENT ] ]
    = (u WHEN e₁) & (u=e₁ WHEN e₂)
    t(e₂) = t(e₁) = t(u)

c) [s₁ PRESENT [s₂ FUTURE ] ]
    = (u WHEN e₁) & (u=e₁ BEFORE e₂)
    t(u) = t(e₁) < t(e₂)

As far as their temporal interpretations are concerned, the tenses of clauses embedded in present-tense clauses behave exactly like matrix tenses. They are thus not very revealing for a comparison of the two possibilities.

This is different with tenses embedded under past and future tensed sentences. Suppose, next, that the matrix clause S₁ is in the past tense, meaning that the utterance u is after the event e₁. Here, it does make a difference whether the reference point of the embedded tense is the utterance or the superordinate event, as a comparison of (25) and (28) below reveals. (An ampersand "&" marks the cases where both possibilities make the same predictions.)
(25) **Parallel Tense:**
(Embedded Tense Relates \(s_2\) to Utterance \(u\))

a) \([s_1 \text{ PAST } [s_2 \text{ PAST }] ] = (u \text{ AFTER } s_1) \land (u \text{ AFTER } s_2)\)
   (i) \(t(e_1) < t(e_2) < t(u)\)
   (ii) \(t(e_1) = t(e_2) < t(u)\)
   (iii) \& \(t(e_2) < t(e_1) < t(u)\)

b) \([s_1 \text{ PAST } [s_2 \text{ PRESENT }] ] = (u \text{ AFTER } s_1) \land (u \text{ WHEN } s_2)\)
   (i) \(t(e_1) < t(u) = t(e_2)\)

c) \([s_1 \text{ PAST } [s_2 \text{ FUTURE }] ] = (u \text{ AFTER } s_1) \land (u \text{ BEFORE } s_2)\)
   (i) \& \(t(e_1) < t(u) < t(e_2)\)

(26) **Serial Tense:**
(Embedded Tense Relates \(s_2\) to \(s_1\))

a) \([s_1 \text{ PAST } [s_2 \text{ PAST }] ] = (u \text{ AFTER } s_1) \land (s_1 \text{ AFTER } s_2)\)
   (i) \& \(t(e_2) < t(e_1) < t(u)\)

b) \([s_1 \text{ PAST } [s_2 \text{ PRESENT }] ] = (u \text{ AFTER } s_1) \land (s_1 \text{ WHEN } s_2)\)
   (i) \(t(e_1) = t(e_2) < t(u)\)

c) \([s_1 \text{ PAST } [s_2 \text{ FUTURE }] ] = (u \text{ AFTER } s_1) \land (s_1 \text{ BEFORE } s_2)\)
   (i) \& \(t(e_1) < t(u) < t(e_2)\)
   (ii) \(t(e_1) < t(u) = t(e_2)\)
   (iii) \(t(e_1) < t(e_2) < t(u)\)

As (26)a) illustrates, relating both events independently to the utterance makes no predictions about the relative ordering of the two; by contrast, if the embedded event \(s_2\) is related to \(s_1\), the former can only precede the latter, as in (26)a). For a present tense embedded under past tense, (25) b) predicts simultaneity with the utterance \(u\) for \(s_2\), while (26)b) predicts simultaneity with \(s_1\). Finally, a future under a past tense can only mean that \(s_2\) follows the utterance on the hypothesis embodied in (25), whereas the one in (26) makes no predictions for the relative temporal ordering of \(s_2\) and \(u\), as shown in c).

Finally, consider the behavior of tenses when embedded under a future-tensed matrix clause. The two possibilities — embedded event ordered relative to utterance or superordinate event— are illustrated in (27) and (28).

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Parallel Tense: (Embedded Tense Relates e₂ to Utterance u)

a) [s₁ FUTURE [s₂ PAST ]] = (u BEFORE e₁) & (u AFTER e₂)
   (i) & t(e₂) < t(u) < t(e₁)

b) [s₁ FUTURE [s₂ PRESENT ]] = (u BEFORE e₁) & (u WHEN e₂)
   (i) t(u) = t(e₂) < t(e₁)

c) [s₁ FUTURE [s₂ FUTURE ]] = (u BEFORE e₁) & (u BEFORE e₂)
   (i) & t(u) < t(e₁) < t(e₂)
   (ii) t(u) < t(e₁) = t(e₂)
   (iii) t(u) < t(e₂) < t(e₁)

Serial Tense: (Embedded Tense Relates e₂ to e₁)

a) [s₁ FUTURE [s₂ PAST ]] = (u BEFORE e₁) & (e₁ AFTER e₂)
   (i) & t(e₂) < t(u) < t(e₁)
   (ii) t(e₂) = t(u) < t(e₁)
   (iii) t(u) < t(e₂) < t(e₁)

b) [s₁ FUTURE [s₂ PRESENT ]] = (u BEFORE e₁) & (e₁ WHEN e₂)
   (i) t(u) < t(e₁) = t(e₂)

c) [s₁ FUTURE [s₂ FUTURE ]] = (u BEFORE e₁) & (e₁ BEFORE e₂)
   (i) & t(u) < t(e₁) < t(e₂)

Where both matrix and subordinate events are related to the utterance, a past embedded under future tense results in an unambiguous ordering of events, as shown in (27)a) above; by contrast, the same configuration of tenses leaves open three distinct orderings of events if e₂ is related to e₁, as (28)a) illustrates. In the case of a present tense within a future tense, the two possibilities make divergent predictions: in (27)b) e₂ is contemporaneous with u, in (28)b), with e₁.

Given the theoretical option for an embedded tense to be related either to the superordinate event or directly to the ut-
terance, the crucial cases are the ones where the matrix sentence is either in the past or the future tense. As we saw in (24) above, present tense matrix sentences do not provide revealing data. The most straightforward cases in which to distinguish whether or not an embedded tense relates to the utterance comes from embedded present tense. Here it is relatively easy to decide whether the subordinate event is simultaneous with the utterance of the higher event. Further cases which distinguish the two patterns derive from embedded past and future tenses, as we saw in (25) through (28) above.

The patterns discussed above an now serve us as kind of template which provides a background against which we can check interpretive options for embedded tenses in languages in which the two patterns are not as nicely distinguished as in Latin earlier. In the following Sub-section we will do this for English, where we will find evidence for the same two patterns once we manage to see beyond the patterns of morphological markings.

2.4 Embedded Tense in English

Having established in the preceding Section the patterns of event-orderings which we expect to find, given our assumptions, we can now examine tense in embedded sentences in English. As we will see, we have here essentially the same patterns of embedded Serial and Parallel tense that we observed above in Latin. Here, however, there are morphological complexities which partly obscure the basic pattern of tenses. These complexities will be the discussed in detail in Chapter Five below. In the present Section we will simply try to match the English morphological tense-markers on the left-hand side of (29) with semantic TENSES, ie. the temporal ordering relations on the right.

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(29) a) past tense (-ed) : PAST : \(u/a_1\) AFTER \(a_2\)
b) present tense (-s/\(\theta\)) : PRESENT : \(u/a_1\) WHEN \(a_2\)
c) future tense (will) : FUTURE : \(u/a_1\) BEFORE \(a_2\)

As we noted in Section 2.3 above, we can ignore all cases in which the matrix verb is in the present tense, as both the Serial and the Parallel patterns make the same predictions. Let us now look at the complete pattern of distribution of English tenses, in order to see which pattern is correct more often, and where false predictions are made.

We begin by examining the tense patterns of sentences which are embedded in future-tensed sentences. A representative set of examples is given in (30). All examples are to be interpreted as uttered at 12:00 noon.

(30) At 2:00 pm John will call and say that ...

a) embedded future:  
(i) .. he will be at home at 3 pm  
(ii) ..*he will be at home at 1 pm

b) embedded present:  
(i) .. he is at home (at 2 pm)  
(ii) ..*he is at home at noon

c) embedded past:  
(i) .. he was at home at 1 pm  
(ii) .. he was at home at noon  
(iii) .. he was at home at 8 am

As a) shows, an embedded future must point to an event which is further into the future than the containing event; for the embedded event simply to be subsequent to the utterance is not sufficient to license an embedded future here; witness the unacceptability of (ii). Likewise in b), the embedded present expresses simultaneity with the superordinate event of saying, as in (i), not with the utterance, as in (ii). Finally, for an embedded past it is sufficient that the subordinate event be prior to the matrix, regardless of whether it is future from the point of view of the utterance, as in (i), or simultaneous with it, as in (ii).
In brief, the set of examples with a future-tensed matrix verb in (30) above exhibits Serial tense. That is, the tenses behave just like we would expect if the embedded event were related by tense to the superordinate event. The pattern here is exactly the same as for Hebrew, and for Latin subjunctive and infinitival tense. As (31) graphically illustrates, the point at which the three tenses come together is the matrix event, rather than the utterance (=NOW).

(31) \[ \begin{array}{c}
\text{John will say} \\
\text{---------------|NOW|---------------|--------------------------} \quad \text{(time)} \\
\{ \hspace{1cm} \text{was} \} \hspace{1cm} \text{will=be} \hspace{1cm} \} \\
\text{he} \quad \{ \hspace{1cm} \text{is} \} \\
\text{home} 
\end{array} \]

With matrix past tense, on the other hand, matters are somewhat more complicated, as (32) reveals. One thing is clear, however, namely that neither of the two possibilities discussed in Section 2.3 above yields the correct results in all cases.

(32) At 10:30 am John called and said that...

a) embedded future:
   (i) ... he \{will\} be at home at 3 pm
       \{would\}
   (ii) ... he \{*will\} be at home at noon
       \{would\}
   (iii) ... he will be at home at 11 am
   (iv) ... he would be at home at 11 am

b) embedded present:
   (i) ... *he is at home (at 10:30 am)
   (ii) ... *he is at home noon

b) embedded past:
   (i) ... *he was at home at 11 am
   (ii) ... he was at home (at 10:30 am)
   (iii) ... he was at home at 8 am

(All examples are to be interpreted as uttered at 12:00 noon)

On the whole, it is obvious, however, that the pattern represented by the examples (32) stays much closer to what is predicted by the assumption that tenses embedded under past are subject to Serial Tense than to the alternative which relates them to the utterance. For data in (32) deviates from the Serial Tense pattern in only two cases: firstly, in the unexpected substitution of embedded past in c)
(ii) for embedded present in b) (i); and secondly, in the will - would alternation, which is not predicted by the Serial Tense pattern. More importantly, these two irregularities share a common trait: in both cases we find past tense morphology where it is not motivated semantically.

The alternative, by comparison, fares a lot worse. The number of false predictions it makes is greater than above: the impossibility of (32) c) (i) is entirely unexpected, and its substitution by a) (iv) even more so; and likewise for a) (ii) replacing b) (ii). The will - would alternation here is even more mysterious than on the first view, since neither form of the future auxiliary is expected in a) (ii) through (iv). Moreover, there is no common pattern to these exceptions. In one case the embedded future form would replaces what ought to be an embedded past tense form, and in the other case it replaces what ought to be an embedded present. Finally, there is the additional problem that the tenses embedded under past would behave radically differently from the way they behave when embedded under future tense, as we saw in (30) above.

Given all this, we conclude that the preponderance of evidence indicates that matrix past tense, like future tense, governs Serial Tense. That is, the basic pattern for tenses embedded in past-tensed sentences is to relate their events not to the utterance, but to the superordinate event. The same conclusion is reached in Baker's (1989 Ch. 17) lucid description of the English tense system. The basic tense pattern in English, Baker notes, is for embedded tense to be subject to Serial Tense in all cases. This is stated in terms of the following Tense-Assignment Principle:
(33) a) When a rule assigns a time to a construction that serves as an independent utterance, it does so in relation to utterance time.

b) When a rule assigns a time to a complement phrase, it does so in relation to the time assigned to the larger phrase of which the complement is a part. (Baker 1989:445)

The distribution of morphological tense-markers over times, as exhibited by the sentences in (32) above, is shown graphically in (34):

(34) \( \text{John said} \)
\[ \text{-------------!NOW!-------------} (\text{time}) \]
\[
\{ \text{was} \_\_\_ | \underline{\text{will-be}} \} \]
\[
\text{he} \quad \{ \text{was} \_\_\_ \underline{\text{would-be}} \} \text{ home} \]

Whereas with the future in (31) the event given by the matrix sentence provides a unique center point on which the three tenses divide the time-line, the past tense in (34) provides two dividing points instead: The major division of the time axis is located at the matrix event; and a secondary division is made at the moment of utterance.

What is no doubt the most striking aspect of the pattern shown in (32) and (34) is the absence of an embedded present tense form. As we will see Chapter Five, however, this is not absolutely so, for there are cases where a present tense form embedded under past tense yields well-formed results. At any rate, this is certainly one aspect of the English tense system which we need to examine more closely, as is the secondary division of the time axis shown in (34) which gives rise to the will - would alternation. These two phenomena have been widely discussed in the literature under the heading sequence of tenses, or SoT. We will explore this in the Chapter Five.
Section 3: Anaphoric Tense

Section 1 above considered tense in simple sentences, and in Section 2 we examined patterns for embedded tenses. As we noted, in matrix clauses and in embedded clauses with parallel tense, tense establishes a temporal ordering relation between the event on the one hand and the utterance on the other hand. However, with embedded Serial tense, an ordering is established between the embedded event and that of the next-higher clause. In the present Section now we turn to cases of temporal interpretation of clauses having "anaphoric" tense or "no tense" at all. I will refer to as phenomena of Anaphoric Tense Dependency (ATD). Like the cases discussed in the last section, this concerns only embedded clauses. Unlike these, however, an embedded event is here located in time not in terms of specific relations in which it can stand vis-à-vis some other event. Rather, as the name indicates, it is located in time parasitically on the temporal location of the super-ordinate event. That is to say, it gets its time specification via anaphora.

The best place to observe Anaphoric Tense Dependency is in the modern Romance languages. Although ATD is not particular to this group of languages, they are uniquely suited for our purposes because (a) the phenomenon has a morphological reflex there, and (b) we have the opportunity to see how it arose from the parent-language Latin.

3.1 The Romance Subjunctive

It is interesting to see what has become of the Latin tense system, and in particular the subjunctive, in the
modern Romance\textsuperscript{11} languages. For at some point in the development of the modern Romance languages from Latin this tense system underwent a radical change. Specifically, there are two major differences in the tense systems of Latin and modern Romance, one concerning the indicative, the other the subjunctive (and infinitival) pattern. As regards the indicative tense system, first, it is now normal in modern Romance is for embedded indicative tense to exhibit the Serial Tense pattern, which was impossible in Latin. (Recall from Section 2 above that embedded indicative in Latin marks Parallel tense.) We illustrate this with the following data from Catalan, from Picallo (1984), p. 87-8, the interpretation of which parallels that of their English translations.\textsuperscript{12}

\begin{footnotesize}
\begin{enumerate}[(1)]
\item \texttt{porta / ha portat} \\
\texttt{Sap que} \texttt{portava / havia portat} \\
\texttt{PRES} \texttt{portarà / va portar} \\
\texttt{portaria / hauria portat} \\
\{ brings / has brought \} \\
\texttt{\textasciitilde s/he knows that s/he \{ brought / had brought\} a book’} \\
\{ will bring \}
\end{enumerate}
\end{footnotesize}

\begin{footnotesize}
\begin{enumerate}[(1)]
\item \texttt{porta / ha portat} \\
\texttt{Sabè que} \texttt{portava / havia portat} \\
\texttt{PAST} \texttt{portarà / va portar} \\
\texttt{portaria / hauria portat} \\
\{ brings / has brought \} \\
\texttt{\textasciitilde s/he knew that s/he \{ brought / had brought\} a book’} \\
\{ will bring \}
\end{enumerate}
\end{footnotesize}

The second major change in the development of the Latin tense system into that of Romance concerns the subjunctive

\textsuperscript{11} French is to be excluded here, as it requires further qualification. In most cases it is \textit{conditionnel} rather than the \textit{subjunctif} which corresponds to what I call the Romance subjunctive here. I will be mainly concerned with Catalan and Spanish, though I believe the facts to be similar in Italian. I will have little to say about French here.

\textsuperscript{12} I would like to thank Eulàlia Bonet for discussing the Catalan facts with me.

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and infinitival tense forms. These two patterns, which in Latin were the proto-typical cases of Serial embedded tense, completely lost their ability to shift time from one event to another. Instead, as is argued convincingly by Picallo (1984), tense in subjunctive clauses is now anaphorically dependent on the tense of the containing event. That is, a subjunctive complement must agree in tense with the higher verb. Thus, the present tense matrix verb in (38)a) only tolerates a subjunctive complement which is likewise in the present tense; and analogously for past tense in b).

\[
\begin{array}{c}
(38) \\
a) \quad \{ \text{porti} \quad \}^{\text{SUBJ}} \\
\text{Desitja que} \quad \{ \text{hagi portat} \quad \} \quad \text{un llibre} \\
\text{PRES} \quad \{ \text{*portés} \quad \} \\
\quad \{ \text{*hagués portat} \} \\
\quad \{ \text{bring} \quad \} \\
\quad \{ \text{have brought} \quad \} \quad \text{a book'} \\
\quad \{ \text{*brought} \quad \} \\
\quad \{ \text{*had brought} \quad \} \\
b) \quad \{ \text{*porti} \quad \}^{\text{SUBJ}} \\
\text{Desitjà que} \quad \{ \text{*hagi portat} \quad \} \quad \text{un llibre} \\
\text{PAST} \quad \{ \text{portés} \quad \} \\
\quad \{ \text{hagués portat} \} \\
\quad \{ \text{*bring} \quad \} \\
\quad \{ \text{*have brought} \quad \} \quad \text{a book'} \\
\quad \{ \text{brought} \quad \} \\
\quad \{ \text{had brought} \quad \}
\end{array}
\]

Regarding the temporal specification of subjunctive clauses, Picallo (1984) notes that the subjunctive tenses "... do not express a value in time-frame coordinates", which makes them "similar to infinitives" (p. 88).\(^{13}\) Thus, the sub-

\(^{13}\) The absence of a real temporal meaning of Romance subjunctive tense-marking can be considered part of the traditional knowledge of grammar in Romance. Specifically for Catalan, Picallo points to Badia-Margarit, A. (1982), Gramàtica Catalana, Gredos, Madrid. Basically the same facts obtain in Spanish, for which cf. Bello & Cuervo (19??). In more modern terms, Spanish subjunctives have been analyzed as argued by Picallo for Catalan by Rivero (1977) and Luján
junctive tenses do not locate the embedded event in time, as indicative tenses do. Instead, she argues (p. 88), the temporal relation of the subjunctive complements in (38) above to the indicative matrix clauses is like that of an anaphor to its antecedent. A subjunctive tense, "... failing to denote a time, is assigned a value in relation to the time-frame specification of its subcategorizing predicate." (ibid.) Subjunctive-marking, she continues, can thus be regarded as the morphological reflex of this anaphoric dependency on the tense of the higher clause.

Picallo (1984) takes the tenses to denote times, rather than ordering relations between events, as we do. Thus, the anaphoric tense-dependency of subjunctives is more properly an anaphoric time-dependency. The complement subjunctive does not have a temporal specification of its own, according to which it is to be interpreted. Rather, it is interpreted relative to the time of the indicative matrix clause. From an interpretive point of view, if the indicative matrix clause and its subjunctive complement are interpreted relative to the same time, we are looking at two events which are essentially simultaneous.¹⁴

(1979).

The similarities between Romance subjunctives and infinitivals have also been noted in the literature for quite some time. Most recently, it has been commented on in Hornstein (1990b), Ch. 4, cf. especially fn. 44, where both subjunctives and infinitivals are analyzed as having the feature [-Tense].

¹⁴ That is, unless the lexical meaning of the matrix predicate states something different. For example, verbs that imply volition (want to, try to, intend to, etc.) are inherently future oriented, and hence imply that the complement is later than the matrix. Conversely, forget to and remember to require their tenseless complements to be earlier. For discussion, cf. Huddleston (1989), especially Section 6.5.
Simultaneity of events is of course what we would get if the complement simply contained a Serial present tense. If so, then the complement would indeed contain a tense, contra the claims made by Piccallo. However, analyzing the Romance subjunctives in this manner would raise more questions than it could answer. Firstly, since there is simultaneity in both (38)a and (38)b, we would have to analyze both present subjunctive and past subjunctive forms as underlying present tenses. The latter would thus have to be explained as a morphological irregularity, a kind of concord phenomenon (akin, perhaps, to the English "Sequence of Tense" cases to be discussed in Chapter Five. However, this would seem to predict that we should get a past subjunctive form where we find a present indicative in (35)b, expressing simultaneity with the super-ordinate past tense event. Furthermore, the difference between the present subjunctive in (38)a and the present indicative in (35) would remain quite inexplicable. Finally, all of this would still not provide us with an explanation as why only a present tense can occur there but not a past or future, and we would in addition need some essentially arbitrary stipulation to the that effect.

Alternatively, we could assume that the subjunctive cases in (38) above are not instances of Serial embedded tense, but that rather each event related directly to the utterance independently of the other in Parallel fashion. In this case, we would now have the exact opposite of the temporal pattern of Latin: the Romance indicative forms in (35) would represent the Serial tense pattern (which in Latin correlated with subjunctive marking), and the Romance subjunctive forms in (38) would show the Parallel tense pattern (which required indicative-marking in Latin). This would work out alright for the case in (38)a with the present tenses. Here the two events would come out simultaneous. In (38)b), however, each event would then be prior to the utterance independently of
the other, and that makes no claims regarding the relative ordering of the two events. In particular, it would not guarantee simultaneity of the two events. Furthermore, we would again have to stipulate that only certain tenses can occur in subjunctive complement clauses. Moreover, this constraint would get rather complicated: it would have to ensure that only a Parallel (Romance subjunctive) present tense can be embedded under a matrix present tense, and only a Parallel (Romance subjunctive) past tense under a matrix past tense.

A similar option would be to treat the subjunctive tenses as "copied" variants of the indicative matrix tenses. That is, we could assume that there is some mechanism which copies the temporal relation of the matrix event to the utterance into the underlyingly tenseless subjunctive complement clauses in (38). This operation would copy the matrix present tense in (38)a into the complement clause, and analogously for the matrix past tense in b). Subjunctive marking could then be interpreted as a sign of such copied tenses. Again, this would work fairly well for the present tense case in (38)a). For the past tenses, on the other hand, this would be more problematic. If the past subjunctive in (38)b) were a copied past tense, it would have to relate the embedded event either to the super-ordinate event, or to the utterance, depending on whether we have Serial or Parallel embedded tense. In the former case, the relation of the lower event to the higher event would be one of anteriority, rather than simultaneity, as desired. In the latter case, the embedded event would be prior to the utterance independently of the matrix event, and hence temporally unordered with respect to it. Thus, we would be facing the same problems as on the option discussed in the preceding paragraph. Unlike the preceding two alternatives, the tense-copying approach could at least explain why we only find the "same" tenses in the subjunctive complements as in their indicative matrix sentences.
What the three approaches just sketched have in common is the fact that they take the relata of the anaphoric dependency of the subjunctive complement on the indicative matrix to be tenses, i.e. the relations between events given in (C1) above. None of these three approaches is really satisfactory. They all have very obvious empirical and conceptual problems, and with the exception of the tense-copying approach, the particular distribution of subjunctive tenses remains a matter of pure stipulation.

The foregoing discussion of tense in Romance subjunctive should remind us of our discussion of event-dependancy in Chapter One, Section 2.4.2 above. There we proposed to analyze the infinitival complements of the class implicative predicates of Karttunen (1971) as cases of bound variable anaphora (in the sense of Higginbotham (1980)) involving the event-arguments of such infinitival complements. Indeed, as we will see in the following Section 3.2, their temporal interpretation parallels that of Romance subjunctive in every respect. If this parallel is real, it suggest that we can re-cast the analysis of Romance subjunctives of Piccallo (1984) straightforwardly in terms of events rather than times, in Section 3.3.

3.2 Implicative Infinitivals

In Section 2.4.2 of Chapter One above we examined a class of predicates which Karttunen (1971) calls implicatives. As we noted there, all the evidence seems to indicate that in these cases the event-position of the complement clause is bound by the event-position of the next-higher sentence, rather than being bound by its own event-operator. Thus we
distinguished implicative manage in (37) a) from non-implicative hope in b).

(37) a) John managed to solve the problem.  
b) John hoped to solve the problem.

The different analyses of these two sentences are shown in (38) a) and b), respectively.

(38)a)  (j\alpha) [ manage(j, [solve(PRO, the problem; a)]; a) ]

b)  (j\alpha) [ hope(j, [solve(PRO, the problem; a)]); a) ]

What led us to this analysis, recall, was the fact that any kind of modification of the event-argument of the matrix clause implicated modification of the embedded event-argument, and vice versa. For example, modification of the matrix event in (39) by the temporal adverb yesterday implicates not just the complement clause, as in b), but the complement as augmented by the modifier of the matrix event, as in c).

(39) a) Yesterday, John managed to solve the problem
b) John solved the problem
c) John solved the problem yesterday

Likewise in (40), even though a) and b) are not synonymous, the truth of either sentence implies the truth of c).

(40) a) Before he left, John remembered to call Mary
b) John remembered [ to call Mary before he left ]
c) John called Mary before he left

These facts, as well as a number of others, fall out from our analysis based on the assumption that the two events are co-indexed, or linked. As shown schematically in (41) a) and b), the difference between (40) a) and b) hinges on whether the adverbial is in the first of the second clause. In either
case it is predicated of the same event-argument $a_1$; hence it also implies c), as well as d), John called Mary.

(41)  a) (a_1) [s_1 .. (a_1) .. [s_2 .. (a_1) .. ] & Adv(a_1) ]
b) (a_1) [s_1 .. (a_1) .. [s_2 .. (a_1) .. & Adv(a_1) ] ]
c) (a_1) [s_2 .. (a_1) .. & Adv(a_1) ]
d) (a_1) [s_2 .. (a_1) .. ]

This predicts that if tense is assumed to be adverbial, as suggested by Kiparsky (1988), Hornstein (1990b), and others, and if we can capture this adverbial nature of tense in terms of an extension of the Davidsonian analysis of modification, as I argued in Chapters One and Two above, then the tense of the matrix sentence will automatically also modify the embedded sentence, as the two have co-indexed event-arguments. This prediction is indeed borne out, as Karttunen (1971) observes (in his Section 5).\textsuperscript{15} Thus in both (42) and (43) the past tense of the implicative verb in a) is incompatible with the future adverbial in the complement clause, the reason being that the two represent contradictory properties predicated of co-indexed event-arguments.\textsuperscript{16} The incompatibility is of the same kind as that of past tense and future adverbial co-occurring in the same sentence, as shown in b).

(42)  a) * John remembered to lock his door tomorrow.
b) * John locked his door tomorrow.
c) John agreed to lock his door tomorrow.

(43)  a) * John managed to solve the problem next week.
b) * John solved the problem next week.
c) John hoped to solve the problem next week.

\textsuperscript{15} The same observation is made in Huddleston (1989) and Baker (1989), as well as in a number of other places.

\textsuperscript{16} This is comparable to the following incongruence with co-indexed thematic arguments:

(1)  [A very tall man]$i$ came in. ??He$i$ was extremely short.
With the non-implicative main verbs in c), finally, no clash occurs between the past tense in the matrix and the future adverb in the complement, since the two event-arguments are not co-indexed.

3.3 Tense and Anaphoric Events

If we assume for the purpose of illustration that the three tenses past, present, and future are analyzable as simple predicates of events (analogous to the way in which Adverbs are represented in (41) above), then the difference between implicative and non-implicative infinitivals as in (42) and (43) a) vs. c) can be captured as in (44) a) and b), respectively.

(44) a) $[\{a_1\} [s_1 \ldots (a_1) \ldots \text{TNS}(a_1) \ldots \text{Adv}(a_1) \}]

b) $[\{a_1\} [s_1 \ldots (a_1) \ldots \text{TNS}(a_1) \ldots \{e_1\} [s_2 \ldots (a_2) \ldots \text{Adv}(a_2) \}]]$

From this it follows that for the implicative construction shown in a) the same co-occurrence restrictions between tense and adverbials apply as in simple sentences.

It also follows from the difference illustrated in (44) that the implicative complement has "the same" tense as the matrix clause. In this sense, the complement tense is anaphoric.

It is clear now that the case of the Romance subjunctive presented earlier in Section 3.1 also falls under this analysis. Indeed the close similarity of Romance subjunctive clauses to certain kinds of infinitivals in Germanic and Romance (except Latin) has been noted frequently in the literature, so (on p. 85) in Picallo (1984), as well as in Lujan (1979), Rivero (1977), Klein (1975), and Hornstein (1990b)
(Ch. 4, fn. 44). The main difference between Romance subjunctive and the implicative infinitivals concerns the presence of the features for person and number for agreement with the subject and the basically redundant marking for temporal dependency.

Like an implicative infinitival, a subjunctive clause does not constitute a complete event in and of itself, and hence cannot enter into a tense relation with another event. The absence of a semantically meaningful tense in the subjunctive clause thus follows. Moreover, if the event-argument of the subjunctive clause is dependent on the event-argument of the matrix clause, then it also follows that the former always stands in the same temporal ordering relation, to the same temporal axis of orientation, as the latter. From the point of view of the semantics, it is as if the tense relation given in the matrix clause applied to the conjunction of the two events. This approach thus suffers from none of the problems found with the three approaches to the Romance subjunctive problem mentioned at the end of Section 3.1 above. On the contrary, the temporal facts follow without further assumptions.

3.4 Summary

In the course of the preceding discussion, we proposed that the idea of Picallo (1984) that the anaphoric dependency of tenses be applied to events instead. Moreover, we suggested that at least some cases of what have traditionally been considered tense-less or untensed sentences receive a temporal interpretation in the same fashion. In this manner we can capture the fact that infinitival and Romance subjunctive clauses are incomplete in some sense, and hence dependent on their containing sentences in a manner that goes be-
yond the dependency of regular indicative complement clauses. More precisely, the dependency of infinitivals and subjunc-
tives is in regard to the containing sentence, and specifically to the event of that sentence, whereas the regular synt-
tactic and semantic dependency of embedded clauses more gene-
really is typically one in regard to some element within the
embedding clause, such as the predicates that select them.

The idea underlying the approach suggested here is that
infinitivals and Romance subjunctives lack their own event-
operator. As we suggested for reasons which are essentially independent of tense and temporal reference in Chapter One,
Section 2.4.2, the Event-position in such a clause is filled
by a variable, and hence is saturated. Thus, from the point
of view of the theta-criterion (cf. Chomsky (1981), p. 335,
and Higginbotham (1985), p. 559ff) --suitably expanded to
cover the implicit E-position as well as regular argument positions-- there are no problems here. Due to the absence of
an event-operator, however, the event-variable is not as-
signed a value from within its own clause. The only way for
it to be given a value is by entering into a bound-variable
relationship (cf. Higginbotham (1980)) to the event in the
next-higher clause.

This difference between Romance subjunctive on the one
hand and indicatives on the other as well as between implica-
tive infinitivals and non-implicative ones can thus be repre-
sented schematically as in (45) a) and b), respectively.

(45) a) **Implicative Infinitivals & Romance Subjunctives:**

\[
\text{O}_\text{Pa} [^s \ldots (a) \ldots [^s \ldots (a) \ldots ] \ldots ]
\]

b) **Non-Implicatives and Romance Indicatives:**

\[
\text{O}_\text{Pa} [^s \ldots (a) \ldots [^s \text{O}_\text{Pa} [^s \ldots (a) \ldots ] \ldots ]
\]

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4. Summary and Conclusions

Summarizing the discussion of this Section, we note that if we conceive of tenses as establishing orderings between events, we can accurately distinguish the two types of morphological tense-patterns found in Latin. Since these tense-relations require as arguments two events that are independent of each other, there can be no real tense in cases of anaphoric event dependency. In these cases, the embedded event-argument is bound by that of the governing clause, as we observed.
Chapter Four: Tense as Temporal Ordering of Events

0. Introduction

Before we go on to elaborating our own proposal for an analysis of tense it is perhaps useful to pause for a moment and recapitulate briefly the discussion of the preceding Chapters.

What we are in the process of doing here is trying to incorporate the idea that tense is of adverbial nature (due to Kiparsky (1988), most recently revived in Hornstein (1990b)) into the Event-Hypothesis due to Davidson (1987a). We are assuming that tense has something to do with time, where time may be conceived of as the fourth dimension of objective reality, and representable as an infinite straight line. This was discussed in Chapter One above, as was our understanding of the notion of events. Subsequently we investigated the relationship of an event to the temporal dimension by examining forms of temporal modification by means of adverbials. We found two kinds of relationships between events and time, pertaining to the temporal duration and temporal location of an event. I argued that these are the only two relationships an event has to time, and that the principles and mechanisms that underlie the different forms of adverbial temporal modification are the only ones required for the complete temporal specification of an event in these two respects. The next step will thus that of examining to what extent this carries over to tense, thereby supporting Kiparsky's idea.
Before being able to do so, however, we had to make precise our understanding of the notion tense. We concluded in Chapter Two that there are in fact three and only three tenses, by showing that categories such as Aspect; the Progressive, and the Perfect do not pertain to the realm of the temporal specification of an event, but rather represent separate semantic domains associated with AUX. The category tense thus comprises the past, present, and future tenses, and nothing else.

With this in mind we examined the semantic contributions of the three tenses to simple matrix sentences. [We will be almost exclusively concerned with simple matrix sentences in this Chapter; tenses in complex sentences will be dealt with in the following Chapter.] It became obvious immediately that tense has nothing to do with temporal duration. Rather, we found that the three tenses pertain to the other aspect of the relation of events to time, viz. temporal location. Specifically, in simple matrix clauses the tenses serve to locate an event in time in relation to the temporal location of an utterance. The manner in which this is done is reminiscent of what we saw earlier with temporal modification by Adverbs of Time, which serve to locate an event in time in relation to a temporal axis that is given implicitly or explicitly in the adverbial. With temporal adverbials we found three temporal ordering relations between an event and an axis of orientation, which exhausts what is logically possible. Given this parallelism in the ways in which Adverbs of Time on the one hand and tense on the other hand locate events in time, it seems reasonable to correlate the three tenses with the primitive ordering relations BEFORE($\alpha$, $\beta$), AFTER($\alpha$, $\beta$), and WHEN($\alpha$, $\beta$).
Assuming the above to be on the right track, we are now ready to consider the question whether the parallelism in the specification of temporal location by means of tense and by means of adverbial modification can be meaningfully expressed in a Davidsonian theory of events. Again, to the extent that this is possible it supports the idea of Kiparsky (1988) and Hornstein (1990b) that tenses are adverbial in some sense.
Section 1: Preliminaries

1.0 Introduction

The Davidsonian analysis of adverbial modification, discussed in Chapter One, Sections 2 and 5 above, analyzes adverbial modifiers as predicates of events. We often captured this in representations such as (1) a) (disregarding tense for the moment), though it was clear that what we really meant is what is shown in b):

(1) John arrived at noon
   a) (j\&a) { arrive(j;a) & at.noon(a) }
   b) (j\&a) { arrive(j;a) & at(a,noon) }

That is, the preposition at represents a particular instance of the primitive ordering relation WHEN(a,\&) expressing simultaneity of the event a (i.e. John's arrival) with the event \& that serves as the temporal axis of orientation (i.e. noon). Thus the sentence given in (1) can be represented more abstractly as in (2).

(2) (j\&a) { arrive(j;a) & WHEN(a,noon) }

Similarly, the example in (3) has the temporal adverb predicated of the event, as suggested in a). Again, what we really mean, and what the syntactic structure of the adverbial dictates, is what is shown in b), with the temporal connective before expressing a temporal relation of anteriority between the event on the one hand and the axis of orientation noon on the other. At a greater level of abstraction, we can again take the temporal connective before to represent a particular lexical instance of the abstract ordering relation BEFORE(a,\&), with a = John's arrival, and \& = noon. (Analogously for AFTER(a,\&) with after in lieu of before).
(3) John arrived before noon
   a) (j,a) { arrive(j;a) & before.noon(a) }
   b) (j,a) { arrive(j;a) & before(a,noon) }
   c) (j,a) { arrive(j;a) & BEFORE(a,noon) }

Transferring this analysis to the domain of tense, the idea of Kiparsky (1968) that tenses are adverb-like can be captured most straightforwardly as in (4) a), for the example given. That is, we can analyze the past tense of the sentence in (4) as a monadic predicate of the event, call it PAST'(a), where a is again John's arrival. Although this is straightforward, as in the cases of adverbials in (1)a) and (3)a) above, we have reason to believe that this is not quite correct. Firstly, there is of course the surmised analogy of tense and Adverbs of Time which would lead us to suspect that if an apparently monadic predicate of an event is analyzed as being composed of an basic diadic predicate in one case, then it seems likely that this is similar in the other case. Furthermore, and more importantly, we noted in the context of the investigation of the semantic contribution of tense to simple sentences in Chapter Two that the three tenses express ordering relations between the event of a sentence and the temporal location of its utterance. Letting the indexical expression now stand for the latter, and analyzing the past tense of the sentence in (4) in terms of a relation PAST"'(a,a), where a stands for John's arrival and a for the temporal axis of orientation now, (ie. noon), we obtain a logical form as in b).

(4) John arrived (uttered at noon)
    a) (j,a) { arrive(j;a) & PAST'(a) }
    b) (j,a) { arrive(j;a) & PAST"'(a,now) }
    c) (j,a) { arrive(j;a) & BEFORE(a,u) }

Furthermore, since the indexical expression now standing for the temporal location of the utterance is derivative on the speech event qua event, we can substitute now with u, which refers demonstratively to the event of the utterance of sen-
tence (4). The diadic predicate PAST can then again be regarded as a particular lexical instance of the abstract ordering relation \text{BEFORE}(a,\overline{a})\), as illustrated in (c) above.

On the basis of our earlier observations with Adverbs of Time, we just made two claims about tense: (i) tense is a two-place predicate of events; and (ii) the tense-relations are instances of the same abstract temporal ordering relations that facilitate specification of temporal location of an event in temporal adverbials. We examine these two claims in Sections 1.1 and 1.2 to follow.

1.1 Tense — Property or Relation?

In the preceding Introduction to this Section we observed that there are basically two ways of implementing the idea that the tenses are predicated of events in the manner suggested for adverbial modifiers by Davidson (1987a). Depending on which option we chose, what we call 'tense' will be one thing or another. On one view, our notion of tense will represent a one-place predicate of events. The three tenses then have roughly the meanings indicated in (5) below [where \(a\) stands for an event].

(5) \textbf{Monadic Tense:}

\begin{itemize}
  \item a) PAST'\(a\) \quad \text{"a precedes speech-time"}
  \item b) PRESENT'\(a\) \quad \text{"a is simultaneous with speech-time"}
  \item c) FUTURE'\(a\) \quad \text{"a follows speech-time"}
\end{itemize}

\[1\] The following discussion applies also to theories in which \(a\) is not an event but a Time (point or interval) or some other interval associated with it (such as the interval \(I\) of Higginbotham (1980) to which a speaker refers by using a tense-form and which interval has to be in a relation of containment with the time of the event; cf. below).
On the alternative view, the one I want to adopt here, the three tenses stand for two-place predicates which denote the three temporal ordering relations in (6). [Where \(a\) is again the event (or some interval associated with it), and \(u\) is the temporal axis of orientation, i.e. with matrix tense, the utterance.]

\[(6) \hspace{1cm} \text{Diachronic Tense:} \]

\begin{align*}
\text{a:} & \text{ PAST}''(a,u) & \text{"a precedes u"} \\
\text{b:} & \text{PRESENT}''(a,u) & \text{"a is simultaneous with u"} \\
\text{c:} & \text{FUTURE}''(a,u) & \text{"a follows u"}
\end{align*}

At first glance, it might seem that the view illustrated in (6) is overly expressive as compared to (5) in that it represents an argument \((u)\) which invariably appears to stand for the utterance event. If this is so, then the fact that it represents some ordering relative to the utterance may actually be part of the meaning of any tense form. In other words if TENSE' \(\in\{\text{PAST}', \text{PRESENT}', \text{FUTURE}'\}\), then TENSE'\((a)\) already means "a is in some tense-relation to the utterance".\(^2\)

Such a view might try to derive further support from the morphological fact that tense-markers often appear certainly in languages, and where they do, they appear as one unit. That is, there do not appear to be any languages where tense is expressed overtly by two elements, one of which denotes the ordering relation and the other, the axis of orientation, i.e. the utterance. In fact, the term referring to the utterance event \((u)\) required by the alternative relational analysis is always only implicit.

The morphological point is of course very weak. The same kind of argument could be advanced against the Event-Hypothesis in toto since the event-denoting term is also not overtly

\(^2\) The tenses are thus treated as indexical predicates on this kind of analysis. They are indexical because the tenses are interpreted relative to the context of their utterance. Cf. Section 2.2.2 below.
represented in languages. And more generally, it is clear from a variety of other phenomena that syntactic and semantic representations often contain abstract elements which are not associated with a phonetic matrix, and which thus are not made explicit.

The point about the redundancy of the argument referring to the speech event would be much stronger in comparison if the facts were such that tenses did indeed always denote temporal order relative to an utterance. And while this generalization is true for simple matrix sentences, it does not appear to be always true. Specifically, we find cases of non-indexical tense in embedded clauses, described as follows in Huddleston (1989) (on p. 790):

"The axis of orientation is not always the speech act, however. It may be established by reference to the process [=event; HL] expressed in the next higher sentence; in such cases, tense will not be deictic."

These cases fall under the pattern of Serial tense (cf. Chapter Three, Sections 2.0 and 2.3 above), as found for example in Latin subjunctive and infinitival clauses. Such cases are also discussed for English in Hornstein (1990b).³

Pertinent examples are given in (7):

(7) a) Next week, the White House will announce that Bush will fire Sununu.
    b) Next week, the White House will announce that Bush fired Sununu.

Suppose Sununu indeed gets fired at some time later than now; suppose further that the White House will announce that fact, also in the future; and consider the two sentences in (7). It is obvious at once that at most one of them can ever

³ Specifically, in Hornstein’s version of the theory of Reichenbach (1947) this concerns cases where the S-point of an embedded tense is associated with the E-point of the next higher tense. For details, cf. Hornstein (1990b), Chapter 4.
be true, and that one's being true automatically makes the other one false; and it is also obvious that an answer to the question which one of them is true and which one is false will depend solely on whether the announcement by the White House comes before or after the fact (of Sununu's dismissal). In other words, it depends on the relative ordering of the matrix event (i.e. the announcement) and the embedded event (i.e. Sununu's dismissal).

If we adopted the view illustrated in (5), where \textit{SENSE}(a) means "a is in some tense-relation to the utterance", then we would now need another set of tenses, as in (8) below, to account for the cases of Serial tense in (7), where a is in some tense-relation with another event.

(8) \textbf{Monadic Tense (II)}:
   a) `PAST(a)"a precedes time of next higher event"
   b) `PRESENT(a)"a is simultaneous with time of next higher event"
   c) `FUTURE(a)"a follows time of next higher event"

Alternatively, on the relational view of tense shown in (8), the same three tenses apply in both matrix tenses and Serial embedded tenses. In the former case, the tense relates

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4 Strictly speaking, it does not necessarily follow from the existence of cases of Serial embedded tense that a view in which tenses denote simple properties of events needs two sets of tenses. For a way out, cf. Higginbotham (1990), where Serial tense is handled in terms of a notion of "potential utterance". Thus the embedded tenses in (7) would be analyzed as if I (the speaker) were to potentially utter them at the time of the announcement from the White House. In this sense, all tenses can be handled in terms of indexical predicates, as in (5). The difference between Serial embedded and matrix tense then boils down to the difference between actual utterance and as-if utterance. Since any as-if utterance of an embedded sentence S is necessarily simultaneous with the event of an actual utterance of S as reported by the matrix clause, the two views under discussion in the text thus make the same predictions in these cases. The comparison of these two views will be taken up again in Section 2.2.2 below.
the event to the utterance event (which is referred to by deixis), as outlined above; in the latter case, tense relates the event to an event described in the next-higher clause. The relations, and hence the abstract TENSES, are the same in both cases.\(^5\)

While this does not prove that the second argument of tense is necessary, it at least suggests that such an argument might be useful in the analysis of certain phenomena which otherwise require a separate explanation. In this sense, the argument that the relational view is too expressive is weakened, if not invalidated.

Furthermore, it is clear in all of this that sooner or later every analysis of tense must pay heed to the fact that what ultimately differentiates the three tenses is the temporal ordering relation of the (time of the) event to the moment of speech. The "sooner" in this case means that the temporal ordering relations are represented in the syntactic structures of the sentences of the object language; and the "later" here means that these differences between the three tense-forms are brought out only in the meta-language when it comes to figuring out the truth-conditions. Either way, at some level we must confront the fact that what differentiates the uses of the three tenses in any given environment is simply a matter of three distinct temporal ordering possibilities of two relata, since that is what tense inherently is about. The most straightforward approach, in my opinion, is the one which all levels treats the tenses as the temporal ordering relations that they ultimately are. This is the approach illustrated by (5) above.

\(^5\) This matter will be discussed in greater depth in Chapter Five below, where we examine tense in complex sentences.
In comparison, the alternative seems to involve an intermediate-level concept which is somewhat redundant. Suppose we endowed our theory with the monadic tenses in (5) above, which we treat as Davidson-style predicates of events. Then the lexical meanings of the three tenses would be as stated on the right-hand sides of (5) a) through c). These three lexical meanings contain parts that remain constant in all three tenses, and they contain parts that vary from one tense to the next. And while both parts, by definition, on this view, constitute the meanings of the three tenses, only those parts that vary constitute the difference in meaning of the three tenses. Since it is the latter that matters mostly for the interpretation, it has to be stated explicitly in the lexical entry for each tense form. Similarly at the semantic end, as we mentioned above, the differences in the contributions of the truth-conditions made by the three tenses hinge solely on the temporal ordering relations they establish between the event and the temporal axis or reference point. In the light of this one must ask whether it would not actually be simpler to deal directly with the ordering relations at all levels. That is, what is there to motivate the one-place predicates of events shown in (5) above in the first place? Unfortunately for this view, there does not seem to be any good evidence to this effect.

None of the points mentioned above establishes conclusively that one or the other way of implementing the idea that tenses are predicates of events is the correct one. Nor do there appear to be any direct empirical facts that decide the matter one way or the other. If this is correct, then the question whether tenses are one-place or two-place predicates of events is entirely theory-internal. And if this is so, then I believe that the relational view of tense is superior because it makes for a simpler theory. The reason for this stems from the fact that only if the tenses are analyzed as
relations can we subsume them under the same primitive ordering relations as we found earlier with temporal modification by Adverbs of Time. This will become clearer below.

In the following, I will thus assume that the view expressed in (8) above is correct. That is to say, the three tenses are diadic predicates of events, denoting temporal ordering relations. In the following two Sections, we will examine these more closely.

1.2 The Primitive Ordering Relations

At the end of the preceding Section we opted for an analysis whereby the tenses denote temporal ordering relations between an event as described by a sentence on the one hand and another event which serves as the axis of orientation, typically (though not necessarily) an utterance. This leaves a number of issues to be clarified. Firstly, we have to consider the question of how many different ordering relations our theory really needs, which we will do in the present Section. Afterwards, in Section 1.3 below, we compare the ordering relations of the tenses with those found in adverbial modification in order to see if they are really the same. And in Section 1.4, finally, we will take a closer look at the arguments or relata of the tense-relations, specifically in regard to the order in which they satisfy the two open positions of a tense-relation.

Let us now turn to the question how many primitive tense-relations there are. In our discussion so far, we have been assuming without much argumentation that the tenses in sentences such as (9) a) - c) serve to order an event relative to an utterance in terms of the three relations made explicit in (10) a) - c), respectively.
(9) a) John left
   b) John is leaving
   c) John will leave

(10) a) \{ \text{leave}(j;a) \ & \ a \text{ precedes } u \} 
    b) \{ \text{leave}(j;a) \ & \ a \text{ simultaneous with } u \} 
    c) \{ \text{leave}(j;a) \ & \ a \text{ follows } u \} 

To start with, it is clear that there cannot be more than these three temporal ordering relations, for that is logically impossible. Given any two events located in the temporal dimension, they are either simultaneous or else they are not, in which case the two events are sequential. If they are sequential, one either follows or precedes the other. These three relations between events thus exhaust the domain of possible orderings.

If there can be no more than three primitive ordering relations, will fewer than three do? Let’s consider if any of the three relations given in (10) can be eliminated. As we will see presently, theories differ considerably in the answers they provide for this question. Basically, every option has been taken in this area: the traditional analysis (cf. Montague (1974)) assumes just one ordering relation (namely precedence), as we saw in Chapter Two earlier; and the framework of Hornstein (1980b), like that of Reichenbach (1947), makes use of two primitive relations (which are simultaneity and precedence), as do the analyses of Enç (1987) and others.

As the comparison of these differing views reveals, the bigger question of whether any of the tense-relations captured in (10) can be eliminated, and if so, which ones, is composed of two component questions: (i) is simultaneity necessary? and (ii) in the non-simultaneous case, do we really need two distinct notions follow and precede, or are the two instances of the same abstract notion of sequence or serial-
ity? We address these questions in turn in the following two sub-sections.

1.3 Is Simultaneity Necessary?

Recall from Chapter Two, Section 3 above that in the standard analysis of tense the PRESENT tense is analyzed as having "no tense", i.e. as the absence of an operator which "shifts" the evaluation time either forward or backward in time. If this works in the traditional operator analysis of tense, then maybe we can reduce the number of primitive ordering relations required in our theory in like manner. The question we are considering then is whether we really need a separate expression marking a positive indication of simultaneity of events, or whether we can do without and simply infer the simultaneity of events from the absence of any expression indicating seriality of events, either by convention or by default.

A good argument can be made here that an expression for the concept of simultaneity is indeed necessary and cannot be dispensed with. This argument is based on the fact that in our discussion of temporal phenomena in Chapter Three above we found it necessary to distinguish two forms of simultaneity for embedded sentences. One of these, which we might dub "true simultaneity" for clarity of exposition, concerns embedded present tenses in examples such as (11)a), where the context given makes it clear that the event of John's thesis being finished obtains at the same (future) time as John's announcement. This relation of true simultaneity of events is positively expressed here by a (non-deictic) PRESENT tense.

(11)a) (Although he is still working very hard at the moment, in a few short days) John will announce that his thesis is finished.

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b) (In a few short days) John will manage to finish his thesis.

In contrast with the case of true simultaneity marked by PRESENT tense in (11) a) we find an instance of what we can call "anaphoric simultaneity" in the b)-example above. As we observed in Chapter One, Section 2.4.2 and again in Chapter Three, Section 3, the complements of implicative verbs such as manage are interpreted temporally as taking place at the same time as their matrix events. We saw, for instance, that the complement cannot be modified by a temporal adverbial (or other) that does not also modify the matrix. On the analysis suggested, this second form of temporal simultaneity derives not from a particular tense-relation between matrix and complement events, but rather from the (more general) fact that the embedded event-argument is in a bound-variable dependency with the matrix event.

Thus, while it is feasible here to analyze the latter case as having no tense, in the sense that no ordering relation is expressed between two events, the same is obviously not true for the case in (11)a), where we have an embedded present tense which makes its usual characteristic contribution to the meaning of the structure. For this we need a notion of simultaneity!

The same point can also be illustrated with Romance subjunctives, as discussed by Picallo (1984) for Catalan. Here the present indicative form in the complement of (12)a) represents true simultaneity (marked by the PRESENT tense relation), expressing simultaneity with the (past) matrix event. By contrast, both the past subjunctive marker in b) and the
present subjunctive marker in c) are instances of anaphoric simultaneity, i.e. the absence of a semantic tense-relation.⁶

(12) a) Sabè que porta un llibre know-PAST-3s that bring-PRES-INDIC-3s a book 's/he knew that s/he was bringing a book'

b) Desitjà que portés un llibre desire-PAST-3s that bring-PAST-SUBJ-3s a book 's/he desired that s/he brought a book'

c) Desitja que porti un llibre desire-PRES-3s that bring-PRES-SUBJ-3s a book 's/he desires that s/he bring a book'

In the light of this difference between true simultaneity with (overt, indicative-marked) PRESENT tense on the one hand and anaphoric simultaneity in tense-less sentences it is obvious that we do need a primitive ordering relation corresponding to PRESENT tense, as shown in (10)b) above. The route taken by traditional tense logic, whereby PRESENT tense is marked by the absence of marking for the seriality of events (cf. Montague (1974), eg., where PRESENT is analyzed as the absence of tense), is not adequate because it fails to capture the difference between the two kinds of cases just discussed.

Further though somewhat circumstantial support for positing a primitive ordering concept of simultaneity derives from the system of temporal specification to which we are trying to analogize the tense-system, i.e. temporal adverbial modification. Concretely, consider the two sentences in (13):

⁶ Note for example that true simultaneity as marked by (indicative) present tense always represents one particular choice of the three tenses; anaphoric simultaneity, on the other hand, is never a matter of choice: Romance subjunctive tense markers never "shift time", regardless of whether they are called "present" or "past subjunctive". For discussion, cf. Section 3.1 in Chapter Three.
(13)  a) John left and Mary arrived.
    b) John left when Mary arrived.

It is immediately obvious from the (13) b) that some notion of simultaneity is required here, for the sentence says more than the sentence in a). Both (13) a) and b) assert the existence of the same two events which are John's departure and Mary's arrival. However, whereas the former says nothing at all about the relative ordering of these two events, the latter makes a definite statement in this respect: it asserts that the two events were simultaneous. Thus, if we assume that and represents pure logical conjunction, then when definitely says more than that. The meaning conveyed by when above and beyond that of and, I submit, is that the former includes the concept of simultaneity. Given this, we conclude that some concept of simultaneity is required to adequately capture the meaning of the temporal connective when and its contribution to the meaning of sentences such as (13)b).

Given further that identical arguments can be made for the temporal conjunctions while and as, which also express simultaneity of conjoined events, we have to conclude that the common denominator of this class of expressions is the abstract ordering relation of simultaneity which we have named WHEN(α,β).

7 Although there is a definite natural tendency to assume that the ordering of events is reflected in the ordering of the conjoined sentences. Cf. Chapter Two, Section 2 above.

8 A good diagnostic for cases where and represents pure logical conjunction is that reversing the order of the conjoined sentence does not alter the meaning of the whole. It is likely that some uses of and also express or imply a causal relation between two sentences, as in it started to rain and we went home. In this case, and may have more than the usual meaning of logical conjunction. These cases are not relevant to the argument at hand, however, and hence ought to be excluded from consideration here.
Thus if the notion of (true) simultaneity is required for an adequate account of temporal adverbial modifiers, and hence has to be considered part of the grammar for independent reasons, then the unmarked assumption in regard to tense would seem to be that this notion is available in the tense-system as well, at least in principle. This is true especially if we are otherwise successful in our endeavor of reducing the tenses to the same primitive notions needed with temporal modification by adverbials. (cf. Section 1.3 below.) If this works out, then we basically get simultaneity for free in the domain of tense.

We conclude, for the reasons stated, that the notion of simultaneity is necessary and cannot be eliminated for the theory.

1.4 Is Seriality Directional?

If an adequate account of the present tense requires the primitive relation \textsc{when}(a,b), then its opposite, expressing non-simultaneity or \textsc{seriality}, is required for an adequate analysis of the past and future tenses (14) a) and b) below.

(14) a) John left
    b) John will leave

The question we want to address now is whether these two tenses require two distinct primitive ordering concepts or whether they can be analyzed as instances of a single basic concept of seriality. In our earlier discussion we assumed the former without much argumentation; accordingly, we analyzed the two sentences in (14) in the manner shown in (15) below.

(15) a) (ja) \{ leave(j;a) \& a precedes u \}
    b) (ja) \{ leave(j;a) \& a follows u \)

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On the alternative, the two sentences in (14) are analyzed as in (18) below, where both past and future involve the same ordering relation precede. The difference between the two tenses arises here from the fact that with past tense the event is asserted to be ordered before the utterance, while with future tense the utterance is ordered before the event.

(18) a) \( \langle j; a \rangle \{ \text{leave}(j; a) \& a \text{ precedes } u \} \)

b) \( \langle j; a \rangle \{ \text{leave}(j; a) \& u \text{ precedes } a \} \)

At first blush, the analysis suggested in (15) would seem more complicated and costly than view expressed in (18) since it makes use of two ordering concepts where the alternative appears to get by with just one. Furthermore, from a logical point of view, given two events \( a \) and \( b \), if \( a \) precedes \( b \), then \( b \) follows \( a \); i.e. the two are logically equivalent. Given this, it seems utterly redundant to assume both ordering concepts as primitive notions of the theory. Presumably for these reasons, most accounts of tense found in the literature adopt a version of this second option. In particular, this is the case for the standard analysis (cf. Chapter Two, Section 3 above), as well as for the framework proposed by Reichenbach (1947), including the version presented by Hornstein (1990b). If we followed the example set by these theories, then we would be able to reduce the number of primitive temporal relations from three to two.

While I have no arguments that prove that we cannot make this reduction, I have a number of arguments suggesting that we should not. Furthermore, I will demonstrate that the apparent gain in simplicity arising from the reduction of the number of ordering relations comes only at a cost. The price for this, so I will argue, consists on the one hand in a kind of rule that is unprecedented in this area of grammar, and on
the other hand, more importantly, in the loss of certain generalizations that follow straightforwardly form the alternative. As a result of all this, we will reject the analysis suggested in (18) at the end of this Section.

We begin once again by comparing the domain of tense with that of temporal adverbials. Consider the two examples in (17) which we analyzed in Chapter One, Section 5 in the manner shown in (18).

(17)  
a) John left before Mary arrived  
b) John left after Mary arrived

(18)  
a) (j,a1) { leave(j,a1) &  
[ j2 : arrive(m,a2) ] [BEFORE(a1,a2)] }  
b) (j,a1) { leave(j,a1) &  
[ j2 : arrive(m,a2) ] [AFTER(a1,a2)] }  

As before with tense, we again have to consider the question whether both relations BEFORE(a,b) and AFTER(a,b) are necessary, or whether they can be reduced to a common concept of sequence, which I will call PRECEDE(a,b) here. In the latter case, the two sentences in (17) will be analyzed as in (19):

(19)  
a) (j,a1) { leave(j,a1) &  
[ j2 : arrive(m,a2) ] [PRECEDE(a1,a2)] }  
b) (j,a1) { leave(j,a1) &  
[ j2 : arrive(m,a2) ] [PRECEDE(a2,a1)] }  

In this latter view, the theory requires only a simple concept of seriality, or sequence, since the difference between the two tenses above arises from the permutation of arguments. In the former view as illustrated in (18), by contrast, the theory requires no permutation of arguments, though only at the expense of having to include two concepts of seriality, which are directional. That is, we have to dis-

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⑨ On the link between the concepts involved in modification and those involved in tense, cf. Section 1.3 below.

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tinguish sequence towards the past from sequence towards the future.

The permutation of arguments in (19), while innocent-looking from a purely semantic perspective, given the logical equivalence mentioned earlier, is not quite as innocuous from the syntactic point of view, however. First off, it is clear that the syntactic structure of all temporal adverbials\(^{10}\) is uniformly such that the event to be modified is the "subject" or first argument of a temporal connective while the event that serves as the temporal reference point or axis is its "object" in the complement-position of the connective. This being the case, (18) is certainly much closer to what we know to obtain in the object-language than is (19). The former analysis thus translates the sentence of the object language straightforwardly into the meta-language (where truth is determined), as is shown in (20).

\[ \begin{align*}
(20) \quad & \begin{array}{ll}
\text{a)} & \text{before} \quad \Rightarrow \quad \text{BEFORE} \\
\text{b)} & \text{after} \quad \Rightarrow \quad \text{AFTER}
\end{array}
\]

By contrast, the alternative analysis requires some kind of rule in the translation procedure that assigns the arguments the specific ordering required by the meaning of the particular connective translated, as shown in (21).

\[ \begin{align*}
(21) \quad & \begin{array}{ll}
\text{a)} & \alpha \text{ before } \beta \quad \Rightarrow \quad \text{PRECEDE}(\alpha, \beta) \\
\text{b)} & \alpha \text{ after } \beta \quad \Rightarrow \quad \text{PRECEDE}(\beta, \alpha)
\end{array}
\]

This illustrates quite clearly that the gain in simplicity in (19) as compared to (18) is only apparent. The price we pay for eliminating directionality from the ordering concept of seriality (i.e. PRECEDE) in (21) is that the translation of a sentence of the object-language into the meta-lan-

\[^{10}\) with the possible exception of the "bare-NP adverbs" of Larson (1985); cf. Chapter One, Section 3.2.1 above.
guage has to make explicit the ordering of arguments, since this does not follow directly from the syntax of the former. As the comparison of (20) and (21) makes transparent, the concept of seriality is obviously ordered: in one case that ordering is expressed vertically in the distinction between BEFORE and AFTER, while in the other case it is expressed horizontally in ordering of arguments, \((a, b)\) vs. \((b, a)\). Either way, it has to be expressed somehow, and it is a mistake here to think that one analysis is simpler or more economical than the other.

Since the cost associated with the two options under the discussion makes no real difference it is necessary to find other factors that help us decide on which alternative to adopt. These other factors include matters of appropriateness and plausibility, as well as matters of the overall simplicity of the theory grammar. One such criterion concerns the compatibility with modern syntactic theory: as mentioned, I take this to argue for the analysis in (18) rather than (19).

Turning now to some more empirically based considerations, we must note that the analysis based on the single ordering relation PRECEDE is also somewhat deceptive in that it suggests that two sentences such as the ones given in (22) are always synonymous. Both are essentially analyzed as in (23).

\[
\begin{align*}
(22) & \quad a) \text{ Mary arrived after John left.} \\
& \quad b) \text{ John left before Mary arrived.} \quad \text{[=}(17)a)] \\
(23) & \quad \text{[}a_1: \text{leave}(j; a_1)\text{][}a_3: \text{arrive}(m; a_3)\text{]} \\
& \quad \quad \{ \text{PRECEDE}(a_1, a_3) \}
\end{align*}
\]

While generally this appears to be more or less correct for telic events such as the above, matters are significantly
more complex, and less clear, with atelic events. Consider for instance the two sentences in (24):

(24)  a) I was a senator after you were one
     b) I was a senator before you were one

As we observed in the context of the examination of the temporal connectives in Section 2 of Chapter Two above, these two temporal connectives differ from each other in crucial ways, and are not simply opposites of each other.
Section 2: Truth-Conditions for Simple Tensed Sentences

Having dealt with the preliminary notions of our framework in Section 1 above, we can now go on to examining the effects of the tenses on the truth-conditions of simple tensed sentences.

2.1 Truth-Conditional Statements and Indexicals

According to the famous Convention T of Tarski (1956), a definition of truth for a language \( L \), in order to be adequate, must be able to derive all equivalence statements of the form (25), where \( T \) stands for the truth-predicate for \( L \) ("is-true-in-\( L \)"), \( S \) stands for some sentence of \( L \) under an appropriate structural description and \( P \) is the translation of \( S \) into the meta-language in which the truth-predicate \( T \) - for language \( L \) is defined.\(^{11}\)

\[
\text{(25)} \quad T(S) \iff P
\]

Thus, for a simple sentence such as (28), a Tarskian theory of truth-conditions must yield a statement of equivalence such as the one in (27):

\[
\text{(28)} \quad \text{Bill left}
\]
\[
\text{(27)} \quad \text{"Bill left" is true } \iff \text{ Bill left}
\]

---

\(^{11}\) Thus, \( S \) is a sentence of the object-language whereas both the predicate \( T \) and the equivalence in (29) are expressions of the meta-language (only). Except where noted explicitly, we will assume that the object language is part of the meta-language.
2.1.1 Problems with Indexicals

While perhaps adequate for dealing with many aspects of sentences, truth-conditional statements of the form given in (27) above are ill-suited for our particular purposes, since we are primarily interested in the contribution of tense to the truth-conditions of sentences. The reason for this derives from the fact that tense is an indexical element, in the terminology of Kaplan (1977). As has been known at least since Davidson (1967b), deictic elements such as tenses, demonstratives, etc. present a particular difficulty for a truth-conditional account of the sentences that contain them. The problem, in brief, is that a sentence containing deictic expressions may vary in truth-value from one occurrence to another because they are, in a sense, semantically incomplete expressions. This is perhaps best illustrated in terms of an overt indexical element such as the first-person pronoun I in (28) below.

(28) I left

A sentence such as this one containing an indexical does not express a complete thought; rather, in order to complete the though, it requires in addition knowledge of the attendant circumstances of its utterance. This is so because the descriptive meaning of an indexical expression does not determine a unique referent for that expression independently of the context in which it occurs. The descriptive meaning or

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12 Kaplan (op. cit.) distinguishes two kinds of deictic elements in natural language: (i) indexicals such as I, you, etc., and (ii) demonstratives such as this and that, etc. The difference between the two, roughly, is that with the former, reference is determined on the basis of the linguistic form alone while the latter require in addition a special "act of reference" (in the sense of Burge (1974)), by ostentation or otherwise. Tense, with which we will be concerned exclusively here, is considered an instance of the former, according to these criteria.
content of the pronoun *I* in (28) above is roughly that of "the person who is uttering it". Thus, if this sentence is uttered by Bill, say, then the pronoun *I* seems to refer to Bill just like the name *Bill* in (28) above does. Given this, (28) and (28) appear to be synonymous, and the right hand side of the truth-conditional statement for (28) ought to be the same as that for (28) in (27) above. However, it is obviously not correct to say that the sentence (28) is true just in case Bill left. For if this sentence is uttered by someone other than Bill, John, for example, then its content is equivalent to that of the sentence *John left*, and not to that of (28). Hence, the step from the descriptive meaning of *I* to the person Bill (or John, as the case may be) is actually quite different from the step from the name *Bill* to the person Bill in (27) earlier. While the latter step is licit independently of the context in which (28) is uttered, the former can not be evaluated without information about the context in which it was uttered.\(^\text{13}\)

The same holds true of the past tense in (28) above, which as we mentioned is also in some sense indexical. Supposing the world is such that Bill left at noon on March 22, 1991, it would be quite inappropriate for me to describe this situation by means of the statement in (28) above at, or any time prior to, twelve noon on that date. In this case, I would not have spoken truly in uttering the sentence. However, any time after twelve noon on March 22, 1991, that same sentence, applied to the same situation, will be appro-

\(^{13}\) This summation of the problem posed by deictic elements is admittedly crude, its purpose being merely to establish the fact that the interpretation of indexicals is context-sensitive. The summary presented here does not, in particular, touch on the problems that arise when deictic elements occur in embedded contexts. For further discussion, cf. Reichenbach (1947) (Section 50), Davidson (1987b), Cresswell (1972), Burge (1974), Lycan (1984) (Ch. 3, in particular), Higginbotham (1986b, 1980), and especially Kaplan (1977).
priate; accordingly, my utterance of (28) will then be true. Clearly, the truth of my utterance of (28) is thus relative to the context in which I uttered it, and in particular, to the time of this utterance. We will turn to matters specific to tense in Sections 2.1.3ff.; in the meantime, we continue our discussion of the more general problems of indexicals.

2.1.2 Normal Forms

Equivalence statements such as (27) above must thus be relativized to contextual parameters, if we are to capture the contribution of an indexical element such as tense o the pronoun I to the truth of a sentence. Elaborating on ideas originally due to Burge (1974)\textsuperscript{14}, Higginbotham ((1988b), pp. 34ff.; and again in (1990), pp. 9f.) presents a suggestion as to how this is to be accomplished. More concretely, the proposal is to predicate truth values of the utterances of sentences (rather than the sentences directly), and to embed Tarskian truth-conditional equivalences of the sort illustrated in (27) above in a conditional of the general form shown in (29):

\begin{equation}
(29) \text{ If } \nu \text{ is an utterance of } S, \\
\end{equation}

\textsuperscript{14} Burge (1974), in turn, is an elaboration on a proposal due to Weinstein (1974).

\textsuperscript{15} The first line of the Normal Form in (29) is further refined in Higginbotham (1986, 1990). Concretely, the revision suggested there is that \nu is not simply an utterance of \( S \), but of \( S \) on a certain syntactic structural description. For specifics, cf. these papers.

On the second and third lines, \( X \) and \( Y \) stand for various (second-order) variables over \( n \)-place predicates, and \( x \) and \( y \) represent various (first-order) variables ranging over individuals. The ones on the second line abbreviate the contextual restrictions, and the ones on the third line, their effects on the interpretation of \( S \). (Cf. the immediately following paragraph.)
and $A(X,Y,\ldots,x,y\ldots)$,
then $u$ is true $\iff C(X,Y,\ldots,x,y,\ldots)$.

The conditional statement above represents what we call the Normal Form for linguistic data about truth-conditions, following Higginbotham (1988b) (p. 34). The antecedent of the main conditional in the Normal Form in (29) (i) defines the relevant utterance $u$ of the relevant sentence $S$ (on the first line), and (ii) lists all the contextual parameters on which the interpretation of $S$ depends (on the second line). The effects on the interpretation of $S$ of these contextual parameters then show up on the right-hand side of the by-conditional consequent of the main conditional (on the third line).

Thus, for our earlier example (28), the Normal Form is something like (30) below (still disregarding tense, for the moment).

(30) If $u$ is an utterance of (28), and the speaker of $u$ refers with the pronoun $I$ to $x$ such that $x$ is the speaker of $u$, then $u$ is true $\iff x$ left.

In effect, this takes the descriptive content of the indexical $I$ out of the clause in which it occurs, and places it in the antecedent of the Normal Form, instead of the statement of the truth-conditions of $S$ which is its consequent.

This seems a viable way of getting the truth-conditions of sentences containing indexical elements. For the reasons stated, and others given in the works cited, we will adopt the format of Normal Forms for truth-conditional statements given in (29) above for the purposes of the following discussion. Since tense is assumed to be indexical, in a sense to be discussed in Section 2.3, this seems to provide us with adequate tools for dealing with the effects of tense on truth-conditional statements.

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2.2 Towards Truth-Conditions for Tenses

As noted, it is commonly assumed in the relevant semantic literature that the tenses are indexical in nature just like demonstratives and other indexicals such as the pronouns I and you or the adverbs yesterday and tomorrow, etc. Given this, it is also commonly assumed that they present problems of analysis very similar to the ones considered in the preceding Section 2.1.\(^{16}\) An example of an analysis of tense along these lines is discussed in Section 2.2.1 hereafter; some problems associated with this particular proposal are then discussed in Section 2.2.2. After this, Section 2.3 argues that this analysis of tense is flawed in a much more fundamental way. Specifically, the argument will be that if the tenses are properly analyzed, they turn out not to be indexical after all, the context-sensitivity we observe in association with their uses being the result of another contributing factor. Appropriate revisions will then be worked out in Section 2.5.

2.2.1 Higginbotham (1990) on Indexical Tenses

Higginbotham (1990) proposes (p. 9ff.) to subsume the tenses under an analysis which is analogous to that of other indexical elements, as outlined in Section 3.1. Thus for a simple sentence such as (31) below he suggests (p. 9) that the past tense "... is itself demonstrative, and can be realized with the speaker referring to an interval of time ... The contribution of the past tense to a simple sentence such

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\(^{16}\) Both of these assumptions are made in all of the references cited in Section 2.1 above.
as [(31)] is then as in [(32)]:" (=an adaptation of Higginbotham’s (#32)).

(31) Mary was happy

(32) If \( u \) is an utterance (of the syntactic structure for) *Mary was happy*, and the speaker of \( u \) refers with its past tense to the temporal interval \( I \) preceding the time of \( u \), then \( u \) is true if and only if for some \( a \), happy(Mary, \( a \)) and \( I \) is contained within the time of \( a \).\(^{17}\)

The corresponding Normal Forms for truth-conditional statements about sentences containing present and future tenses, although not given in Higginbotham (1990), are presumably something like (34) and (38):

(33) Mary is happy

(34) If \( u \) is an utterance (of the syntactic structure for) *Mary is happy*, and the speaker of \( u \) refers with its present tense to the temporal interval \( I \) containing the time of \( u \), then \( u \) is true if and only if for some \( a \), happy(Mary, \( a \)) and \( I \) is contained within \( T(\alpha) \), the time of \( a \).

(35) Mary will be happy

(36) If \( u \) is an utterance (of the syntactic structure for) *Mary will be happy*, and the speaker of \( u \) refers with its future tense to the temporal interval \( I \) following the time of \( u \), then \( u \) is true if and only if for some \( a \), happy(Mary, \( a \)) and \( I \) is contained within \( T(\alpha) \).

\(^{17}\) At this point, Higginbotham’s Normal Form in (#32), quoted here as (32), contains the following footnote (#8, p. 10):

"I [=Higginbotham] am assuming here that with each event \( a \) is associated a unique interval, its time, consisting intuitively speaking of all the times when it was going on."

We adopt this assumption for the purposes of the following discussion. I will on occasion use the abbreviation \( T(\alpha) \) to refer to the time of the event \( a \).
As before with the indexical pronoun I, the indexical past tense is taken out of the sentence $S$ in which it occurs and out of the truth-conditional statement about $S$, and is placed in the antecedent of the Normal Form. There it functions as a context-dependent restriction on the utterance of $S$. Thus, if the view of tense suggested in Higginbotham (1990) is correct, then the Normal Forms given above will yield appropriate truth-conditional statements for tensed sentences.

The question to be addressed now is whether the Normal Forms given above are based on a feasible theory of tense. And if not, how can the Normal Forms suggested by Higginbotham (1990) be adapted without losing the account of the indexicality of the tenses? These two questions will be answered in the following. So as not to unduly burden the exposition, the discussion will proceed exclusively in the realm of past-tensed sentences, though it is clear that matters carry over straightforwardly to the other two tenses.

2.2.2 Problems with Intervals

We now turn to some general problems ensuing from the assumption that the tenses refer to intervals distinct from the time of the events. A first, and presumably minor, problem with the view of tense suggested in Higginbotham (1990) concerns what appears to be a slight inconsistency which is left unexplained in the manuscript. More concretely, note that in (32) above (repeated below), which quotes Higginbotham's (#32), the second conjunct after the bi-conditional states that the interval $I$ to which the speaker is said to refer deictically with the tense, must be contained in the time of the event $e$. 

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(32) If \( u \) is an utterance (of the syntactic structure for) Mary was happy, and the speaker of \( u \) refers with its past tense to the temporal interval \( I \) preceding the time of \( u \), then \( u \) is true if and only if for some \( a \), happy(Mary,\( a \)) and \( I \) is contained within the time of \( a \). [emphasis added]

Immediately thereafter, however, in the context of a more complex example, we find a truth-conditional statement which incorporates the exact opposite containment-relation: here, the past-tense interval \( I \) must contain the time of the event. This is in Higginbotham's (#33), the relevant parts18 of which are quoted in (37):

(37) If \( u \) is an utterance (of the syntactic structure for) John said \( X \), and the speaker of \( u \) refers with the past tense of the (main) verb of \( u \) to the temporal interval \( I \) [preceding the time of \( u \)], ... then \( u \) is true if and only if for some \( a \) and \( X \), say(John,\( X \),\( a \)) and the time of \( a \) is contained within \( I \) .... [emphasis added]

The only difference between the two appears to be that in the latter case, we have an event of saying, which is telic, while in the former case we have an event of being happy, which is atelic. Nothing that is of any consequence follows from this, however, and there does not seem to be any real need for the diverging containment relations in (32) and (37) above. That is, nothing is lost if the former is subsumed under the latter, as expressed in (32') below. Then we can uniformly require that \( T(a) \), the time of the event \( a \), be contained in the past-tense interval \( I \).19

18 I omit parts which are not germane to the present discussion. In particular, (37) does not include those parts of Higginbotham's original (#33) which relate to the embedded sentence \( X \) said by John. We will discuss embedded tenses in Chapter Five below.

19 Jim Higginbotham (p.c.) (April 9, 1991) has since conceded that the particular formulation chosen in (32) is not the best way to express the underlying idea, and that the containment relation might just as well be the reverse for
(32’) If \( u \) is an utterance (of the syntactic structure for) \( Mary \text{ was happy} \), and the speaker of \( u \) refers with its past tense to the temporal interval \( I \) preceding the time of \( u \), then \( u \) is true if and only if for some \( a \), \( \text{happy}(Mary,a) \) and \( T(a) \text{ IS CONTAINED WITHIN } I \).

[=Higginbotham’s (#32) in (32) above, with reversed containment relation]

The statements given in (34) and (38) above for present and future tenses are of course subject to the same revision.

While this problem is perhaps trivial as regards the strictly mechanical implementation of an account of tense, it serves nevertheless to illustrate that an analysis in which tense refer to intervals introduces a degree of complexity that is difficult to assess. The reason for this arises from the fact that the explanation provided by such an analysis is somewhat oblique, although descriptively it may well be adequate. The reason for this obliqueness, in turn, derives from the fact that the main theoretical construct of this analysis, ie. the tense-interval \( I \), is such that we really have no concrete (ie. non-abstract, non-mathematical) intuitions about it. Moreover, the status of the tense-interval \( I \) in linguistic theory is somewhat unclear, as is its relation to other theoretical constructs of grammatical explanation. While the latter point will become clearer in the following Sub-section, I will continue here with the first. Both points are valid, in my judgment, because these problems can easily be avoided; as I will argue presently, the complications introduced by the construct \( I \) are entirely unnecessary, as is \( I \) itself.

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atelic events.
The sense in which the theoretical construct of a tense interval \( I \) is unintuitive, as suggested above, is that it obscures the basic intuition that the use of past tense in a sentence asserts that the event described by that sentence is a \textit{past event}. That is to say, the whole discussion about the containment of the tense interval \( I \) by \( T(a) \), or vice versa, is basically academic. Intuitively it is clear in most cases that the temporal interval asserted to be past corresponds exactly to the time of the relevant event. This is trivially obvious in the case of telic events: if \textit{the bomb exploded} some time in the past, then the only past interval talked about is that corresponding to the explosion. To say that the sentence really asserts the existence of some larger past interval \( I \) in which the explosion is contained seems confusing and redundant at best, and wrong at worst. Similarly, if at some past time \textit{Mary was happy} for two hours, what is asserted to be past is the two-hour interval during which \textit{Mary was happy}, not some smaller interval \( I \) contained in or by it. In both these cases, we would want to say that the past tense interval \( I \) simply equals \( T(a) \), the time of the event.

Overall, the status of the past-tense interval \( I \) is far from clear. Basically we know only two things about this interval: (i) it precedes \( T(u) \), i.e. the time of the utterance; and (ii), it is larger than the interval \( T(a) \) corresponding to the duration of the event \( a \). Both of these facts are given in virtue of the semantic statement in (32') above; the first is part of the meaning of the past tense, as given in the antecedent of the Normal Form, and the second follows from the truth-conditions which state that \( T(a) \) be contained in \( I \). Other than that, we know next to nothing about interval \( I \).

Sub-section 2.2.3, next, inquires to what extent intervals are necessary at all for capturing the relevant proper-
ties of tense. After all this, we will return to problems of indexicals and the discussion of Normal Forms for truth-conditional statements, in Section 2.3.

2.2.3 Eliminating Tense-Intervals

Far more significant than all the complexities presented above is the fact that there does not appear to be anything at all that can be gained from the theoretical construct of a tense-interval I. As we mentioned before, it is intuitively clear that the relevant interval I to which we refer by means of the past tense is exactly the interval corresponding to the duration of the event which we ultimately want to locate in time by means of tense. That is to say, if the function of tense is to locate an event in time, and if the goal of an analysis of tense is to explain how this is achieved, then an analysis is successful in the case of our past-tensed example Mary was happy if it manages to explain the fact we judge this sentence as true if and only if Mary's happiness obtains at some time prior to the utterance of the sentence which asserts it. The putative past-tense interval I simply does not seem to contribute anything towards that goal, however.

When looked at from this angle, the step involving demonstrative reference to a past interval I, which then in turn must stand in some relation (of containment) with the time of the event T(a), is utterly superfluous. Given this, nothing seems to be lost and everything is to be gained in terms of simplicity if we revise the Normal Forms of truth-conditional statements for tensed sentences in the following fashion:

If u is an utterance (of the syntactic structure for) Mary was happy, and the speaker of u refers with its past tense to the temporal interval T preceding the time of u, then u is true if and only if for some a, happy(Mary,a) and T is the time of a.
This revised version thus replaces (32) and (32') above. Analogous revisions apply to the statements about present tense in (34) and (34'), and the statement about future tense in (38).

Note that according to the Normal Form in (38) the meaning of the past tense morpheme is practically identical to that of the indexical time-adverb *then*. That is, it denotes an interval which (i) is in the past relative to the time of its utterance, and (ii) whose duration or magnitude is not fixed. Regarding the latter, the usual interpretation of either the temporal adverb or the past tense is that it is understood to cover the entire duration of the event characterized by it.

With the elimination of the tense-intervals I in favor of the event-time T(a) we achieve a significant simplification of the Normal Forms for truth-conditional statements for tensed sentences. This maneuver not only removes the superfluous theoretical construct I, but at the same time we also manage to depose of the potential for problems arising from (containment and other) relations between intervals, such as were mentioned in Section 2.2.2 above. Further simplification along these lines will be discussed in the following Section.

2.2.4 Eliminating Times of Events

In the preceding Section we simplified the Normal Forms for truth-conditional statements for tensed sentences suggested in Higginbotham (1980) by eliminating the notion of a tense-specific interval on grounds of redundancy. The result of this simplification is shown in (38) above. What this statement says, in effect, is that a past-tensed sentence
such as Mary was happy is true just in case the time of the event of Mary's being happy precedes the time of the utterance of the sentence which describes that event. While this, no doubt, is a lot simpler than the original version which required that the time of the event of Mary's being happy be contained in some past-tense interval which precedes the time of the utterance of the sentence which describes that event, it still seems to contain some degree of redundancy. This redundancy makes for the topic of inquiry of the present Section.

Regarding unnecessary elements in the Normal Form in (38) we may wonder, in particular, whether it is really necessary to take the detour over times of events, rather than dealing with the ordering of events directly. That is to say, why don't we simply say that the truth-conditions for past-tensed Mary was happy require that the event of Mary's being happy precede the utterance of the sentence which describes that event instead of requiring that the time of the event of Mary's being happy precedes the time of the utterance of the sentence which describes that event, as (38) above has it?

As with the elimination of the tense-intervals I in the preceding Section, I don't think that the simplification just proposed can be argued on empirical grounds. Indeed, it is very difficult, and perhaps even impossible, to decide whether the two versions given informally in the preceding paragraph make diverging predictions regarding primary linguistic data. Even so, the two can be compared on theory-internal grounds; and here, I think, a good argument can be
made for the version which orders events rather than times of events.²⁰

The argument for the elimination of talk of times of events in favor of talk of events more directly is supported by two kinds of considerations, one pertaining to the simplicity of the theory, the other, to the analogy with semantic domains other than time. In the following discussion, these considerations will inevitably get intertwined to some degree. Nevertheless, it will be useful to bear in mind that they are distinct, conceptually. Taken together, these two kinds of considerations provide a good argument for the above-mentioned further revision of the Normal Form in (38).

2.2.4.1 Adverbials and Times of Events

We begin by examining the analogous situation in the spatial domain. Concretely, consider the example in (39) a) below, which deals with the relative spatial location of two objects. The sentence says that the object denoted by the expression barn stands in a behind-relation to the object denoted by house (from the perspective of the speaker). Assuming that the three expressions have the usual denotations and omitting detail not germane to the argument, this is adequately captured in b).

(39)  a)  the barn is behind the house
      b)  behind(barn,house)
      c)  behind(LOC(barn),LOC(house))

²⁰ Here and below, when using the term event informally I take it to cover utterances as well as the familiar events described by sentences. I will continue to use the variable u to refer to the (event of the) utterance of sentence S while reserving the variable e for the Davidsonian event of S. It is clear, however, that the distinction of u and e is grounded only in considerations of convenience and exposition, and does not reflect any more fundamental differences in type, etc.
Of course it is possible to express the same information as is conveyed in terms of objects in (39) b) above in a much more complicated fashion involving abstract attributes of objects, as illustrated in c). For instance, one might rephrase the statement that the barn is behind the house in terms of an abstract notion of "Location" or "Space" (which can be conceived either as "Space-points" or as "Space-regions"); as the space of the barn is behind the space of the house. Or, quantifying over "Space-points" one might say that every Space-point included in the barn is behind every Space-point included in the house. Either way, nothing seems to be gained by moving from concrete objects to abstract Spaces, and it would seem rather difficult to motivate such move. Within the range of precision required to account for the spatial relations of objects as expressed in language, the simple first solution seems entirely adequate.

The exact same reasoning applies in the temporal dimension in our next example (40)a). Thus we have a choice between either relating events directly, as in b), or taking a detour over abstract attributes of events such as "Times" (which again can be conceived as either time-points or intervals), as in c):

(40) a) the fire was after the explosion
b) after(fire, explosion)
c) after(TIME(fire), TIME(explosion))

Similarly in (41) a) below, which is like (40) above except that the two relata are more complex, having a more sentence-like internal structure. Again we have the two options shown in b) and c):

(41) a) [np Mary's arrival] was after [np John's leaving]
b) after(Mary's.arrival, John's.leaving)
c) after(TIME(Mary's.arrival), TIME(John's.leaving))
Given the preceding example, there is no reason not to extend the distinction from events sailing under nominal descriptions to events described by sentences. That is to say, modulo the difference in grammatical category, the example in (42) below is just like the one in (41) above, as regards the two options for analysis given in b) and c):

(42) a) [Mary arrived] after [John left]  
b) after([arrived(Mary)],[left(John)])  
c) after(TIME([arrived(Mary)]),TIME([left(John)]))

As is clear from the examples discussed so far, the abstract notions LOC(x) and TIME(x) are little more than playful elaborations of the theory on the basic entities, viz. events and other objects. They don’t add anything substantial to the explanation of the phenomena. Thus, saying that (42) a) above orders the time of Mary’s arrival after the time of John’s departure, as in c), says no more than saying that the event of Mary’s arrival is ordered after the event of John’s departure, in b). We know that events are located in time and have temporal duration in virtue of our knowledge of the concept of event, just like we know that concrete physical objects have spatial location and extension in virtue of our acquaintance with the concept of a concrete physical object.

Examples very similar to (42) above are discussed in Higginbotham (1988a), and again in Higginbotham (1991), where the temporal relation between the two sentences, expressed by after, is naturally analyzed in terms of a relation between events, as in b), rather than a relation between times, as in c). (43) presents an illustration from Higginbotham (1991) (Section 2):

(43) a) Mary left after John left  
b) (jε) { leave(Mary;ε) &  
   [ε+\epsilon : leave(John;ε')] [ε after ε'] }  
c) (jε) { leave(Mary;ε) &  
    [ε+\epsilon : leave(John;ε')] [T(ε) after T(ε')] }  

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To be sure, there is nothing actually wrong with the logical form in (43) c); it captures the relevant properties of the interpretation of a) just as well as b) does. However, it purports to give precision which on the one hand is not required for the interpretation, and which on the other hand it does not, in fact, provide: c) doesn’t say more than b), it merely says the same thing in a more complicated fashion.

Additional examples illustrating the same point derive from all sorts of cases of adverbial modification, moreover. Thus, (44) a) is normally paraphrased by saying that the event of John’s leaving occurred on Monday, as expressed by the Davidsonian logical form in b), not that the time of that event occurred on (or is contained in) Monday, as c) claims:

(44)  
a) John left on Monday  
b) $\langle ja \rangle$ [ leave(John; a) & on.Monday(a) ]  
c) $\langle ja \rangle$ [ leave(John; a) & on.Monday(TIME(a)) ]  
   or: $\langle ja \rangle$ [ leave(John; a) & T=TIME(a) & on.Monday(T) ]

Similarly with the locative adverbial in (45) and the manner-adverb in (48), we have the option of either analyzing the adverbials in a uniform fashion as predicates of events, following Davidson (1987a), or of introducing whatever abstract attributes suit the occasion, as in the analyses suggested by the c)-forms:

(45)  
a) John was running in the park  
b) $\langle ja \rangle$ [ run(John; a) & in.the.park(a) ]  
c) $\langle ja \rangle$ [ run(John; a) & in.the.park(LOC(a)) ]  
   or: $\langle ja \rangle$ [ run(John; a) & L=LOC(a) & in.the.park(L) ]

(48)  
a) John walked slowly  
b) $\langle ja \rangle$ [ walk(John; a) & slow(a) ]  
c) $\langle ja \rangle$ [ walk(John; a) & slow(MANNER(a)) ]  
   or: $\langle ja \rangle$ [ walk(John; a) & M=MANNER(a) & slow(M) ]

A quick comparison of the last three examples reveals a pattern of decreasing intuitive appeal of the c)-versions.

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Thus (46) c) borders on the nonsensical; and matters are only slightly more appealing in the case of Locations or places, and even more so in the case of Times. In spite of this, however, consistency demands that we either accept the c)-version in all cases, or else in none. For suppose we only accepted TIME and LOC attributes; then manner would have to be captured in the theory in some other way, say via Davidson-style predication over events. Yet if we admit of such an analysis in this case, then what justifies not employing it throughout?

21 Note that the degree of acceptability of the three c)-versions seems to correlate with the degree to which we manage to dissociate the abstract attributes from the things whose attributes they are. The latter is of course the distinguishing factor which underlies the linguistic distinction between alienable and inalienable possession, illustrated by the contrast between these two examples:

(i) There was a car in the drive-way, but now it is in the garage.
(ii) There was a space in the garage, **but now it is in the drive-way.

Suppose we have a one-car garage and a one-car drive-way; then in the situation described, the car and the empty space basically trade places, and both sentences ought to be acceptable, contrary to fact. The reason why this fails is that whereas the car can be dissociated from its location, the space cannot. Thus the car is the same regardless of whether it is located in the garage or the drive-way, since it is alienably possessed by either. Matters are different with the empty space, however, which is inalienably possessed by either the garage or the drive-way. Hence the empty space in the former is not the same as that in the latter; hence I can not refer back to the empty "space-in-the-garage" by means of the pronoun it in the second sentence of (ii), as the two are not coreferent.

Similarly, it is next to impossible to consider the MANNER-attribute independently of the thing whose attribute it is, while this is much more easily possible with the LOCATION- and TIME-attributes (which might well be a result of the fact that we can give names to the latter two, but not the former). Even so, as the example given above makes clear, location cannot always be considered in isolation.
Of course, it is trivially true that there are different kinds of adverbia
tial modifiers, such as those of time, place, frequency and manner, etc. However, an adverbial belongs to one kind or another in virtue of its lexical entry, not in virtue of its syntactic and semantic mode of combination with the rest of the sentence. Moreover, the Davidsonian analysis is preferable to the alternative precisely because it offers a uniform treatment of all (relevant) kinds of adverbials, including a straightforward account for the adverb-dropping inferences discussed in Chapter One, Section 2.2.3 above.

In contrast, the analysis involving abstract attributes suggested by the c)-version above obscure rather than illuminate what is common to all cases. Worse yet, if we permit the introduction of such abstract attributes into the theory in the case of events, then what is to stop us from introducing similar theoretical constructs for abstract attributes of other objects all over the place? Thus, what is to decide that in *The tree is ten feet tall* it is really the object denoted by *tree* that is ten feet tall and not, say, the abstract property HEIGHT which can be attributed to that object? Why should we assume that *snow is white* is true if and only if *snow* is white? Shouldn´t we then rather say that it is the abstract attribute COLOR which we can attribute to *snow* of which whiteness is predicated? In brief, there is no telling where one should draw the line, and what is on the other side of the line. For if on the other side of the line we simply predicate properties of events and other objects directly, then we could do so in all cases and save ourselves the unnecessary complications resulting from the introduction of abstract attributes into syntactic and semantic representations.

In all the examples discussed above it is self-evident without further explanation that the b)-versions are much
simpler than the c)-versions, notwithstanding the fact that
the two versions are (or can be made to be) extensionally
equivalent. The reason for this is trivial: the b)-versions
achieve the same results without recourse to theoretical
constructs the effects of which are hard to come to terms
with. Moreover, as mentioned earlier, the difference between
the two versions concerns not only the fact which is obvious
from the representations given above, viz. that one makes use
of abstract attributes such as LOC and TIME, etc., while the
other makes do without; for the former, in addition, also re-
quires a concomitant theory of these abstract attributes,²²
and thus invites questions and problems such as were dis-
cussed in Section 2.2.2 above.

In addition, as the analogy with the spatial domain in
(39) and (45) makes clear, the introduction into the theory
of attributes of objects and events, such as locations and
times, is utterly counter-intuitive. Objects such as barns
and houses are well-established and respectable entities that
conceived as such by the human mind an that are treated as
such in language. Thus, in the absence of convincing evidence
to the contrary, it seems most reasonable to assume that they
should be treated as such in the theory of language as well.

The above considerations are all the more pertinent since
we do not actually seem to derive any benefits from the in-
troduction of such abstract attributes. That is, the c) ver-
sions above cum abstract attributes don’t actually say more,

²² Anyone who has ever tried to make a theory of tense
in terms of intervals work out in detail will know just how
involved things can get. The problems with intervals touched
upon in Enç (1987) barely scratch the surface; still, as
Enç’s discussion (p. 650ff.) makes clear, intervals cannot be
indexed by simple indices; instead, they require sets of in-
dices so as to be able to handle inclusion relations, etc.
For discussion in greater depth, cf. eg. Partee (1984), Ben-
net & Partee (1978), etc.
or say the same thing in a more precise or intuitive or intelligible way, than the b) versions do without such theoretical constructs.

In sum, we note that in the cases discussed in the context of examples (40) through (44) above, where the location in time of an event \( a \) is characterized by means of temporal adverbials, everything points to an analysis in terms of events, rather than Times of events. Returning to the issue of tense with which we began Section 2.2.4, we now have to address the question whether the above considerations permit a valid analogy to the analysis of tense.

2.2.4.2 Tense and Times of Events

It is clear, first of all, that all considerations pertaining to simplicity carry over to tense as well. There can be no doubt that it is a lot simpler and more straightforward to say that the truth-conditions for the past-tensed sentence *Mary was happy* require that the event of *Mary's* being happy precede the utterance of the sentence which describes that event than to say that they require that the time of the event of *Mary's* being happy precede the time of the utterance of the sentence which describes that event, as it is expressed in the Normal Form in (38) above.

As to the analogy between temporal modification of an event and tense, next, the idea that tense itself is "adverbial in nature" has been advanced before, most notably in Hornstein (1990b), although not in a Davidsonian framework of adverbial modification. Thus the question now is whether this idea can be expressed in a manner compatible with our earlier suggestion that tense orders events directly, rather than time of events.
Recall from the end of Section 2.2.3 that the Normal Form in (38), repeated below for convenience, basically analogizes the function of the past tense to that of the adverb then.23

(38)  If u is an utterance (of the syntactic structure for) Mary was happy, and the speaker of u refers with its past tense to the temporal interval T preceding the time of u, then u is true if and only if for some a, happy(Mary,a) and T is the time of a.

Then being an adverb, it is of course subject to the same considerations as the adverbial on Monday in (44) above. Thus (47) a) below, which is just like (44) in all relevant respects, is subject to an analysis as in b), rather than c), for all the reasons mentioned:

(47)  a) John left then
     b) (Ja) [ leave(John;a) & then(a) ]
     c) (Ja) [ leave(John;a) & then(TIME(a)) ]
     or: (Ja) [ leave(John;a) & T=TIME(a) & then(T) ]

The fact that then pertains to time rather than some other attribute of events follows from its lexical meaning; hence, again, it is not necessary that we introduce an abstract attribute TIME to capture that fact.

Taking literally the analogy between then and the past tense, let us suppose the past tense corresponds to a predicate PAST very similar in meaning to the adjective past (as in this past Sunday). If so, then we can express the past tense in the sentence (48) a) adverbially as a conjoined predicate of the event, as b) shows.

23 The analogy has its limits, of course. Thus, unlike the past tense then can be applied to future events (or intervals) as well, though this is irrelevant here. Note furthermore that the analogy of course holds only where then is understood in the intended sense of at that time, rather than the irrelevant sense of next or subsequently.
(48) a) John left
b) (\exists a) [ leave(John;a) & PAST(a) ]
c) (\exists a) [ leave(John;a) & PAST(TIME(a)) ]
or: (\exists a) [ leave(John;a) & T=TIME(a) & PAST(T) ]

The detour over an abstract attribute shown in c) is dispensable again, since the fact that PAST deals with time already follows from its meaning. That is to say, PAST(a) locates a in past time, which is all that needs be said. Saying that the time of a is located in the past time by the past tense adds nothing more.

Thus, to the extent that an adverbial analysis of tense is tenable, the analogy from temporal adverbs to tense is valid, and it looks rather like it should be possible to eliminate talk of intervals from the Normal Form (38) altogether. Further support for this conclusion derives from two additional points to be made presently. The first of these concerns direct quotation of utterances; the second derives from considerations pertaining to the so-called performative hypothesis entertained by some researchers in the late sixties and early seventies.

Consider again the sentence in (48)a), John left. Intuitively, it is clear that an adequate truth-conditional statement for this sentence must capture the fact that my utterance of (48)a) should count as true if John did in fact leave prior to my saying that he did, and as false otherwise. The case is slightly different, however, if I don't actually utter sentence (48)a) but quote it in reporting some one else's utterance of it, as in (49) below. Suppose we are planning what to do if the police come knocking on our front door to ask for John, whom they want to arrest. Suppose the plan is as follows: when the police arrive at the front door John will slip out the back; Mary will answer the front door and do as described in (49):

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Mary will say: "John left."

Assuming that Mary will keep to the plan and that she will speak truly when uttering the sentence attributed to her in (49), then her utterance of (48)a), John left, is subject to the same truth-conditions as mine was earlier; hence the (time of) John's leaving must be prior to (the time of) her utterance. But (the time of) Mary's utterance of John left simply is the (time of the) event described in the main sentence in (49), viz. Mary's saying something. Focussing on the tense of the quoted sentence in (49) (and disregarding the tense of the matrix sentence), we observe that its tense locates John's leaving not in relation to my utterance of (49), but in relation to the event of Mary's saying something which is described in the matrix sentence of (49) (which in turn happens to be my description of Mary's utterance). Thus the situation is rather like that of (43) above (Mary left after John left; taken from Higginbotham (1991)) where two sentences are conjoined by the temporal connective after. That is, the quoted past tense in (49) orders the reported event as being prior to the main event rather than my utterance of (49), as illustrated in (50).

(50) a) Mary will say: "John left." 
    [=(49)] 
    b) \(\{\text{say}(\text{Mary},X;e) \& \) 
       \(X = \langle [\text{e}'] : \text{leave}(\text{John};e') \rangle [\text{e after } e'] \} \)
    c) \(\{\text{say}(\text{Mary},X;e) \& \) 
       \(X = \langle [\text{e}'] : \text{leave}(\text{John};e') \rangle [T(e) after T(e')] \} \)

If this analysis of the quoted past tense in (49)/(50)a) is correct, as it seems to be, then we have again the two op-

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24 The tense of the sentence John left as its occurs quoted in (49) is thus not indexical in the sense discussed earlier in Sections 2.1 and 2.2.1, as it is not dependent on the context of my utterance of (49). Rather it is dependent on the context of the event described in the matrix sentence, viz. Mary's saying something. We will return to issues pertaining to the indexicality of tenses in Section 2.3 below.
tions shown in (50) b) and c). That is, we can analyze the (quoted) tense either in terms of the event's directly, as in b), or we can do so indirectly by taking the detour over times of events, as shown in c). As regards tense, then, the quoted sentence can be analyzed just like the adverbial clause introduced by after in (43) above. We have thus succeeded in analogizing at least the use of tenses in quotes to cases of modification by temporal adverbials. To the extent that the above discussion is on the right track, the exact same considerations apply here as in the case discussed earlier, and we are thus led to rejecting the more complicated analysis in terms of times suggested in (50) c) in favor of the one in b), which proceeds in terms of events.

The argument just made for quoted sentence can be transferred piece by piece, moreover, to sentences of indirect speech reports. Thus, the indirect version (51) of (50) above basically makes the same point.25

(51) a) Mary will say that John left
    b) (\textit{a}) \{ say(Mary,X,a) & X= \langle[\textit{a} - \textit{leave}(John;a')] [a after a'] \rangle \}
    c) (\textit{a}) \{ say(Mary,X,a) & X= \langle[\textit{a} - \textit{leave}(John;a')] [T(a) after T(a')] \rangle \}

Again, both simplicity and the analogy to the adverbial case in (43) earlier suggest that we adopt the analysis in b) rather than the one in c).

Now, if we are correct in concluding that tense in sentences of direct or indirect speech reports specifies the

25 I am deliberately not going into this argument in greater depth as tense in embedded sentences will be dealt with in detail in Chapter Five below. It is clear that the point made in the text leaves a lot be said. Even so, I think that in a weak sense it supports the argument pertaining to the elimination of the construct T(a) in the analysis of tense.
temporal location of the events rather than their times, then it seems more than likely that this is the case more generally. For if the simpler analysis (in terms of events rather than their times) is available in principle, then it will take precedence over more complicated alternatives unless it is ruled out by further constraints. In other words, additional arguments would be required to support the view that the analysis suggested above for quoted tenses should not be applicable to tenses more generally.

Our final argument in support of the conclusion that tense directly relates to events rather than times of events derives from observations made by proponents of the Performative Hypothesis of Generative Semantics, following pioneering work by Austin (1970). These include, in particular, Sadock (1989) and Ross (1970), but also R. Lakoff (1988), Schreiber (1972), Cole (1974), and C. Smith (1978). According to the view held by these authors, simple matrix sentences are to be thought of as being embedded in so-called "hyper-sentences" (Sadock (1989)) under implicit performative verbs. Thus, a simple declarative sentence $S$ is claimed to be the complement of the implicit performative declare in a hyper-sentence the subject of which is the speaker and the direct object of which is the person(s) spoken to, paraphraseable roughly as I declare (to you) that $S$. By the same token, commands, questions, requests, and so on are thought of as embedded under hyper-sentences such as I order you, I request of you, etc. While this hypothesis fails as proposal about the syntax of natural language, it nevertheless captures important insights into the semantics of matrix clauses. Specifically, there is an obvious similarity between the implicit performative verbs postulated by this view and the function of the antecedents of the Normal Forms of truth-conditional statements such as (38) above. Recall from Section 2.1.2 above that it is the main purpose of the antecedent of a Normal Form to list all
the contextual parameters required for the interpretation of a sentence containing deictic elements such as the indexical pronouns I and you, as well as demonstrative this and that, etc. Similarly, the hyper-sentence can be used to specify the context-dependent parameters of a matrix sentence embedded under the performative. 28

Specifically regarding tense now, the verbs of the hyper-sentences are performatives, and hence they necessarily have present tense, or "no tense". That is to say, they are simultaneous with the performance—acts they represent, or with their implicit utterance, if you will. The tenses of the (overt) matrix clauses, in turn, are then considered in relation to the performatives as past, present, or future. Now, if one were to implement a version of the performative hypothesis in terms of the event-hypothesis, then simple matrix clauses would be subject to the same considerations as the

28 I will not dwell on the parallel between performative hyper-sentences and the antecedents of Normal Forms, since (i) it is intuitively obvious, and (ii) it has also obvious limits. As to the similarities, the indexical pronouns I and you and demonstrative that are introduced in the hyper-sentence and can be treated as bound variables in the matrix, as in [SPEAKER\_x declare\_z TO AUDIENCE\_y concerning THING\_z that [ I\_x gave that\_z to you\_y ]]; alternatively, they are given in the antecedent of the Normal Form like this: if in uttering <I gave that to you> the speaker refers with the pronoun "I" to \( x \) (which is himself), and with "you" to the person \( y \) spoken to, and with "that" to thing \( z \), then his utterance is true \( \equiv \) for some event \( a \), \( x \) gave \( z \) to \( y \) in \( a \). As to the differences between the two approaches, the context-sensitive elements can be treated as bound variables on the performative view and hence are not really deictic at all; furthermore, it does not easily lend itself to a truth-functional analysis.

For details, cf. the references cited in the text.
quoted sentence in (50) or the embedded sentence in (51) above.

In summarizing the discussion of this sub-section we note that no doubt the strongest support in favor of the elimination of the theoretical construct of an event-time \( T(a) \) from the analysis of tense derives from the first argument presented above. The observation that tense is in some sense adverbial in nature, made by Hornstein (1990b), for example, suggests that the two modes of temporal specification of sentences (viz. tense and modification by temporal adverbials) ought to be treated in like manner in the theory as well. In the framework embraced here, this is captured nicely by the fact that both temporal adverbs and tense are analyzed as Davidson-style predicates of events. As the obvious parallels between the past tense and the adverb then demonstrate (cf. (47) and (48) above), it would seem totally unwarranted to predicate temporal adverbs of events directly while taking the detour over Times of event in the case of tense. At the very least, such a dichotomy would require some supporting evidence and argumentation, which does not exist, however. The other two arguments presented above --from quoted and embedded tenses, and the performative hypothesis, respectively-- are successively weaker, in comparison. Even so, they

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27 To my knowledge, no one has proposed such a combination of the performative and the event hypotheses, and I will not do so either. However, Cole (1974) advances a syntactic argument for the performative hypothesis on the basis of the following observation about tense in Hebrew: He first notes that matrix tense indicates real time whereas embedded tense indicates relative time, i.e. time relative to the time of the next higher sentence (Serial tense, in our terminology). Then he argues that all tenses can be uniformly analyzed as relative if one assumes that the apparent absolute tense of a matrix clause is analyzed as relative to the time of the performative hyper-sentence. For details, cf. Cole (1974). Similarly, C. Smith (1978) advances arguments from the interpretation of English tenses in favor of super-ordinate hyper-sentences.
may serve to show, at least, that the further revision of truth-conditional statements which is our current topic is feasible and in accordance with the insights of researchers working in quite different frameworks. Most importantly, however, when taken together they make a good case for the elimination of talk of times of events from the analysis of tense. A revision of our truth-conditional statements in this spirit will be formalized in the following sub-section.

2.2.4.3 Times as Abstract Attributes of Events

On the basis of the facts considered in 2.2.4.2 we concluded that an adequate analysis of the truth-conditional interpretation of tense does not seem to require recourse to Times any more than this was found to be the case for the analysis of adverbials, temporal or otherwise, in 2.2.4.1. In both cases, the analysis can proceed straightforwardly in terms of events.

This suggests that the status of Times in linguistic theory is ancillary, at best, in the sense that they serve no purpose in the explanatory part of the theory, and hence do not exist as a primitive notion of the theory.\(^{28}\) To the extent that Times are of any theoretical use at all, we can thus conceive of them as attributes of events, which are the real primitives of the theory.\(^{28}\) As such, Times may perhaps

\(^{28}\) This use of the notion existence is due to Chomsky. As he has been saying in his spring semester classes, an abstract theoretical entity can be said to exist iff it plays a rôle in an explanatory theory.

\(^{29}\) I am using the term attribute in a technical sense here, in opposition to the more general term property. Thus, if \(x\) is a bachelor, then \(x\) has the properties of being male and of being unmarried, though these are not attributes. Bachelor \(x\) may, however, have the attributes of being six feet tall, or of being in a physical location, etc. Of
serve a purpose in the description of certain phenomena, or in aiding the exposition of an analysis. To be sure, no harm is done if we reduce events to their temporal aspects, e.g. for the purposes of being able to talk about the temporal interpretation of linguistic expressions in abstract terms, when other aspects of events are simply irrelevant. However, we should be aware in this case that we are really talking about events by means of certain properties we attribute to them. To use an analogy, we can equally well reduce real physical objects to points and then talk about these objects in terms of their Cartesian coordinates, without confusing the coordinates with the objects.

Applying the considerations discussed in the preceding Sections to our truth-conditional analysis of the tenses we can recast the statement in (38) above, which holds that the past tense in Mary was happy orders the time of Mary's being happy before the time of my utterance, so as to require simply that the event of Mary's being happy obtain before my utterance of that sentence.

If we were simply to make the change from Times of events to events in (38) above, then our revised Normal Form would come out as in (52):

(52) If u is an utterance (of the syntactic structure for) Mary was happy, and the speaker of u refers to some event e preceding u, then u is true if and only if happy(Mary,e).

However, the statement in (52) is somewhat problematic, for several reasons. Firstly, the sentence on the right-hand side of the bi-conditional expressing the truth-conditions for u is an open sentence since, secondly, the event-operator now course, the latter two are properties as well, though they are not inherent or inalienable properties of x.
appears in the antecedent of the conditional Normal Form. This, in turn, is so because the event-argument is now indexical, i.e. it is the object of the act of reference, in the sense of Burge (1974), as discussed in Sections 2.1 and 2.2.1 above. However, this does not seem quite right: the event $a$ is not referred to deictically; rather, it is described by the sentence. More seriously, the statement in (52) fails completely to capture the correct truth-conditions for our example-sentence in that it does not permit the speaker to speak falsely. To see that this is so consider the case where there is no event $a$ of Mary's being happy. If so, the antecedent of the normal form will be false, and hence the statement (52) is trivially true, regardless of whether the truth-conditional equivalence which is the consequent of the normal form is true or false. Obviously, this is not the desired result! An utterance of Mary was happy should not be predicted to count as true of there is no event of Mary's being happy.

The reason why we ended up with the curious result shown in (52) is of course that in our discussion in the preceding Section we have concentrated exclusively on substituting events for Times as the relata of the logical tense relation precede while completely ignoring issues pertaining to the indexicality of tenses. And while the change from Times to events has been motivated in the former respect, we haven't really discussed its implications for the second issue. Given this, (52) is infeasible precisely because it embodies claims about both temporal order and the indexicality of tense. For what is strange about (52) above concerns just these latter issues. What this tells us, then, is that we have to re-examine the problems associated with the indexicality of tense; we will do so in Section 2.3 below.
In the meantime, if we want to capture the conclusions of our discussion as they pertain to temporal ordering simpliciter, it is advisable that we do so by giving only the truth-conditional equivalence which governs our example sentence *Mary was happy* while ignoring, or abstracting away from, issues of indexicality. Thus we can say that for any utterance \( u \) of the (syntactic structure for) *Mary was happy* the truth-conditional equivalence will be:

\[
(53) \quad u \text{ is true if and only if for some } a, \text{ happy}(\neg \text{ Mary}, a) \text{ and } a \text{ precedes } u.
\]

This differs from (52) by the absence of the antecedent of a Normal Form.\(^\text{30}\)

The truth-conditions stated in (53) are practically identical to the ones given to tensed sentences by Davidson (1987b), save for the fact that the last conjunct of (53) orders events (\( a \) and \( u \)) rather than Times. Hence (53) is subject to the same criticisms raised by Burge (1974) against Davidson, in that it ignores the indexicality of tense. We will address these issues in detail in Section 2.3 below. Before this, however, we will briefly summarize our findings of Section 2.2.

2.2.5 Summary of Section 2.2

We started off our discussion of what an adequate statement about the truth-conditions of a simple tense sentences ought to look like by examining the proposal of Higginbotham (1990) in Section 2.2.1. This proposal, which present an ex-

\(^{30}\) Recall from Section 2.1.2 above that is was precisely the issue of indexicality which motivated the introduction of Normal Forms for truth-conditional statements in Higginbotham (1986a), (1990), and similar statements in Weinstein (1974) and Burge (1974).
tension of earlier work by Weinstein (1974) and Burge (1974), captures the context-sensitivity of tenses by placing the in the antecedent of a so-called Normal Form, as shown in (54) [= (32') above, i.e. Higginbotham's (#32) in (32), with reversed containment relation.]

(54) If \( u \) is an utterance (of the syntactic structure for) *Mary was happy*, and the speaker of \( u \) refers with its past tense to the temporal interval \( I \) preceding the time of \( u \), then \( u \) is true if and only if for some \( a \), \( \text{happy}(\text{Mary}, a) \) and \( T(a) \) IS CONTAINED WITHIN \( I \)= (32')]

Then, in Section 2.2.2 we pointed out several problems with this view, all pertaining to complications arising from the assumption that the tenses denote special tense-intervals which then have to stand in some relation (containment) to the time of the event. On this basis we argued in Section 2.2.3 that the special tense-intervals \( I \) of Higginbotham (1990) are not necessary to an adequate characterization of the interpretation of tense in simple sentences because (i) they make no substantive contribution to the analysis, and (ii) they make the analysis unnecessarily complicated. For the reasons presented there, we proposed to eliminate the special tense-intervals from the explanatory part of the theory, and to have their purpose served instead by the event-times \( T(a) \), the existence of which was assumed independently, as (54) makes plain. This led to the revision in (38) above, shown here as (55):

(55) If \( u \) is an utterance (of the syntactic structure for) *Mary was happy*, and the speaker of \( u \) refers with its past tense to the temporal interval \( T \) preceding the time of \( u \), then \( u \) is true if and only if for some \( a \), \( \text{happy}(\text{Mary}, a) \) and \( T \) is the time of \( a \). [= (38)]

It is important to note that in the original Normal Form (32)-(32') of Higginbotham (1990), given in (54) above, the tense-interval \( I \) plays a dual rôle. On the one hand, it is instrumental to establishing temporal order, i.e. in ensuring
that the event of Mary's leaving described in the sentence take place prior to the utterance of the sentence which describes that event; on the other hand, however, it is also the object of the deictic "act of reference" (in the sense of Burge (1974)). Both of these functions were transferred from I to T(a) in the move from (54) to (55). As we noted, this analogizes the theoretical construct T(a) to the adverb then in the relevant respects.

Finally, in Section 2.2.4 we presented arguments in favor of another simplification of the theory. Specifically, we argued that the interpretation of the tenses is not affected if we replace the time of the event T(a) with the event a itself. Given that the ordering relations are intrinsically temporal in nature, we argued, it makes no difference for the interpretation whether we order events or times of events in the temporal dimension. However, it does make a difference as regards the complexity of the theory, in that the analysis proposed is simpler, requiring fewer primitives.

Simply replacing T(u) with u and T(a) with a in (55) led us to the strange statement in (52) above, repeated here as (56).

(56) If u is an utterance (of the syntactic structure for) Mary was happy, and the speaker of u refers to some event a preceding u, then u is true if and only if happy(Mary, a).

[=(52)]

As we noted, this statement is fundamentally inadequate in that it does not permit the speaker to speak falsely, in cases where there is no event of Mary's leaving. Furthermore, as we also noted, it is strange because it incorporates predictions about the second function of Higginbotham's original tense-interval I, viz. indexical reference. These predictions
concerning indexicality are obviously false, contributing to the above-mentioned inadequacy of (58).

So as to capture at least those aspects of (58) that appear to be correct (i.e., the ones pertaining to the ordering of events), we rephrased the above statement in (53), repeated here as (57). In so doing, we temporarily eliminated from our discussion the concerns of indexicality of the tenses (which the following Section will address) by giving only the consequent of the Normal Form. Thus we said that for an utterance \( u \) of the (syntactic structure for) *Mary was happy* the truth-conditional equivalence will be:

\[
(57) \quad u \text{ is true if and only if } \neg (53) \text{ for some } a, \text{ happy}(\text{Mary}, a) \text{ and } a \text{ precedes } u.
\]

It is perhaps useful at this juncture to tally up the differences as well as the similarities that obtain in the four versions of the truth-statement. As to similarities, first, we note that regardless of all the superficial and substantial differences between them, the truth-statements in (54) through (57) above are still basically identical in another significant respect. More specifically, note that the ordering relation "precedes", which makes the tense of the example under discussion a past tense, remains the same in all versions of the truth-statement (and indeed in all\(^{31}\) theories of tense). Thus, where the four versions given above differ is not so much in the tense-relations, but in the tense-relata, i.e., the entities that are the arguments of the ordering-relations. This becomes evident as soon as we compare, in (58) to (60) below, the relevant parts of the statements given in (54) through (57) above.

\(^{31}\) This is not entirely correct, for some theories have only two tense relations (simultaneity and precedence) whereas others have three (simultaneity, anteriority, and posteriority).
(58) as in (54):
   a) PAST: I precedes T(u) & T(a) is contained in I
   b) PRESENT: I overlaps T(u) & T(a) is contained in I
   c) FUTURE: I follows T(u) & T(a) is contained in I

(59) as in (55):
   a) PAST: T(a) precedes T(u)
   b) PRESENT: T(a) overlaps T(u)
   c) FUTURE: T(a) follows T(u)

(60) as in (58)/(57):
   a) PAST: a precedes u
   b) PRESENT: a overlaps u
   c) FUTURE: a follows u

Regarding the differences between the four versions in (54) to (57), second, there are of course the different relata, or arguments of the tense-relations, as is evident from (58) to (60). In addition, there appear to be two further differences, which are related. Thus, on the one hand, there are the concerns of the indexicality of the tenses: In (54), the speaker is said to refer (via deixis) to the past-tense interval I; in (55), demonstrative reference is to the interval T which corresponds to the duration of the event a; in (56), the demonstration is basically claimed to be to the event a itself, which leads to an incoherent truth-statement, as we noted; and in (57), finally, we simply omitted the concerns of context-sensitivity. On the other hand, there are also differences as to the exact place in the truth-statement where the tense-relations occur: In (54) through (56), this ordering relation appears in the antecedent of the normal form, whereas in (60) it shows up on the right-hand side of the truth-conditional equivalence. As we mentioned before, the placement of elements in the antecedent of a Normal Form has been motivated primarily by considerations pertaining to indexicality, in the sense that the antecedent of a Normal Form offers a place for listing the parameters that enter into the context-dependent interpretation of elements occurring on the right-hand side of the equivalence which is
the consequent of the Normal Form. At a somewhat deeper level, however, the placement of the tense-relation in either the antecedent or the consequent naturally also affects the truth of the entire statement, in ways that will be discussed briefly in Section 2.4 below.

Finally, it is worth pointing out that with the last revision of the truth-statement in (57) above we have come full circle, in a sense. That is to say, in reducing the relata of the ordering relation, first from Higginbotham's tense-interval I to the time of the event $T(a)$ (cf. (58) and (59) above), and then from $T(a)$ simply to $a$ (cf. (59) and (60)), we have arrived at something very similar to the original statement of Davidson (1987b) which served as the basis for objections raised by both Weinstein (1974) and Burge (1974). Of course (57) does not correspond exactly to the truth-conditions given by Davidson (1987b), which would be as in (i):

(i) "Mary was happy" is true as (potentially) spoken by $p$ at $t$ if and only if Mary is happy [at some time] prior to $t$.

Thus, as mentioned earlier, (57) expresses a temporal ordering of events, whereas (i), of times. Furthermore, the truth-predicate of Davidson (1987b) in (i) is relativized to a speaker $p$ and an utterance-time $t$ while that of (57) is not so relativized, since it simply ignores the questions raised by indexical elements, pending their discussion in the following Section.
Section 3: Revised Truth-Conditions for Tenses

The alternative analysis of tense as pertaining to the ordering of events, rather than time, which I suggested earlier, elegantly avoids such problems as were mentioned above. The existence of events as useful elements of an explanatory theory of linguistics can be considered well-established, whereas the same can not be said about time-points and -intervals. Thus if we succeed in analyzing tense phenomena purely in terms of events, and without recourse to Times, then we've basically eliminated the need for the latter. Given this, we have simplified the theory, in the sense that a theory which explains a given range of phenomena with one primitive notion is better than another theory which employs two primitive notions in the explanation of the same range of phenomena.

If we adapt Higginbotham's Normal Forms given above in this sense, we derive a number of desirable consequences. Firstly, the tenses themselves are no longer needed in the antecedents of the Normal Forms. It suffices to represent these relations in the logical forms which are on the right-hand side of the truth-conditional statement which is the consequent of the Normal Form. Concretely, this means that the tenses themselves are part of the syntactic representation, and as such, not context-sensitive. [This will be relevant later on in our discussion of embedded tenses in Chapter Six, in the context of the relation between direct and indirect statements.

At the same time, we can keep the indexicality on which tense appears to depend; what is indexical is the reference to the axis-event. This will remain in the antecedent of the
Normal Form, where it is needed for independent reasons (i.e. because truth is predicated of it). What we will have to assume is that the utterance event defined in the antecedent clause is available in the syntactic representation. The act of reference (or alternatively, Quantifier/operator) which picks out the utterance-event must be assumed to bind into the logical form in a parallel manner to the case of the indexical pronoun \( I \) in our earlier example. If this requires adding a clause (to the antecedent) to the effect that there be an event \( e' \) such that \( e' \) is the utterance of \( S(e) \), so be it. Otherwise, we can just assume that \( u \) is directly available in logical forms.

3.1 Basic Format for Truth-Conditional Statements

If we adapt Higginbotham’s Normal Forms in the manner suggested above, we get the following general scheme, where TENSE ranges over the three ordering relations BEFORE, AFTER, and WHEN:

\[(81) \quad \text{If } u \text{ is an utterance of } \langle S \rangle \text{ and } C, \text{ then } u \text{ is true iff } (\exists a) \ [ \ S(a) \& \text{TENSE}(u, a) ] \].

The same, but more formally:

\[(82) \quad (\forall u) (\forall x) \ [ \ \text{utterance}(u, \langle S \rangle)) \& C(u) ] \implies \text{TRUE}(u) \iff (\exists a) \ [ \ S(a) \& \text{TENSE}(u, a) ]\].

Note that there is nothing indexical about tense here, except the reference to the utterance \( u \), which, however, is antecedently available for quite independent reasons.

Furthermore, note that Higginbotham’s proposal locates the differences among the three tenses in the meta-theory, whereas ours locates it in the object language. That is, since for Higginbotham the tenses themselves are indexical,
they are listed with other context-dependent elements in the antecedent of the Normal Form. (Their effects are then registered in the consequent, of the right-hand side of the truth-conditional equivalence; cf. (29) above.) In the analysis proposed here, however, the tenses are expressed and determined in the object language, in the logical form which enters into the truth-conditional statement (cf. (81) above). Not only that, the tense-relations are explicitly encoded in the syntactic representation.

3.2 PAST Tense

Given the general scheme introduced above, a past-tensed sentence such as (31) is interpreted according to (84) below.

(83) Mary was happy

(84) If $u$ is an utterance of the syntactic structure for (31) in context $\mathcal{C}$, then $u$ is true iff for some event $e$, happy(Mary,e) and AFTER($u$,e).

On the other hand, for a telic event as in (85), we get a statement that does not differ substantially from that for the atelic example above.

(85) John left

(86) If $u$ is an utterance for the syntactic structure for (86) in context $\mathcal{C}$, then $u$ is true iff for some event $e$, leave(John,e) and AFTER($u$,e).

3.3 PRESENT Tense

The present tense is handled accordingly. The Normal Form is basically the same as the one given previously for the past tense, except that AFTER is replaced with WHEN here. Our
earlier example (33) of an atelic event, as well as the telic event in (87), come out as in (68) and (69) below:

(33) Mary is happy
(67) Mary is leaving

(68) If $u$ is an utterance of the syntactic structure for (31) in context $C$, then $u$ is true iff for some event $a$, happy(Mary, $a$) and WHEN($u$, $a$).

(69) If $u$ is an utterance of the syntactic structure for (67) in context $C$, then $u$ is true iff for some event $a$, leave(Mary, $a$) and WHEN($u$, $a$).

3.4. FUTURE Tense

The future tense works analogously, in terms of the relation BEFORE, as shown:

(35) Mary will be happy

(70) If $u$ is an utterance of the syntactic structure for (35) in context $C$, then $u$ is true iff for some event $a$, happy(Mary, $a$) and BEFORE($u$, $a$).

(71) Mary will leave

(72) If $u$ is an utterance of the syntactic structure for (71) in context $C$, then $u$ is true iff for some event $a$, leave(Mary, $a$) and BEFORE($u$, $a$).
Chapter Five: Embedded Tense: Two Problems

Section 1: Sequence of Tense Phenomena

As we noted in Section 2.4 of Chapter Three above, the major deviation of the English tense-system from the normal Consecutio Temporum pattern observed earlier in Hebrew and Latin (subjunctive and infinitive) concerns the substitution of past-tensed forms for present-tensed forms in sentences which are embedded in past-tensed sentences. These irregularities in the tenses embedded in past-tensed sentences have traditionally been regarded as a kind of agreement, or concord, between tenses in matrix and embedded sentences. In the traditional grammar of Curme (1931:354), this is described as follows: "When the governing proposition has a past tense form, a past tense form usually follows whether it is suitable to the occasion or not."

Although alternative views have recently been advanced, as we will see below, the traditional view still prevails in most of the literature. It is adopted, for instance, in Ladusaw (1977) and Comrie (1985), and also in Baker (1989, Ch. 17). There, the SoT phenomenon is treated as a Past-Harmony Rule affecting the form, though not the function, of tenses embedded under past:

(1) a) In the portion of a temporal structure that lies below an 'earlier' element, replace every form predicted by the Time-Assignment principle with its corresponding past-harmonic form.  

(b) The past-harmonic version of a non-past-tense verb form is just the corresponding past-tense form.  

(Baker 1989:458)
What this view says, in essence, is that we are here looking at an irregularity in the morphology, though not the semantics, which is best handled by a minor adjustment rule at PF.

To illustrate this, SoT accounts for the unexpected past-tense form in the complement of (2) below. What John said, when he called this morning, is I am at home (right now). From the point of view of the semantics, the complement clause thus contains a present tense, expressing simultaneity of matrix and embedded events. Its past-tense marker, on the view outlined above, results from SoT agreement with the past-tense form of the matrix verb.

(2) Simultaneous Reading:
    at 10:30 am John called
    and said that he was at home (at 10:30 am)

Such irregular cases are to be distinguished from the normal cases where the complement contains a real (semantic) past tense, as in (3) below. Here, the complement event takes place earlier than the matrix event, and the past-tense marking is the result not of SoT, but of that semantic function which shifts the time of the embedded event further into the past.

(3) Shifted Reading:
    at 10:30 am John called
    and said that he was at home (at 8:00 am)

This leads to a systematic ambiguity in such sentences as (4). Depending on whether the past-tense form in the complement represents an underlying past-tense function or simply is the result of SoT on an underlying present-tense function, we get either a shifted reading or a simultaneous reading. At this moment, we are only concerned with the latter.

(2) a) John heard that Mary was pregnant
    b) John told me that he was enjoying his classes
    c) Ann said that Karen had to finish the paper
This traditional view has been disputed recently, most notably by Enç (1987, 1990), who makes an attempt at eliminating the SoT rule altogether by designing her account of tense in such a way as to predict morphological shape from meaning. She argues (1987:638) that this move is given initial plausibility by the fact that the SoT rule "... seems unconnected to any other principle of grammar ..." and that its "... only function seems to be rendering meaning opaque." Furthermore, it is "quirky" in that it does not apply to all tenses equally. Although Enç concedes that these are not arguments against the traditional view, she asserts that, at least, they "cast suspicion" on it. However, it seems to me that from an objective point of view, these observations actually work in favor of the traditional view. For aside from the lexicon, PF is the place where we would expect such erratic behavior to originate. The fact that both the remote demonstrative determiner and one of the complementizers surface at PF as that is also unconnected to other principles of grammar, and also renders meaning opaque; it is also quirky, for it does not extend to this. Likewise for morphological case-alternations, which occur with the animate pronouns he-him and she-her, but not with inanimate it-it, or with any other kinds of NPs. Furthermore, it is typical of PF to render meaning opaque. Take thematic relationships, for example, which are encoded at every level of representation except PF; and to the extent that they are represented there, such representation is highly opaque. More generally, there are only two things PF can do with meaning: either it maps it onto a phonological distinction, and thus preserves it, or else it obliterates the meaningful distinctions of other levels by mapping underlyingly distinct structures onto the same PF-representations. At any rate, PF certainly cannot make meaning more transparent than it is underlyingly. PF, after all, is the level where syntactic structure is con-
flated, and it is thus only to be expected that distinctions found at other levels of representations are lost. In sum, I think that these considerations, if anything, serve to undermine Enç's view rather than supporting it.

The main motivation for Enç's attempt at eliminating the SoT rule altogether stems from cases where the past-harmony rule apparently fails to apply, and sentences embedded under past tense surface with present-tense marking, as shown in her examples in (5) below. Since these occur side by side with the examples in (6), where SoT did apply, Enç concludes that such a rule would have to be optional, at best. In the terminology of Baker (1989:457), the non-application of the past-harmony rule is called "usurpation". In (5), for example, "the past time of the lower clause is `usurped' by the non-past time from the clause above it."

(5) a) John heard that Mary is pregnant  
    b) We found out that John knows the solution

(6) a) John heard that Mary was pregnant  
    b) We found out that John knew the solution

Baker and Enç agree that what distinguishes (5) from (6) is that in the former, but not in the latter, the state of affairs described in the complement is asserted to cover not only the time of the matrix event, but also the moment of utterance. Both illustrate the respective arrangements of times as something like the following:

(8) a) [John hear S]  
     \--------|--\----------||\----------\NOW\-----------> (time)  
     \____Mary=be=pregnant____/  

b) [John hear S]  
     \--------|--\----------||\----------\NOW\-----------> (time)  
     \____Mary=be=pregnant____/
For Baker, usurpation as it occurs in (5) above does not detract from the validity of the generalization captured the past-harmony rule. Usurpation, rather, is simply an alternative option for the linking of tenses in complex sentences. Thus, provided that the relevant times are in a configuration as shown in (8)a) above, the tense of the embedded clause is linked to the utterance instead of the super-ordinate sentence. SoT is the basic pattern for tenses embedded under past, and usurpation is a special option available if certain conditions are met. The latter is exceptional is not so much in regard to the past-harmony rule in (1) as in regard to the tense-assignment principles. Given this, the absence of past-harmony follows quasi automatically.

For Enç, on the other hand, the difference between (5) and (8) constitutes the foundation on which she builds her argument against the traditional view of SoT sketched earlier. Given that there is an interpretive difference between the pairs of sentences, so she argues (pp. 838f and again pp. 848ff), and further, given the fact that the only visible difference between the sentences lies in the tense-morphology of the complement clauses, it must be that the latter is responsible for the former. Hence, the present and past tense-markers in the complements of (5) and (6), respectively, are interpreted differently from each other; hence the past-tense form in (6) cannot be due to past-harmony; and hence there is no SoT. In Enç's own words, "The difference in interpretation [between (5) and (6)] must be due to the presence of past tense in [(8)] in contrast to [(5)], since this is the only obvious difference between the two sentences. However the correct interpretations are to be assigned, the semantics must 'see' that [(6)] has past tense in the complement. This is not possible in the Sequence of Tense approach where the complements have identical representations for the purposes of interpretation." (Enç 1987:837).
This argument, as summarized here, rests on two factual premisses and several assumptions. The facts are: (i) the sentences in (5) and (8) differ in meaning, and hence in their semantic representations; (ii) they differ in respect to one morphological feature, viz. their tense-markers. However, more than on these facts, the argument rests on the assumption that "what we see is what we get". That is to say, it depends on the assumption that the morphological difference we see in these sentences directly correlates with the interpretive difference. As things stand, however, this assumption is not quite as innocuous as it appears. For in this case, it directly concerns the question we are trying to answer: Is the past tense in the complement of (8) a case of mere harmony, as the traditional view has it, or is it meaningful, as Enç wants to argue? In the argument at hand, Enç answers this question by stipulation. It is this stipulation, that the interpretive difference "must be due" to the morphological difference, which leads to the conclusions that (a) "the semantics must 'see'" this difference, that (b) as a result of this difference, the embedded past tense in (8) cannot be the outcome of past-harmony, and that (c) there is no SoT rule. However, this is not surprising, this is circular.

Furthermore, Enç's argument does not just assume that the embedded past tense-marker in (8) expresses any old difference to (5); it crucially assumes that the past-tense marker here expresses the same semantic function it expresses in matrix clauses, and when embedded under present- and future-tensed sentences. And again, this seems questionable. For aside from the difference between (5) and (6), there remains the fact that the embedded sentence in (6), despite its past-tense marking, is interpreted as simultaneous with the matrix event (at least under the SoT-reading). And this is rather
irregular for the past-tense marker, or indeed for any tense marker.

For there are two distinct things which from the point of view of the normal Serial tense pattern are irregular about the pairs of sentences in (5) and (6). One concerns the fact that the embedded present tense in (5) relates its event to the utterance, rather than the next-higher clause. The other pertains to the fact that the embedded past-tense form in (8) expresses simultaneity with the super-ordinate event, rather than anteriority. These are distinct facts, and they ought to be discussed separately, even if they ultimately come under a common explanation. In Enç's argument, these two phenomena are treated as a single fact, as "the" difference between (5) and (8), which is then correlated with the only visible (morphological) distinction in these two sentences. However, the question we are interested in here, whether or not an SoT rule exists, actually concerns only the latter point.

Thus, a more cautious way of proceeding would be to treat these questions separately. That is, we want to assume that the difference between (9) a) and b) is due to some other factor than the difference between (10) a) and b).¹ This is suggested by the fact that even though these two phenomena overlap in the case discussed by Enç, either has a wider domain of application in areas where they do not overlap, as we will see shortly.

(9) Usurpation:
   a) John said that Mary was pregnant (the reading of (10)a)]
   b) John said that Mary is pregnant

¹ In practice, Enç (1987) does of course distinguish the two, for they receive different explanations (cf. below). It is only in her argumentation against the SoT rule that she blurs the distinction between past-harmony and usurpation.
(10) **Past-Harmony (SaT):**
   a) in May, 1989, John said [that Mary was pregnant (in May, 1989)]
   b) in May, 1989, John said [that Mary was pregnant (in 1988)]

Furthermore, as I just pointed out, Enç's argument stands only with the help of the assumption that "what we see is what we get". If we suspend this assumption for a moment, we find that there is an alternative possibility here which is equally compatible with the morphological and interpretive facts, namely the analysis suggested by Baker (1989). That is, suppose that the interpretive difference in (9) a) vs. b) is due to the fact that in the former, we have Serial tense, i.e. the embedded event is temporally related to the matrix event, while in the latter, we have Parallel tense, i.e. the embedded event is temporally related to the utterance. If so, it is the different relata of semantic tense which account for the interpretive distinction, and both (9) a) and b) can have the same semantic tense, namely present, despite the difference in form. The different morphological marking is then due to the same factor which explains the relevant interpretations, in that SaT only applies where there is Serial embedded tense.

This is the route I want to take in the following. As we will see, it leads to an analysis which is not only much simpler than Enç's, but also has greater generality, in that it also accounts for related phenomena with future tense, which are outside the scope of her analysis. More specifically, we first finish our discussion of SaT as shown in (10)a) above, and then turn to double-access readings with embedded Parallel tense, i.e. the phenomenon illustrated in (9)b), in **Section 2** below.

As Enç notices (1987:635), the application of SaT is limited to complements with stative predicates. Thus, the
sentences in (11) are ambiguous while the ones in (12) are not.

(11)  a) John heard that Mary was pregnant
      b) John knew that Mary was in London

(12)  a) the gardener said that the roses died
      b) Sally thought that John failed the test

In (11), the complements can get either a (normal) shifted reading, such that they precede their matrix events, or they can get the SoT reading of being simultaneous with their matrix events. By contrast, the sentences in (12) only have the shifted readings.

The question now is whether this is a constraint on SoT. There are good reasons for thinking that this is not so. Notice, first, that on the simultaneous interpretation, the sentences in (11) are paraphrases of the sentences in (13), which show overt present-tense marking. However, the sentences of which the examples in (12) would be paraphrases, if they had simultaneous readings, are themselves ungrammatical, as (14) demonstrates.

(13)  a) John heard: "Mary is pregnant"
      b) John knew: "Mary is in London"

(14)  a) * the gardener said: "The roses die"
      b) * Sally thought: "John fails the test"

Thus, it is not as though these were fine sentence, and for some mysterious reason SoT cannot apply to them. These are bad to begin with. The reason for this has nothing to do with tense, but rather with aspect. As described with great clarity in Baker (1989:485), it is generally impossible for non-stative verbs in English to have a punctual interpretation with simple present tense. (Though a habitual interpretation may be available in some circumstances.) This changes as soon as progressive or perfective aspect is added: the sentences
in (15) are grammatical, and the ones in (18) have simultaneous readings of their complements, and thus result from SoT:

(15) a) the gardener said:
   "The roses {are dying / have died}"
   b) Sally thought:
      "John {is failing / has failed} the test"

(18) a) the gardener said that
   the roses {were dying / had died}
   b) Sally thought that
      John {was failing / had failed} the test

Note, moreover, that the facts just discussed provide further evidence for the conclusion that past-harmonic forms in examples such as (11) and (18) indeed have semantic present tenses in their complements. For the aspectual constraint covering non-stative verbs only applies to simple present tense, but not simple past tense. This is demonstrated both by the well-formedness of sentences like John failed the test and the roses died (which cf. to (14) above!) and the availability of shifted (i.e. underlying past-tense) readings in (12). Thus, if the complements of (12) contained underlying past tenses also on the simultaneous readings, this would be quite unexpected. Hence, the unavailability of simultaneous readings in (12) is due crucially to the fact that the complements of the sentences contain semantic present tenses.

Enç's account, in contrast, cannot explain the facts just discussed.² The correlation between the unavailability of

² Enç (1987) does not discuss these matters, beyond simply mentioning (pp. 634f) the fact that only stative complements permit simultaneous readings. However, in footnote 3 she does give a hint at an explanation in terms of a syntactic constraint, which is to be found in the same ms. in which she argues that the future is not a tense, but rather a modal. This paper, to which I have not had access,
simultaneous readings in (12) and the unacceptability of simple present tense in (14) for non-stative sentences escapes her because she analyzes the cases of past-harmony in terms of a semantic past tense, rather than a present. Thus, in Enç's analysis both the simultaneous reading in (17) a) and the shifted one in b) involve a semantic past tense in the complement clause.

(17) a) in May, 1989, John said [that Mary was pregnant (in 1988)]  
b) in May, 1989, John said [that Mary was pregnant (in May, 1989)]

The difference between these two cases, Enç (1987:648f) argues, lies in the way in which the past tense in the complement is anchored. With the shifted reading given by (17)a), the complement tense is anchored through its local Comp, as shown in (18)a) below. The lower Comp is governed by the matrix verb, and hence has the entire sentence as its governing category. Thus, it must be anchored by binding. The matrix tense is a possible antecedent (as shown by co-indexation). Therefore, the lower Comp is anchored because it is bound by matrix tense; the lower tense, in turn, is now anchored because its local Comp is anchored. The result is that Compo denotes utterance time, PAST₁ some time prior to that (John's saying), Comp₁ the same time as PAST₁, and PAST₂ some time prior to that. Hence, Mary's pregnancy precedes John's saying.

(18)a) [Compo [John [PAST₁ [say [Comp₁ [Mary [PAST₂ ... = (17)a)  
b) [Compo [John [PAST₁ [say [Comp₁ [Mary [PAST₁ ... = (17)b)

The simultaneous reading in (17)b), on the other hand, is obtained via indexing as in (18)b). Given that the complement tense has a governing category, it can also be anchored by

direct binding from the matrix tense, as the indices reveal. As a consequence of this, the complement time (Mary's being pregnant) is simultaneous with the matrix time (John's saying).

In sum, Enç's analysis gives both the shifted and the simultaneous readings of past-tense forms embedded under past tense the same semantic tense function, and accounts for the difference in interpretation in terms of different relata of this tense relation. In contrast, the solution suggested by Baker (1989) gives them different tense functions, but the same relata.

Finally, the will - would alternation observed earlier for embedded future tenses also seems to fall under the same phenomenon of SoT. It visible effect, however, are somewhat different. For in contrast to the case just discussed, we have here no ambiguity. The reason for this is once again morphological in nature, just like the reason for the ambiguity with past tenses is morphological. The main morphological difference between the English past-tense and future-tense markers is that the former, like the present-tense marker, is a bound morpheme, whereas the latter is free. Thus, when an underlying present tense is embedded under a past tense, and SoT applies and copies the marker of the matrix into the complement, a conflict arises between the bound morpheme expressing the underlying present tense and the copied bound morpheme. As we saw, the latter wins out, and the semantic present tense is no longer visible. As a result, such sentences are indistinguishable morphologically from sentences with underlying past tenses in their complement, and the form of the sentence gives rise to ambiguity. With underlying future tense in the complement, however, no such conflict arises, as the future is expressed by a free morpheme; the past-tense marker copied by SoT, on the other
hand, is a bound morpheme. The two can co-exist without problems, with the former affixed on the latter.

Thus, if we take the view of Baker (1989), the sentences in (13) a) and b) can be regarded as further instances of SoT. In both cases, the embedded tense takes on the past-tense morphology of the containing sentence. And in both cases, the embedded future relates to the superordinate event. Supposing that today is Thursday, and all days mentioned are in the same week, the embedded event in a) is future only from the point of view of the matrix event, but past from the point of view of the utterance. In b), the embedded event is future in regard to both matrix and utterance events. SoT applies in both cases.

(19)a) On Monday, John said that Mary would leave on Tuesday
   b) On Monday, John said that Mary would leave on Friday

   In these cases, SoT is completely regular. On the other hand, in the sentences in (20), where we find Parallel tense instead, there appears to be the additional constraint that the embedded event take place after the utterance, as the ill-formedness of a) indicates.

(20)a) *On Monday, John said that Mary will leave on Tuesday
   b) On Monday, John said that Mary will leave on Friday

   It is not clear what Enç would say about the cases of SoT in (19) since she does not address the future, which for her is a modality, not a tense. By parity of reasoning, however, we would expect that she would claim that in (19) the modal has semantic past tense, since this what we see morphologically. Hence the sentence would express some kind of past modality. The past here could only be a simultaneous past, not a shifted past, however. For there is no reading of either sentence in (19) on which the futurity of Mary’s leaving is prior to John’s saying-event. Such a situation would not be
incompatible with the facts, e.g. if Mary's departure had been planned for a long time, but was announced by John only on Monday; however, (19) simply says nothing of the sort. The only reading available there is one where the futurity of Mary's departure is contemporaneous with John's announcement of it.

While this accords well with Baker's view, where SoT pasts are underlying present tenses (or future, in this case), it is somewhat more problematic for Enç's account. For on that view, "what you see is what you get", and the complements of (19) above contain underlying past tenses. Thus, in order to ensure that only a simultaneous reading is obtained, she would need some additional mechanisms which bear out the constraint that tense on the modal will can be anchored only via binding from the matrix past tense, but not from its local Comp (which would yield the unwanted shifted reading). There is no doubt in my mind that the mechanical aspects of this problem can be solved via the skilful manipulation of the definitions of government, governing category, etc., but that does not make the wrong approach right. The modal will would be unlike other modals in this respect: John said that he could lift 500 pounds is ambiguous, after all, between a simultaneous and a shifted reading. Thus, the exceptional behavior of the future auxiliary would have to be stipulated. This, plus the mere fact that the "past" tense of the future auxiliary is always simultaneous with a governing past tense (and it does not occur without such) ought to indicate that we have no past tense here at all.

In brief, this account for SoT with the future auxiliary is not only dubious, it is also much more complicated and less elegant than the alternative. Also from an explanatory point of view, nothing is gained by adopting Enç's account, while a number of generalizations are lost. Among these are
the facts that both Sot and what Baker calls usurpation (to be discussed in the following section) each have wider domains of application than just the common area of overlap which serves as the basis of Enc’s account, as discussed above.

Thus, Enc’s (1987) account is at a serious disadvantage as compared to the traditional view, as presented by Baker (1989) and others. We thus conclude that Sot is a low-level morphological process which copies a past-tense marker onto an embedded tense relating to the superordinate event. As such, Sot is completely regular, and has no interpretive repercussions whatsoever. We can even assume that it applies to underlying past tenses, with no ill-effects. That is to say, we lose nothing by assuming that Sot also applies in the shifted readings of embedded past-tense forms, i.e. where they represent underlying semantic past-tenses. The process is just not visible there, for the same reason that the underlying present tense is not visible morphologically with the simultaneous readings.
Section 2: Double Access Readings

We now turn to the double access phenomenon Baker (1989) (p. 457) calls usurpation, and Huddleston (1989), re-orientation. There are two main cases of it, one of which intersects to some extent with the SoT phenomenon, in that it affects semantic tense-functions embedded under past-tense forms. This concerns the examples in (38) above, which are repeated here as (21). Specifically, in (21) b), we find a regular present-tense form embedded under past tense, rather than the past-harmonic present-tense form as in a), if the time of the subordinate event is to be understood so as to include the moment of utterance.

(21)a) John said that Mary was pregnant
   b) John said that Mary is pregnant

The use of the usurped present tense in b) above not only stresses the present relevance of the embedded proposition, it also commits the speaker of the larger sentence to the truth of the embedded proposition. Thus, if I added "... but he was wrong" to b), I would be contradicting my utterance of (21)b); by contrast, no such contradiction results if I added the same comment to a), however. This is brought out more clearly, perhaps, by the following examples from Baker (1989:459).

(22)a) John told me on Sunday that Marsha did not like the plan, but she seems to have changed her mind.
   b) John told me on Sunday that Marsha does not like the plan, but she seems to have changed her mind.

The same effect can be observed in the other case where we find SoT. This concerns semantic future tense in sentences embedded in the same environment, as observed by Baker (p. 459f): "Suppose that it is now Wednesday, and that the Monday and Friday in [(23)] are in the same week:"
(23) On Monday, John told me...
   a) ... that he would come to the meeting on Friday (but
      now he's changed his mind)
   b) ... that he will come to the meeting on Friday (**but
      now he's changed his mind)

As before, we can negate the embedded clause without contra-
diction only in the case of the past-harmony case in a). With
Parallel tense as in b), the speaker is again committed to
the truth of the embedded proposition; its negation results
in contradiction.

The conclusion Baker draws here concerning the difference
between the SoT sentences in (21)a), (22)a), and (23)a) and
the corresponding b)-sentences is the following: In the a)-
sentence (where we find SoT), we have regular cases of Serial
embedded tense; that is, the tenses relate the embedded
events to the matrix event. By contrast, the b)-sentences
represent cases of Parallel embedded tense, meaning that
tense relates and embedded event directly to the utterance.
This conclusion accords well with an observation made by
Hornstein (1990a) with respect to the following examples:

(24)a) John said three days ago that Harry would leave
      in a week.
   b) John said three days ago that Harry will leave
      in a week.

In both cases, the matrix event takes place three days prior
to the utterance, and the embedded event takes place sometime
after that, as both sentences contain embedded future tenses.
In a), now, we have Serial tense (and hence SoT), meaning
that the embedded tense relates to the matrix event. Specifi-
cally, the embedded event is one week after the matrix event.
Hence John's leaving occurs four days after the utterance. On
the other hand, in b) we have PARallel tense and the embedded
tense thus relates to the utterance. Thus John's leaving oc-
curs seven days after the utterance, in this case. The sentences in (24) above correspond to the direct quotes in (25).

(25)a) John said (3 days ago): "Harry will leave in a week."
   b) John said (3 days ago): "Harry will leave in 10 days."

   Exactly the same difference as we observed between the a) and the b) sentences above can be found, though without morphological repercussions, with future-tense matrix clauses, as our next set of examples illustrates. Thus, the sentence in (28) below can be understood as a report of either the situation in a) or of that in b):

   (28) In three days, John will announce that Bill will leave in a week
   a) In three days, John will say: "Bill will leave in a week."
   b) In three days, John will say: "Bill will leave in four days."

   When understood as a paraphrase of b) above, the future of the complement in (28) relates to the utterance, not the matrix clause, and we are looking at a case of Parallel tense. Inversely, when paraphrasing a), the complement displays Serial tense, and its tense thus relates to the superordinate event. The absence of a morphological reflex in this case is not due to the choice of pattern itself; rather, it is due to (the absence of) SoT, which applies only in past-tensed environments in Serial tense configurations.

   Similarly in the following example, we find an ambiguity of the same kind. Suppose the sentence is uttered on a Wednesday. Then the Friday mentioned in the complement can be either the Friday following the utterance, with Serial tense, or the Friday preceding the utterance, with Parallel tense.
(27) On Saturday, John will tell you that he just found out on Friday
   a) On Saturday, John will say: "I just found out yesterday."
   b) On Saturday, John will say: "I just found out yesterday a week ago."

As these examples show quite clearly, the phenomenon of usurpation has a much wider domain of application than that of SoT discussed in the preceding section. This fact alone serves to invalidate Enç's approach to the latter phenomenon.

The difference between the Parallel-tense variants in the b)-sentences and the Serial-tense versions in the a)-sentences of (21) through (27) above is a reflex of the same distinction which governs the difference in Latin between indicative and subjunctive (or infinitival) tense. There, too, only the latter exhibit Consuetio Temporum, whereas the former relates to the utterance. If this were Latin, we would say that the b)-sentences represent external dependency, and the a)-version internal dependency. That there is such a distinction in the English data above is further suggested by the fact that only the b)-sentences above can be paraphrased by conjoined statements of the sort given below. Take our earlier example (21) above, which is repeated in (28). Here, only the usurped version in b) is synonymous with (29) below.

(28) a) John said that Mary was pregnant = (9), (21)
    b) John said that Mary is pregnant

(29) Mary is pregnant, and John said so/announced that.

And similarly for the other examples in (22) through (27), only the b)-sentences are paraphrased by the sentences in (30).

(57)a) Marsha does not like the plan, and John told me that/so on Sunday. **But now she seems to have changed her mind. (22)b)
b) John will come to the meeting on Friday; he told me that/so on Monday. **But now he seems to have changed his mind.

(23)b)
c) Harry will leave in a week, and John said so/announced that three days ago.

(24)b)
d) Bill will leave in a week, and John will say so/announce that in three days.

(28)b)
e) John found out last Friday, and he will tell you that on Saturday.

(27)b)

This thus seems to indicate that the external dependency of complements having usurped tense is one of conjunction, semantically. The proposition expressed by the complement clause is attributed to the speaker, as well as the subject of the main clause. As we noted earlier, the speaker is committed to its truth-value, in the sense that its negation leads to contradiction (cf. (22) and (23) above).

Furthermore, there appears to be a constraint to the effect that the speaker and subject of the sentence to whom the complement proposition is attributed be "same-sayers", in the sense of Davidson (1988). That is to say, in a sentence such as (31) below, both John and I must severally assert the proposition *Mary is in town this week*.

(31) John said that Mary will be in town this week.

It is interesting to note what counts as "the same proposition" in this regard. In my indirect report of the proposition I attribute to John in (31) I may substitute referring expressions to coreferential terms, including expressions referring to points and intervals in time. Thus, John may have actually said "my wife" or "the woman that I love", etc., or simply "she", where I use "Mary" in my report. Similarly, the actual utterance by John of the proposition I here attribute to him may have included the temporal adverbial "next week" where I have "this week", or he may have said "the last week of August", etc., depending on when
exactly he made that utterance. All of this still counts as
John and I having asserted the same proposition.

This changes radically, however, as soon as we differ in
terms of the tense used. Suppose John said (32a) yesterday,
and that it is now 12 o'clock on the following day, and John
is indeed in my office. In this case, I cannot report John's
sentence as in b), for that is not what John said. His sen-
tence included a future tense. Thus, I must use the Serial
(cum SoT) version in c). It is also impossible for me to say
d), though for different reasons. If John is already here, I
cannot say that he will be here without violating the Gricean
maxims governing the maximal informativeness of my utterance.

(59)a) "I will be in your office at noon tomorrow"
    b) #John said that he is in my office at noon today
    c) John said that he would be in my office at noon today
    d) #John said that he will be in my office at noon today

Similarly in (35) with different tenses. If the state of
affairs is as in a), then John and I cannot be same-sayers of
b). From my point in time, the use of the future tense used
by John is illicit. Again, the Serial construction in c) must
be used here. Finally, d) is out, once again, because it does
not accurately report what John said; hence we are not same-
sayers.

(33)a) a week ago, John predicted: "Mary will arrive
    in two days"
    b) #John predicted that Mary will arrive in two
days, and she did
    c) John predicted that Mary would arrive in two
days, and she did.
    d) # John predicted that Mary arrived {in two
days / five days ago}, and she did

This constraint is interesting in its own right, no
doubt. However, it would lead us too far afield to inves-
tigate it in greater depth, which is why we leave matters at
this point. For our purposes, it is sufficient to note that
in addition to the Serial tense construction, English also has what Baker calls *usurpation*, where an embedded clause is temporally related to an utterance. The exact distributions of these two constructions will be of no concern to us in the following.

Basically the same constraint was observed by Ogihara (1989), who calls it temporal isomorphy constraint. What goes uncaptured in his framework, however, is that this is just a special case of the more general same-saying constraint on indirect discourse sentences, described in Davidson (1988).

Summarizing our discussion of the double access and SoT cases, we can represent the three crucial cases as in (34), (35), and (38) below:

(34) **Past-Tense with Shifted Reading**

a) John said Mary was happy

b) John say-PAST [ Mary be-PAST happy ]

\[ u < \quad \text{bridle} \quad \]

(35) **Past-Tense with Simultaneous Reading**

a) John said Mary was happy

b) John say-PAST [ Mary be-PRESENT happy ]

\[ u < \quad \]

(38) **Present-Tense with Double-Access Reading**

a) John said Mary is happy

b) John say-PAST [ Mary be-PRESENT happy ]

\[ u < \quad \quad \]

Here, the first two represent patterns of Serial Tense. If the preceding discussion was on the right tack, then the Parallel pattern in (38) can be simplified to (37).

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3 The arrows are meant to indicate that the tense at the end of an arrow is construed with respect to the time (or event) at the head of the same arrow.
(37) John say-PAST [ Mary be-PRESENT happy ]

That is, the so-called double access reading is in reality just a "single access" reading. That is, the present tense in the complement is interpreted relative to the moment of my utterance of (37); hence it is primarily present with respect to me. The fact that it is also interpreted as present from the point of view of the event of John's saying derives not from the nature of the tense, but simply from the fact that the (present) tense relation John used in his actual utterance of Mary is happy is the one I have to report, in order to be same-sayers with John.
Bibliography


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Fillmore, Charles J. (1971): Lectures on Deixis. Given at the University of California at Santa Cruz.


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Heinämäki, Orvolli (1972): "Before." CLS 8, pp. 139-151.


Higginbotham, James (1991): Either/Or. ms. Massachusetts Institute of Technology. (Earlier versions of this paper have circulated since 1987.)


Kaplan, David (1977): Demonstratives. Ms., UCLA.


Larson, Richard & Peter Ludlow (1990): Interpreted Logical 
Forms. Ms., SUNY Stony Brook, N.Y. (Draft of 7/19/90)

Leech, G.N. (1970): Towards a Semantic Description of 
English. Bloomington, Indiana, Indiana University 
Press.

London, U.K.

Levin, Beth (1985): "Lexical Semantics in Review: An Intro-
duction." In: B. Levin, ed., Lexical Semantics in 
Review. MITWPL I, pp. 1-62.

Lewis, David (1975): "Adverbs of Quantification." In: Keenan, 
E., ed., Formal Semantics of Natural Language, pp. 3-

Lewis, David (1979): "Score-Keeping in a Language Game." In 
A. Bäuerle et al., eds., Semantics from Different 
Points of View. Springer Verlag, Berlin, Germany.


New York, Oxford University Press.


Studies in Linguistic Semantics, pp. 98-113. Holt, 
Rinehart and Winston, Inc., New York, N.Y.

McCawley, James D. (1978): Syntax and Semantics 7: Notes from 
the Linguistic Underground. Academic Press, New York, 
N.Y.

McCawley, James D. (1988): "Adverbial NPs: Bare or Clad in 
See-Through Garb?" Language 54, Nr. 3, pp. 583-90.

Mittwoch, Anita (1977): "Negative Sentence with Until." CLS 
13, pp. 410-17.


Séguin, Margaret (1973): "The Interaction of 'Jôb Têk' ('Until') and NEG in Hindi (or: Did the Students Make Noise Until the Teacher Didn't Come?)." CLS 9, pp. 597-602.


