Time in Natural Language

Interface Explorations 11

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Time in Natural Language

Syntactic Interfaces
with Semantics and Discourse

by

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To my mother Mary Lally Thompson
for her love of books and ideas

I was a hidden treasure and I wished to be known,
and so I created the worlds that I might be known.

Hadith Qudsi

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Chapter 1
Time in Natural Language

1.1 Introduction

This book is concerned with the linguistic representation of time. Temporal distinctions may be marked in a language by morphology on the verb. For example, the past tense sentence in (1) indicates an event that occurs in the past relative to the time at which the sentence is spoken, represented by the past tense morphology *-ed* at the end of the verb.

(1) *The police arrested the robber.*

While inflectional morphological marking on the verb is one way in which langauges express temporal meanings, we may inquire whether these notions are expressed in the syntactic structure of the sentence as well. An influential claim of recent work on time in natural language in the generative tradition of linguistic theory is that natural language specifies temporal notions in the structure of sentences according to the constraints of Universal Grammar.

The linguistic effects of temporal interpretation may not seem obvious when examining a language such as English, which exhibits little inflectional morphology. Several examples, however, illustrate the effect of temporal interpreation on the structure and meaning of sentences. Consider (2a) and (2b). (2a) can have a meaning where Mary's leaving takes place at 2:00, or a meaning where it takes place sometime before 2:00. However, when the temporal adverbial appears at the beginning of the sentence, as in (2b), it can only mean that Mary's leaving takes place sometime before 2:00.

(2) a. *Mary had left the store at 2:00.*
b. *At 2:00, Mary had left the store.*

Another example of the sort that I will be concerned with in this book is provided in (3). (3a) is temporally ambiguous; the matrix event of seeing is interpreted as taking place either before the time of claiming or before the time of arriving. However, this ambiguity is lost in (3b), with the temporal adjunct clause in initial position; it can only have the meaning where the event of seeing is interpreted as taking place before the time of claiming.

(3) a. *John saw Mary in New York before she claimed that she would arrive.*
b. *Before she claimed that she would arrive, John saw Mary in New York.*

A third example of how temporal interpretation is dependent on syntax is provided in (4). (4a) is ambiguous; it can be interpreted with the waiting taking place at the time of storming into the room, or with the waiting occurring at the time at which the sentence is uttered. However, the existential construction version of (4a) in (4b) does not permit the second reading; (4b) can only be interpreted with the waiting occurring at the time of storming into the room.

(4) a. *Three passengers waiting for the flight stormed into the room.*
b. *There stormed into the room three passengers waiting for the flight.*

The interpretation of tense across sentences is also influenced by the structure of the sentence. In (5a), where *then* occurs at the end of the second sentence, the event of dropping by John's house is interpreted as occurring at the same time as Mary's going to the bank. (For example, Mary drops by John's house on her way to the bank.) However, in (5b), where *then* occurs at the beginning of the second sentence, the event of dropping by John's house is interpreted as occurring after the event of going to the bank.

(5) a. *Mary will go to the bank. She will drop by John's house the*
b. *Mary will go to the bank. Then she will drop by John's house.*

Whether the event of a sentence is viewed as having a definite end point or as unfinished affects the syntactic processes of the sentence. Notice that Prepositional Phrases such as "for three hours" which measure the duration

of an event, allow a question with stranding of the preposition, as in (6a). However, as shown in (6b), the same construction is not permitted with a prepositional phrase such as "in three house", with provide an end point to an event.

(6) a. *How many hours did you push that cart for?*
b. **How many hours did you read that book in?*

Aspectual verbs in English show a similar effect with extraction. Aspectual verbs describing the beginning of an event allow extraposition from subject position, as seen in (7a), while those describing the middle or the end of an event do not permit extraposition, as shown in (7b) and (7c).

(7) a. *A lecture started on anaphora.*
b. **A lecture continued on anaphora.*
c. **A lecture finished on anaphora.*

The broad goal of this book is to provide an analysis of the structure of time which accounts for the systematic correlation between the temporal meaning and structure of sentences, exemplified in examples such as (2)–(7). I will argue that the explanation for this correlation is that syntactic locality constrains the interpretation of time in natural language.

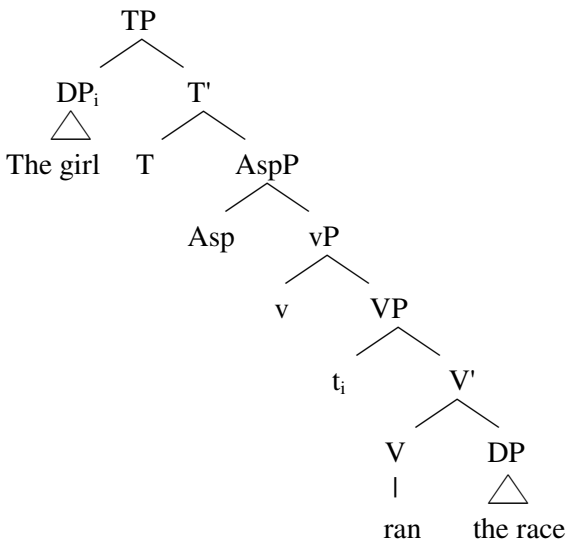
1.2 Syntactic Framework

I assume the Minimalist Approach to syntactic theory of Chomsky (1995, 2000, 2001) and I presuppose familiarity of the reader with this theory. (For introductory discussion of Minimalism, see Uriagereka 1996; Radford 1997, 2004; Lasnik, Uriagereka, and Boeckx 2004 and Hornstein, Nunes, and Grohmann forthcoming.)

The general structure of the clause that I adopt in this work is as exemplifed in (8).

(8) a. *The girl ran the race.*

b.



1.3 Semantic Framework of Tense

1.3.1 Reichenbach (1947)

I assume a Reichenbachian approach to the semantic representation of tense, where tenses are composed of three times: the Event time, the Speech time, and the Reference time (Reichenbach 1947). This system is illustrated in (9), repeated from (2b), where the Event time is the time of Mary's leaving, the Reference time is the time by which Mary leaves (in this sentence, 2:00), and the Speech time is the time at which the sentence is uttered.

(9) *At 2:00, Mary had left the store.*

Following Hornstein's (1990) neo-Reichenbachian approach to tense, the structures of the basic tenses of English are as in (10), where tenses are composed by linearly ordering the three times. If two times are separated by a line, the leftmost time is interpreted as temporally preceding the other time, an dif two times are separated by a comma, they are interpreted as contemporaneous.[1]

(10)	S , R , E	present	E _ S , R	present perfect
	E , R _ S	past	E _ R _ S	past perfect
	S _ R , E	future	S _ E _ R	future perfect

To illustrate this system, notice that in the tense structure of the simple future tense in (10), the Event time occurs linearly, and hence temporally, after the Speech time. This is the correct temporal interpretation for a future tense sentence, as shown in (11), where the event of buying takes place after the Speech time, when the sentence is uttered.[2]

(11) *John will buy a car.*

1.3.1.1 Times as Semantic Features

Within the Minimalist framework, times may be conceived of as features associated with particular lexical items. These features may be either syntactic or semantic. Chomsky distinguishes between 'uninterpretable' syntactic features, which must be checked and deleted, and 'interpretable' features, which need not be deleted, and therefore need not enter into checking relations. If times were syntactic features, we thus would expect that the syntax of tense would potentially involve checking of these features, and hence movement (overt or covert). However, the syntax of tense does not seem to involve displacement for checking.[3] Therefore, I assume that times are semantic features.

1.3.2 Syntax of Tense

Recent work on the syntax of tense shows that there is a principled relationship between the meaning and phrase structure representation of tense (Hornstein 1977, 1981, 1990; Gueron and Hoekstra 1988; Zagona 1988, 1990; Giorgi and Pianesi 1991, 1998; Stowell 1993). Assuming that times are represented as semantic features on lexical items, what is relevant to syntax is which lexical items the three times are associated with. I claim here that by postulating a one-to-one mapping between times and lexical items, we can account for the correlation between the morphology and the semantics of tense.

The tense morphemes of English, which I assume are associated with the head of TP, order the Reference time in the tense structure with respect to the Speech time. For example, the past tense morpheme *-ed* orders the Reference time before the Speech time, as exemplified in (12a–b), while the future tense morpheme *will* orders the Reference time after the Speech time, as in (13a–b). I thus follow Hornstein (1990) in associating the Speech time with Infl, and, in particular, I claim that it is a semantic feature associated with the head of TP.

(12) a. *Mary swatted the fly.*
b. E , R _ S (past tense structure)

(13) a. *Mary will swat the fly.*
b. S _ R , E (future tense structure)

The aspectual morpheme of English *have* orders the Event time with respect to the Reference time; the presence of *have* orders the Event time as preceding the Reference time, as in (14a–b), and the absence of *have* orders the Event time as simultaneous with the Reference time, as in (12a–b), repeated in (15a–b).

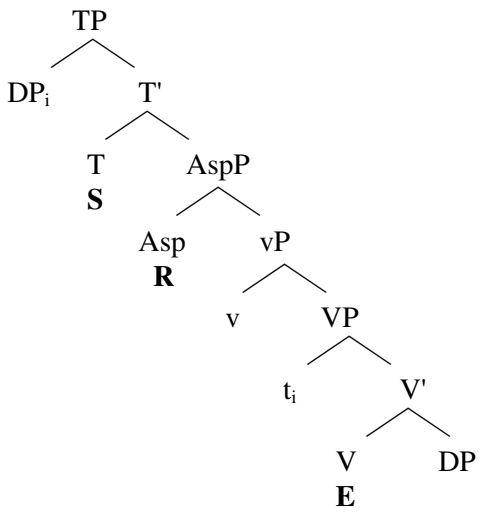
(14) a. *Mary had swatted the fly.*
b. E _ R _ S (past perfect tense structure)

(15) a. *Mary swatted the fly.*
b. E , R _ S (past tense structure)

Therefore, it is natural that the Reference time be represented as a semantic feature associated with the head of Aspect Phrase (AspP), which I assume is positioned between TP and VP.

Times are thus associated with syntactic heads in the following way: the Event time is a semantic feature associated with V, the head of VP, the Speech time a feature associated with T, the head of TP, and the Reference time a feature on Asp, the head of AspP, as in (16).[4,5]

(16)



1.4 Semantic Framework of Aspect

Tense is traditionally understood to be the grammaticalized location of events in time, while aspect referes to the internal temporal contour of an event. Much semantic work on aspect assumes the Vendlerian classification of events into the four classes in (17a–20a), with an example of each in (17b–20b) (Vendler 1967).

(17) a. Accomplishments – events which have a duration and a definite end point
b. *Mary drew the circle.*

(18) a. Achievements – events which have a definite end point, but which are instantaneous
b. *Mary found the treasure.*

(19) a. States – events which are ongoing in time
b. *Mary knew French.*

(20) a. Activities – processes or 'happenings' which are ongoing in time
b. *Mary pushed the cart.*

Vendler claimed that it is the verb that determines aspectual class. However, as has been discussed by many authors, the aspectual classification of events is also influenced by the verb's arguments, as well as by adjunct PPs, morphological distinctions such as perfect–imperfect, etc. (Dowty 1979; Tenny 1987, 1994, etc.).

The sentences in (21a–i) illustrate the compositional nature of aspect. As is shown by their compatibility with the PPs *in an hour* and *for an hour,* (21a) is telic; interpretted as having a distinct, definite and inherent end point, and (21b) is atelic; interpretted as ongoing in time. These examples illustrate the influence of the direct object on telicity; a bounded verb in combination with a definite noun phrase direct object, which is bounded, results in a telic reading, while the same verb with a bare plural direct object, which is unbounded, results in an atelic reading.

(21) a. *John built the house in a week / *for a week*
b. *John built houses *in a week / for a week*
c. *John was building the house *in a week / for a week*
d. *John walked *in two hours / for two hours*
e. *John walked to the store in two hours / *for two hours*
f. *John walked toward the store *in two hours/for two hours*
g. *John walked to stores *in two hours / for two hours*
h. *John watched the house until 3:00.*
i. *John loved Mary until last year.*

As seen in (21c), the use of the progressive results in an atelic reading. The progressive marker thus does not have the feature [bounded], while other aspect markers compatible with telic readings have this feature. This is natural, given that many languages have aspectual morphemes which encode telicity distinctions, including the widely-studied aspectual systems of the Slavic languages (see Brecht 1984; Smith and Rappaport 1991 and references therein). In the Russian example (22a), the verb *eat* with the perfective morpheme results in a telic reading, while in (22b), the verb without the perfective morpheme results in an atelic reading (examples from Smith and Rappaport 1991: 315).

(22) a. *Ja s"el mjaso.*
I PERF-ate meat
'I ate the meat.' (telic)

b. *Ja el mjaso.*
I ate meat
'I was eating the meat.' (atelic)

The contrast between (21d) and (21e) shows that the addition of a goal phrase to an atelic event can result in a telic reading; *to the store* specifies a locative end point to the event by "defining a Path that terminates at the Thing or Place that serves as its argument" (Jackendoff: 36). Goal PPs thus have the feature [bounded] and combine with the bounded Asp head and bounded verb to result in a telic reading.

(21f) shows that the [bounded] feature of the goal PP is itself compositionally derived − the preposition must be bounded in order to result in a telic reading; *toward* only defines a Path but does not specify an end point, and is therefore unbounded. (21g) illustrates that the object of the preposition also plays a role; if the object is unbounded, the whole PP is unbounded, and can not contribute to a telic reading.

Example (21h) shows that the addition of an *until* phrase to an atelic event can also result in a telic reading; *until* "is a function that bounds an unbounded event...with a time..." (Jackendoff: 18). (21i) illustrates that statives, which are often considered incompatible with telic readings, can be telic with an *until* phrase; the [bounded] feature of the PP combines with the [bounded] features of the Asp and V to derive a telic reading.

1.4.1 Jackendoff (1991)

Given that aspect seems to be determined by several different elements, much recent work has claimed that the primitives of aspect are not the aspectual classes of Vendler, but that aspect is rather the result of the combination of features of the verb, noun phrases, PP adjuncts, etc. (Verkuyl 1972, 1989, 1993; Pustejovsky 1991; Jackendoff 1991; Zagona 1993).

I follow Jackendoff (1991), who argues that telic events have the feature [bounded] while atelic events do not have this feature; an entity is bounded if it is conceptualized as having a clear boundary in time and/or space (see also Verkuyl and Zwarts 1992).[6] For example, individuals are bounded by having a particular shape, while portions of matter are not bounded in time or space. The direct object of (23) is an example of a temporally bounded DP.

(23) *The students performed the play.*

A key feature of Jackendoff's analysis is that the feature [bounded] applies to DPs, Vs, and PPs. This approach makes possible a unified explanation for the role of the direct object and adjunct PPs in determining the telicity of the event, in terms of the contribution of the feature [bounded].

1.4.2 Syntax of Aspect

I propose that a feature-based analysis of contrasts such as (2la–b) is made available in terms of feature checking; events with a definite end point such as the one in (21a) involve interpretation of the verb and either a bounded direct object or a bounded PP in the checking domain of AspP, whereas events with no end point specified such as the one in (21b) involve interpretation in a projection lower in the clause than AspP.

Evidence for this syntax comes from langauges which show overt syntactic differences depending upon aspectual interpretation, such as Scottish Gaelic. In (24a), VO order results in an atelic reading, whereas in (24b), OV order results in a telic reading (examples from Ramchand 1992: 415); see chapter 6 for discussion.

(24) a. *Bha Calum a' faicinn a'bhalaich*
Be-PAST Calum PROG see-VNOUN the boy-GEN
'Calum was seeing the boy.' (atelic)

b. *Bha Calum air am balach (a) fhaicinn*
Be-PAST Calum PERF the boy-DIR 'a' see-VNOUN
'Calum had seen the boy.' (telic)

1.5 Organization of the Book

The book is organized as follows: in chapter 2, I propose an analysis of the syntax of tense according to which the temporal information of a clause is represented syntactically not only by TP (Tense Phrase) but throughout the structure of the clause. Assuming that tenses are composed of Reichenbachian Event, Reference and Speech times, I argue that the Event

time is represented in VP, the Reference time in AspP, and the Speech time in TP.

I provide evidence for this analysis from the syntax and interpretation of temporal PP adverbs such as *at 5:00*. A temporal adverbial which modifies the Event time is argued to be adjoined to VP, and a temporal adverbial which modifies the Reference time to be adjoined to AspP. This proposal is shown to explain the behavior of temporal adverbials in coordination and preposition stranding constructions, as well as linear order restrictions on their occurence. VP constituency tests, including pseudoclefting, remnant questions, *though*-movement, and VP fronting, further support the analysis. Interaction between temporal adverbials and the scope of the direct object, sentential negation, and sentential and manner adverbs is accounted for. In addition, the semantics of clause-initial temporal adverbials is explained on the current analysis.

In chapter 3, I discuss the syntax of temporal adjunct clauses. I argue that temporal adjuncts are located in different positions in the clause, depending on their temporal interpretation; adjunct clauses interpreted as simultaneous with the matrix event are adjoined to VP, and those interpreted as nonsimultaneous with the matrix event are adjoined to an inflectional projection. Evidence for this analysis is discussed from constructions involving long-distance temporal interpretation and ellipsis constructions.

In chapter 4, I explore the temporal syntax of gerundive relatives in subject position, showing that reflexes of the syntax of tense are evident in the interpretation site of subjects at LF. The temporal interpretation of gerundive relatives is claimed to be ambiguous between being dependent on the Event time of the main clause, or being dependent on the Speech time of the main clause. Given the claim that the Event time is represented in VP, I propose that a gerundive relative in subject position which is interpreted with respect to the Event time correlates with a VP-internal interpretation of the subject. Since the Speech time is associated with TP, when the gerundive relative is interpreted with respect to the Speech time, the subject is interpreted in Spec, TP. Evidence for this claim is discussed from constructions involving coordination, existential *there*, scope of quantificational adverbs and cardinality adverbials, and extraposition. In addition, I show that the peculiar lack of binding-theoretic anti-reconstruction effects in gerundive relatives is explained on this analysis. Also accounted for is the contrast in extraposition constructions between gerundive and full relatives.

Chapter 5 turns to a discussion of the representation of tense at the discourse level, focusing on the behavior of the temporal adverb *then* in discourse. I provide an analysis which shows that the discourse representation of tense is based on the same primitives and principles as the syntactic representation of tense. I argue that the analysis of tense proposed in chapter 2 explains a correlation between the position and meaning of *then*; when *then* occurs in clause-final position, the event of the clause with then is interpreted as cotemporal with a previous event, whereas when *then* occurs in clause-medial or clause-initial position, the event of the clause is interpreted as occurring after a previous event. I claim that clause-final *then* is adjoined to VP, and involves linking of the Event time of its clause with the Event time of the previous clause, deriving the cotemporal reading. Clause-medial *then*, on the other hand, is adjoined to AspP, and hence involves linking of the Reference times of tense structure, deriving the ordered events reading (clause-initial position is derived from medial position). Evidence for this analysis of *then* comes from the parallel temporal patterning of temporal adjunct clauses, as well as the behavior of *then* with perfect tenses. This account also explains the interaction of *then* with futurate readings of present tense and infinitival clause constructions.

Chapter six provides an investigation of aspectual phenomena, showing that the theory developed thus far in order to account for tense phenomena also extends to explain generalizations from the aspectual domain. In particular, I argue that there is evidence for the claim that the Event time is represented in VP and the Reference time in AspectP from structures involving aspectual interepreation. Events with a definite end point involve interpretation of the verb and either a bounded direct object or a bounded PP in the checking domain of AspP, whereas events with no end point specified involve interpretation in a projection lower in the clause than AspP. Evidence for this claim comes from the syntactic distribution of the ambiguous adverb *quickly,* which can modify either the manner or the end point of an event. I argue that when *quickly* modifies the manner, it is adjoined to VP, and when it modifies the end point, it is adjoined to AspP. This approach explains certain linear order restrictions and preposing facts involving *quickly.* I investigate the syntax of durative and time frame adjuncts, arguing that, depending on whether the adjunct modifies the duration or the end point of the event, it is adjoined to VP or to AspP. Data involving preposition stranding, scope of *only*, and parasitic gap constructions supports this approach. In addition, it is argued that

extending Diesing's Mapping Hypothesis (Diesing 1990, 1992) to the interpretation of the objects of adjunct PPs explains a restriction on the interpretation of the objects of time frame adjuncts.

The final chapter presents an anlysis of the syntax and semantics of aspectual verbs. According to the approach developed in chapter 6, a telic interpretation is syntactically realized by a bounded V being interpreted inside AspP, along with another bounded XP in AspP. I argue that aspectual verbs indicate that the beginning of the event is structurally represented in VP, and the continuation and end of the event are represented outside of VP, in the inflectional projections. Evidence for the analysis comes from the syntax of focus constructions, existential constructions, extraposition constructions, as well as the interpretation aspect with quantifier scope ambiguities.

Notes

1. Note that the tenses that are realized in English are a subset of the possible tenses. Within this system, there are sixteen possible tenses, with different languages realizing different options (see Hornstein 1990 for discussion):

(i)				
	Present	S , R , E	Present Perfect	E _ S , R
		S , E , R		E _ R , S
		R , E , S	Past Perfect	E _ R _ S
		E , R , S	Future Perfect	S _ E _ R
	Past	E , R _ S	Distant Future	S _ R _ E
		R , E _ S	Future in Past	R _ S , E
	Future	S _ R , E	Proximate Future	S , R _ E
		S _ E , R		R , S _ E

2. Note that in the tense structures of (2), the simple as well as the complex tense structures include a Reference time. We will see evidence for this claim from the distribution of temporal adverbial PPs in section 2.5, as well as from the structure and meaning of temporal adjunct clauses in chapter 3, and the syntax of temporal discourse connectives in chapter 5.
3. This fact about the syntax of tense is supported by an acquisition experiment with a language savant named Christopher, who is cognitively impaired but displays unusual speed in learning new languages (see Smith and Tsimpli 1995). Smith and Tsimpli attempted to teach Christopher an invented, SVO language, in which the past tense was formed by attaching a morpheme to the

verb and moving the direct object to the front of the sentence, deriving OSV order.

Christopher failed to learn this construction; he consistently produced SVO order for past tense sentences. It thus seems that a process of past-tense formation involving movement of the object is linguistically unlearnable. This is expected if tense does not involve checking of features.

4. It is probable that there are additional functional projections in the clause structure; I provide here only the structure that is important for the present discussion.
5. I assume that precedence and contemporaneity are primitive relations of the semantics and are not represented as semantic features associated with lexical items.
6. Jackendoff assumes the features [+bounded] and [-bounded], while I use only the feature [bounded]; an element not specified with that feature is unbounded.

Chapter 2
The Structure of Time Adverbials

2.1 Introduction

In this chapter, I introduce a structure for tense whereby the temporal information of a clause is represented throughout the structure of the clause, in TP, AspP, and VP. I present evidence for this analysis from the syntax and interpretation of temporal PP adverbials which, depending on their position, modify different parts of the tense structure of a clause.

I begin this chapter in section 2.2 with an overview of the semantic approach to tense that I adopt here, that of Reichenbach (1947). According to this theory, tenses are composed of three times: Event, Reference, and Speech times. I propose that these times are represented as semantic features associated with different lexical heads; the Event time with V, the Reference time with Asp, and the Speech time with T. Thus, the Event time is represented in VP, the Reference time in AspP, and the Speech time in TP, as discussed in section 2.3. In section 2.4, I turn to a discussion of the locality restriction on adverbial modification. I demonstrate that a Minimalist approach to the syntax of adverbials provides a natural way of defining this restriction.

Section 2.5 shows how the theory of tense and the restriction on adverbial modification proposed here combine to provide an analysis of the ambiguity of temporal adverbials; depending on their adjunction site, temporal adverbials modify either the Reference or the Event time of the clause. Evidence for this structural account of the ambiguity of temporal adverbials is presented from linear order facts in section 2.6, from coordination data in section 2.7, and from preposition stranding in section 2.8.

Section 2.9 presents data involving VP constituency tests, including pseudoclefting, *though*-movement, and VP fronting, in the light of this analysis. This analysis is also shown to explain structural asymmetries between the direct object and temporal adverbials, in section 2.10, and between sentential negation and temporal adverbials, in section 2.11.

Section 2.12 offers an analysis of the interaction of temporal adverbials with sentential and manner adverbials. In section 2.13, I show that the pre-

sent analysis accounts for the fact that clause-initial temporal adverbials unambiguously modify the Reference time. An ambiguity with durative adverbials in the present perfect tense is shown to be accounted for on this approach in section 2.14. Section 2.15 argues in favor of the adjunction analysis of temporal adverbials adopted in this chapter, in contrast to recent non-adjunct analyses of temporal adverbials.

2.2 Semantic Framework

Recall from chapter one that according to Reichenbach's theory, tenses are composed of three times: the Event time, the Speech time, and the Reference time (Reichenbach 1947). In (1), the Event time is the time of Bill's finishing his work, the Reference time is the time by which Bill finishes his work (in this sentence, six o'clock), and the Speech time is the time at which the sentence is uttered.[1]

(1) *At six o'clock, Bill had finished his work.*

Hornstein's (1990) neo-Reichenbachian approach to tense proposes structures for the basic tenses of English as in (2).

(2)	S , R , E	present	E _ S , R	present perfect
	E , R _ S	past	E _ R _ S	past perfect
	S _ R , E	future	S _ E _ R	future perfect

2.3 A Syntax for Tense

Following the claim in recent work on the syntax of tense that there is a principled relationship between the meaning and phrase structure representation of tense (Hornstein 1977, 1981, 1990; Gueron and Hoekstra 1988; Zagona 1988, 1990; Giorgi and Pianesi 1991, 1998; Stowell 1993), and assuming that times are represented as semantic features on lexical items, what is relevant to syntax is which lexical items the three times are associated with. I claim here that by postulating a one-to-one mapping between times and lexical items, we can account for the correlation between the morphology and the semantics of tense.

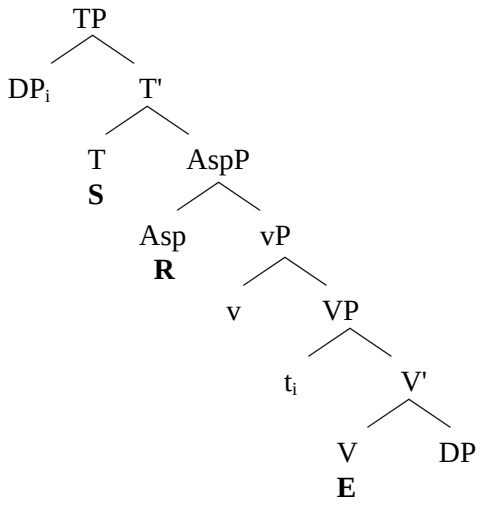
The tense morphemes of English, which I assume are associated with the head of TP, order the Reference time in the tense structure with respect

to the Speech time. I thus follow Hornstein (1990) in associating the Speech time with Infl, and, in particular, I claim that it is a semantic feature associated with the head of TP.

The aspectual morpheme of English *have* orders the Event time with respect to the Reference time; the presence of *have* orders the Event time as preceding the Reference time and the absence of *have* orders the Event time as simultaneous with the Reference time. Therefore, the Reference time is represented as a semantic feature associated with the head of Aspect Phrase (AspP), which I assume is positioned between TP and VP.

Times are thus associated with syntactic heads in the following way: the Event time is a semantic feature associated with V, the head of VP, the Speech time a feature associated with T, the head of TP, and the Reference time a feature on Asp, the head of AspP, as in (3).

(3)



2.4 The Syntax of Adverbials

In this section, I turn to a discussion of the locality restriction on adverbial modification. I demonstrate that a Minimalist approach to the syntax of adverbials yields a natural formulation of this restriction.

2.4.1 The Locality of Adverbial Modification

It has been observed that adverbial modification is subject to a strict locality condition (see Zubizarreta 1987; Uriagereka 1988; Sportiche 1988; Hornstein 1990 for formulations of this condition). An example of this locality requirement is provided in (4). Although the adverb *quickly* has c-command scope over the embedded VP in (4a), it can only modify the matrix VP; only the event of saying can be interpreted as occurring quickly, not the event of giving a speech. (4a) cannot mean what (4b) means examples based on Hornstein 1990: 168).

(4) a. *John said quickly that Bill gave a speech.*
b. *John said that Bill quickly gave a speech.*

Uriagereka (1988: 208) formulates this locality requirement in terms of government. The restriction in (5) explains why in (4a) *quickly* can only modify the matrix event; *quickly* governs only the matrix VP, and not the embedded VP.[2]

(5) Condition on Adverbial Modification: An adverbial must govern the element it modifies

Interpreting this locality restriction within the Minimalist framework, where government does not play a role, we can formulate this requirement using the notion of modification domain in (6), which makes use of the definition of checking domain of Chomsky 1995, chapter three:178. Thus, the adverb *quickly* in (4a) is in the modification domain of the verb *said*; and thus modifies the main predicate, whereas *quickly* in (4b) is in the modification domain of *gave* and therefore modifies the embedded predicate.

(6) a. Condition on Adverbial Modification: An adverbial must be in the same modification domain as the element that it modifies

b. Modification Domain: the modification domain of (a head) α is the minimal residue of α[3].

I assume that adjuncts enter the derivation freely in the construction of the phrase marker, so that temporal adverbials may adjoin to any phrase before

SPELLOUT; they modify the time located in the head of the phrase that they are adjoined to.[4]

2.5 Syntax of Temporal Adverbials

Temporal adverbials have been analyzed as sentential and as verb phrase constituents. Chomsky (1965), Dresher (1976), and Hornstein and Weinberg (1981) argue that temporal adverbials are associated to S (IP), while Jackendoff (1972), Andrews (1982), Larson (1988), and Stroik (1990) claim that temporal adverbials are associated to VP. In this section, I present evidence that, depending on the temporal interpretation, temporal adverbials are either associated to VP or to a higher functional phrase.

In order to determine the position of temporal adverbials, we must first consider what it is that these adverbials modify. If we assume that they modify tense, and that the temporal information of the clause is located in the head of IP, it seems straightforward that temporal adverbials are adjoined to IP. Hornstein and Weinberg (1981) argue that temporal adverbials are adjoined to S (IP), not VP, based partly on subcategorization facts. They note that there is a selection relation between some PPs and Vs, as shown in (7a–b), and claim that these must therefore be associated with VP.

(7) a. **He dashed all day.*
b. *He dashed into the post.*

They point out that there are no temporal PPs for which there is a selection relation between the PP and the V, as shown in (8a–b).

(8) a. *He ate dinner at 6:00.*
b. *He . . . at 6:00*

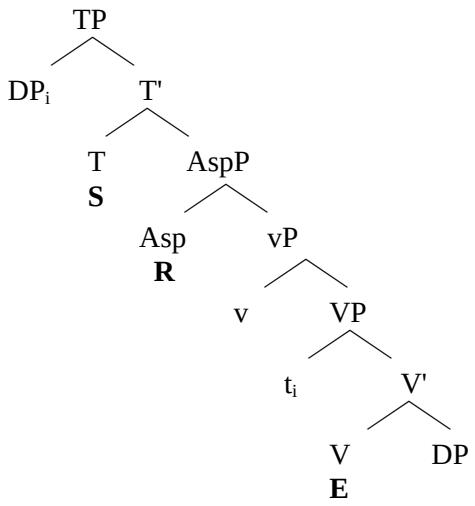
However, there seem to be verbs which do require temporal adverbials, such as *last*, as shown in (9):

(9) a. **John lasted in the room.*
b. *John lasted (for) 3 hours.*

Therefore, subcategorization facts do not show that temporal adverbials must be associated to IP.

If we assume the analysis of tense discussed in section 2.3, whereby the temporal information of a clause is not represented simply in IP, but instead in TP (Speech time), AspP (Reference time), and VP (Event time), as in (10), there are three potential sites for temporal modifiers.

(10)



Hornstein points out that the Speech time cannot be directly modified by adverbials. This is shown by the fact that (11) cannot be felicitously uttered at 3:00, with the meaning *John left and it's 3:00 now*.[5,6]

(11) *John left at 3:00.*

Hornstein claims that this restriction is explained by the fact that the Speech time is deictic, and deictic elements in general cannot be modified (*sad you, *empty there).

Given that the Speech time is located in the head of TP, and that it cannot be directly modified, it follows that temporal adverbials are not adjoined to TP. This leaves the Reference and Event times for modification. The present analysis thus predicts that temporal adverbials may be adjoined to AspP or VP. In the next section, I show that this structural ambiguity correlates with a semantic ambiguity.

2.5.1 An Ambiguity in Temporal Adverbials

Braroe (1974) points out that certain constructions with temporal adverbials in English are ambiguous; (12) can be paraphrased as in (13a) or (13b).

(12) *The secretary had eaten at 3 p.m.*

(13) a. *The time that the secretary actually ate was 3 p.m.*
b. *The secretary had already eaten by 3 p.m.*

Braroe argues that this ambiguity is structural. Assuming the generative semantics approach to auxiliary verbs, *have* is associated to a higher S; when the adverbial adjoins to this higher S, it modifies the auxiliary verb, yielding the reading in (13b). When the adverbial adjoins to the lower S, the reading in (13a) results.

Hornstein (1977) argues against Braroe's structural analysis, pointing out that the account predicts that this ambiguity should arise in all sentences containing an auxiliary, given Braroe's assumption that all auxiliary verbs hang from a higher S. However, as shown by (14), (Hornstein's (26)), this is not the case; a sentence in the progressive is not ambiguous in the way a perfect sentence is.

(14) *John was driving home at 3 p.m.*

Another incorrect prediction that Braroe's analysis makes is that in a language such as French, where the simple past is expressed with the verb *avoir* 'to have', the same ambiguity should show up. However, this prediction is not borne out, as shown by (15) (Hornstein's (25)), which is unambiguous in the same way that the simple past in English is unambiguous.

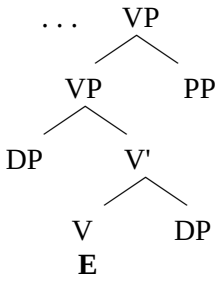
(15) *La secrátaire a mangá á trois heures.*
the secretary had ate at three hours
'The secretary ate at 3 o'clock.'

Hornstein offers an alternative to Braroe's analysis, claiming that on the reading in (13a), the adverbial modifies the Event time, while on the reading in (13b), the adverbial modifies the Reference time.[7]

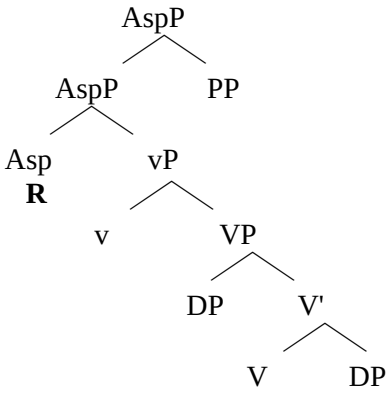
I adopt Hornstein's claim that this temporal ambiguity is due to modification of the Event or Reference time, and, following the intuition of Braroe, I claim that there are two different structures associated with the

two different modification possibilities (independently, Zagona 1988; Inclán 1991; Nakajima 1991 and Westphal 1994 have pursued structural analyses of this ambiguity). I propose that when the adverbial modifies the Event time, it is adjoined to VP, as in (16), and when it modifies the Reference time, it is adjoined to AspP, as in (17).

(16)



(17)



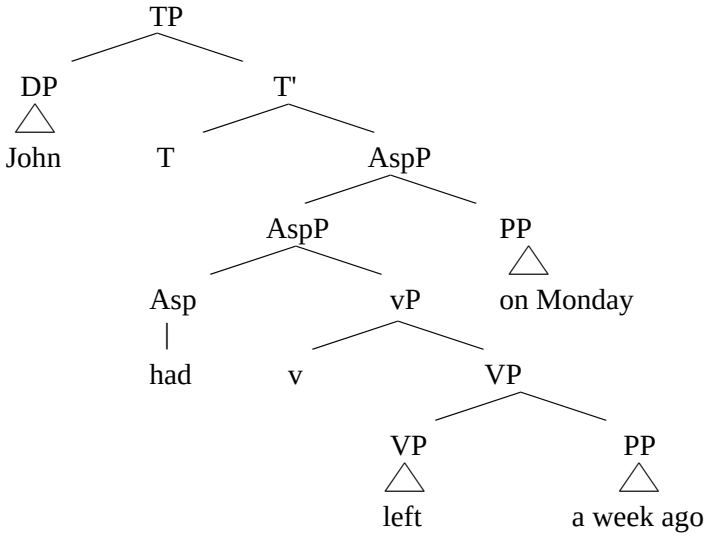
2.6 Linear Order Restrictions

This analysis predicts that when one clause-final adverbial modifies the Reference time and another the Event time, the Reference time-modifying adverbial must occur after the Event time-modifying adverbial, since the Reference time-modifying adverbial is structurally above the Event time-modifying adverbial. As is shown in (18), this prediction is borne out; only the order Event time adverbial – Reference time adverbial is possible. In (18a), *a week ago* specifies the time at which the leaving takes place (Event time), and *Monday* specifies the time from which the Event time is evalu-

ated (Reference time), as in structure (19). As shown by (18b), the opposite order is not possible.[8]

(18) a. *John had left a week ago on Monday.*
b. **John had left on Monday a week ago.*

(19)



The linear order restrictions on temporal adverbials thus lend support to the general claim that Reference time-modifying adverbials are associated with a phrase structurally higher than Event time-modifying adverbials.[9]

2.7 Coordination

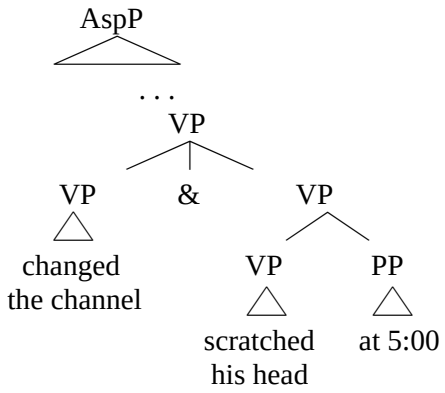
Coordination data also support the analysis developed here.[10] Assuming that coordination operates on like semantic categories, and given that AspP and VP are semantically unlike categories, (20a) involves coordination of a category lower in the structure than AspP – either vP or VP (The intended reading for the examples in (20) are with *had* ranging over *changed the channel* and *scratched his head*). [11]

(20) a. *John had changed the channel and scratched his head.*
b. *John had changed the channel and scratched his head at 5:00.*

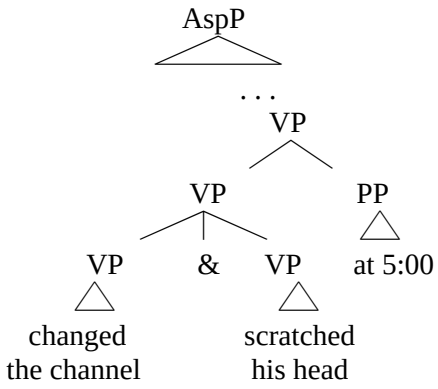
When a temporal *at*-phrase occurs sentence-finally, as in (20b), on the Event time reading it can modify either the whole conjunct or just the second conjunct; (20b) can mean that the changing and the scratching both occur at 5:00 (the whole conjunct is modified), or that just the event of scratching takes place at 5:00 (the second conjunct only is modified). However, on the Reference time reading, the adverbial must modify the whole conjunct; (20b) can mean that both the event of changing the channel and the event of scratching take place sometime before 5:00, but it cannot mean that just the event of scratching, and not the event of changing the channel, takes place sometime before 5:00.

This data is explained by the analysis of temporal adverbials proposed here. The Event time-modifying adverbial may be associated with the second VP in the coordination, as in the structure in (21a), resulting in the reading where only the second event is modified. The adverbial may also be associated with the whole conjunction, as in the structure in (21b), deriving the reading where both events are modified.

(21) a.

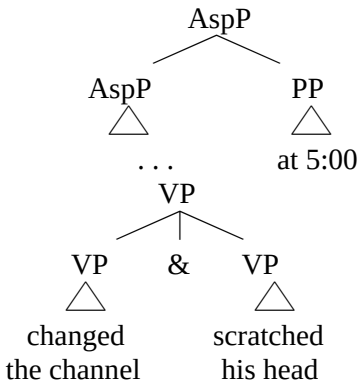


b.



However, since there is only one Reference time in the clause (because there is only one AspP), when the adverbial modifies the Reference time, as in the structure in (22), the modification holds for both events.

(22)



Another argument from coordination for the structure of temporal adverbials postulated here comes from the conjunction of these adverbials. In (23), there are two events of leaving, which are modified by the temporal adverbials either on their Event or their Reference time readings. (23) may mean that one event of leaving took place at 2:00 and another at 3:00, or that one event of leaving took place sometime before 2:00 and another sometime before 3:00. However, (23) cannot mean that one event took place at 2:00 and another took place sometime before 3:00, or vice-versa.

(23) *John had left the office at 2:00 and at 3:00.*

This is explained on the current analysis, since the conjunct phrase *at 2:00 and at 3:00* must be attached to one position in the clause; to VP, resulting in the Event time readings of both PPs, or to AspP, resulting in the Reference time readings of both PPs, and thus the two PPs must modify the same time.

2.8 Preposition Stranding

Temporal PPs allow preposition stranding, as shown in (24b):

(24) a. *At what time did he leave?*
b. *What time did he leave at?*

Hornstein and Weinberg (1981) claim that PPs that are associated to VP allow preposition stranding, while PPs associated to IP do not. Evidence for this claim comes from the contrast shown between (25a) and (25b) (their (19a) and (19b)).

(25) a. *Who did you speak to Harry about yesterday?*
b. **Who did you speak to Harry yesterday about?*

Hornstein and Weinberg argue that in (25a), *who* is extracted directly from the VP-constituent *about who,* whereas in (25b), the phrase *about who* has postposed to an IP position, and next *who* is extracted.

Given the generalization that preposition-stranding is permitted with VP-constituents and not IP constituents, we predict that preposition stranding is only possible when the PP modifies the Event time, and not when it modifies the Reference time. The data in (26) show that this prediction is borne out; (26a), with WH-movement of the PP, asks for the time by which the leaving takes place (Reference time reading). However, (26b), with preposition stranding, asks for the time of the event of leaving, and not the time by which the event of leaving takes place.[12]

(26) a. *At what time had John left?*
b. *What time had John left at?*

2.9 Constituency Tests

In this section, I show that constituency test data discussed by Andrews (1982) support the claim that temporal adverbials which modify the Event time are adjoined to VP, while temporal adverbials which modify the Reference time are adjoined to AspP. VP constituency tests such as Pseudo-clefting (27a), *though*-movement (27b), and VP fronting (27c), show that when the VP is isolated, the only reading possible for an *at* phrase temporal adverbial is where the adverbial modifies the Event time – in (27a–c), the leaving takes place at 6:00, not sometime before 6:00.

(27) a. *What John had done was leave the store at 6:00.*
b. *Leave the store at 6:00 though John had, Mary still didn't see him.*
c. *John claimed that he had left the store at 6:00, and left the store at 6:00 he had.*

This data is predicted on the approach developed here, since in these constructions, the adverbial is necessarily associated with VP, and hence is only able to modify the Event time.[13]

2.10 Direct Objects and Temporal Adverbials

It has been noted in the literature (Anderson 1979, Contreras 1984, Stroik 1990, Lasnik and Saito 1991) that certain adjunct phrases seem to be c-commanded by their direct objects. The relevant data is summarized in (28)–(32) below, where in the (a) sentences the direct object is the phrase that licenses an element in the adjunct, and the (b) sentences have the licensing phrase embedded inside the direct object position, hence unable to c-command out of the direct object position. For example, in (28a), the quantifier phrase *every crewman* licenses the bound reading of *his* within the adverbial phrase, whereas in (28b), *every crewman*, embedded within the direct object, does not license the bound reading of *his* within the adverbial phrase.

(28) Quantifier binding
a. *The captain irritated every crewman$_i$ by visiting his$_i$ cabin with no warning*

b. **The captain irritated every crewman's$_i$ wife by visiting his$_i$ cabin with no warning*

(29) Negative Polarity Item licensing
a. *John does no work at all quickly.*
b. **John does the work that nobody likes at all quickly.*

(30) Reciprocal licensing
a. *I saw the men$_i$ somewhere near each other's$_i$ houses*
b. **I saw the men's$_i$ wives somewhere near each other's$_i$ houses*

(31) *Each . . . the other*
a. *I photographed each man somewhere near the other's home.*
b. **I photographed each man's friend somewhere near the other's home.*

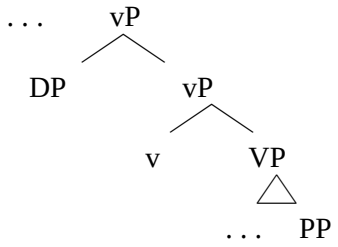
(32) Binding Condition C
a. **Mary visited him$_i$ during John's$_i$ incarceration*
b. *Mary visited his$_i$ mother during John's$_i$ incarceration*

2.10.1 A Minimalist Account of the Asymmetry

Branigan (1992) proposes that the asymmetry between direct object and adjunct can be accounted for by assuming the Minimalist account of Case (see also Lasnik and Saito 1991; Lasnik 1993), whereby the direct object in English moves out of VP at LF for Case-checking in the Spec of a higher functional projection (following Chomsky 2000, 2001, I assume that this position is vP, a light verb shell). Hence, assuming the definition of c-command in (33), at LF, the raised object asymmetrically c-commands into a VP-adjoined adverbial, as shown in (34):

(33) α c-commands β iff α does not dominate β and every maximal projection that dominates α dominates β

(34)



The structural analysis of temporal ambiguity offered here predicts that the direct object may be in a position at LF which c-commands into a VP-adjoined temporal adverbial, but not an AspP-adjoined temporal adverbial.

The relevant data to check this prediction is provided in (35)–(39) below, where the possible readings are summarized below the examples. For example, in the quantifier binding example in (35), the only reading available for the adverbial on the bound reading of the pronoun is the Event time reading: the sentence must mean that the events of firing take place at the break times, and cannot have the Reference time reading, where the events of firing take place sometime before the break times. The same contrast is found with negative polarity item licensing, reciprocal binding, *each...the other* constructions, and condition C effects, as shown in (36)–(39).[14]

(35) Quantifier binding
The boss had fired every worker$_i$ at the time of his$_i$ break
Event time reading: event of firing takes place at break times
*Reference time reading: event of firing takes place sometime before break times

(36) Negative Polarity Item licensing
John had identified no problems at anyone's quitting time.
Event time reading: event of identification takes place at no one's quitting time
*Reference time reading: event of identification takes place sometime before no one's quitting time

(37) Reciprocal licensing
John had seen Mary and Phil$_i$ at each other's$_i$ break times
Event time reading: event of seeing takes place at break times
*Reference time reading: event of seeing takes place sometime

before break times

(38) *Each . . . the other*
I had photographed each man at the other's break time.
Event time reading: event of photographing takes place at break times
*Reference time reading: event of photographing takes place before break times

(39) Binding Condition C
Mary had seen him$_i$ at the time that John$_i$ presented his paper
*Event time reading: event of seeing takes place at presentation time
Reference time reading: event of seeing takes place sometime before presentation time

The generalization is that the direct object c-command effect obtains only when the adverbial modifies the Event time, as predicted on the analysis pursued here.

2.11 Negation and Temporal Adverbials

Sentential negation takes scope over Event time-modifying adverbials and not over Reference time-modifying adverbials. This is explained by assuming that NegP is located between AspP and VP (or vP), and that Reference time-modifying adverbials are adjoined to AspP and Event time-modifying adverbials to VP.

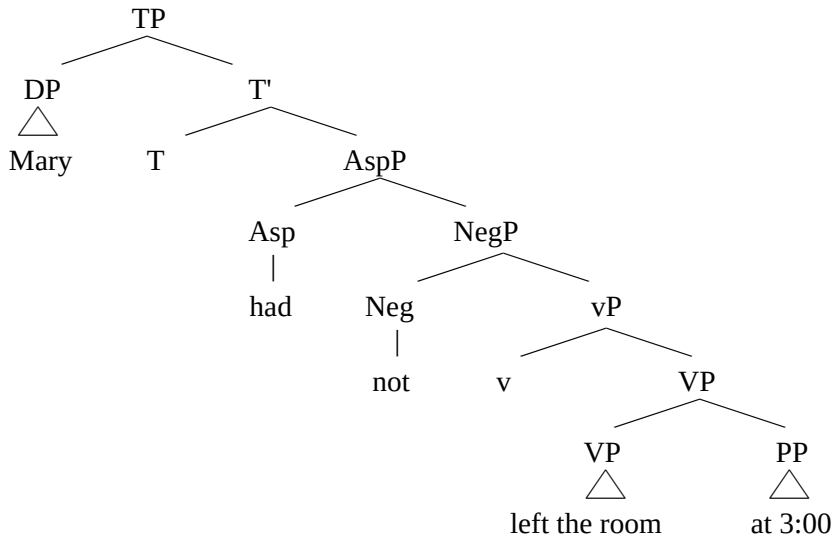
The fact that Event time-modifying adverbials are within the scope of sentential negation is illustrated by the possible readings of (40). On the Event time reading, where the event takes place at 3:00, negation has scope over the adverbial; the reading is: *It is not at 3:00 that Mary leaves the room.* On the Event time reading, the sentence cannot have the reading where the adverbial takes scope over negation, meaning: *It is at 3:00 that Mary does not leave the room.*

(40) *Mary hadn't left the room at 3:00.*

(41) Event time reading
a. 'It is not at 3:00 that Mary leaves the room.'
b. *'It is at 3:00 that Mary does not leave the room.'

This is predicted, since sentential negation takes scope over Event time-modifying adverbials, as shown by the structure in (42):

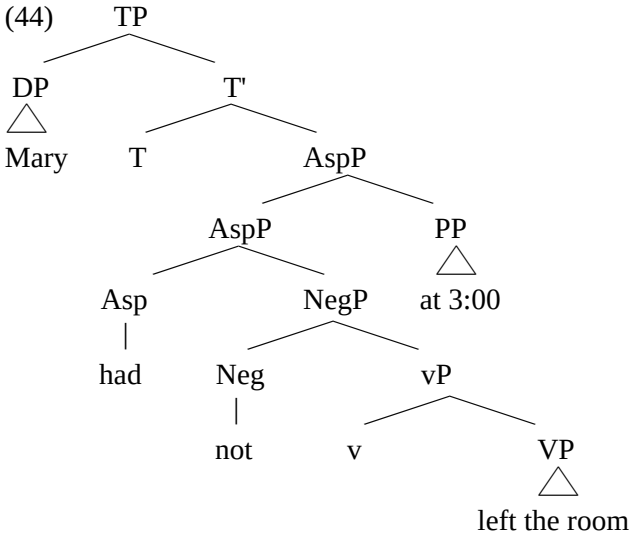
(42)



However, when the adverbial modifies the Reference time, the judgments reverse – the adverbial is outside the scope of negation. On the Reference time reading of (40), where the event takes place sometime before 3:00, the meaning is where the adverbial is outside the scope of negation: *It is sometime before 3:00 that Mary does not leave the room*, and it cannot have a reading where the adverbial is within the scope of negation: *It is not sometime before 3:00 that Mary leaves the room.*[15] The structure of (40) on the Reference time reading is as in (44).

(43) Reference time reading
  a. 'It is sometime before 3:00 that Mary does not leave the room.'
  b. *'It is not sometime before 3:00 that Mary leaves the room.'

(44)



Given this analysis, we have independent motivation for the assumption in section 2.9 that what moves in VP fronting is a projection beneath AspP (which is why VP fronting with the adverbial permits only the Event time reading of the adverbial). As is well-known, VP fronting strands sentential negation, as shown by the fact that (45a) permits the sentential negation reading, whereas (45b) does not.

(45) a. . . . *and write a letter she would not*
b. . . . *and not write a letter she would*

Since it has been shown that Negation is located beneath the position of the Reference time-modifying adverbial, and given that Negation is stranded in VP fronting, the projection that moves in VP fronting must be beneath NegP, and, hence, beneath the position of the Reference time-modifying adverbial, AspP.

2.12 Scope of Adverbials

2.12.1 Agent-Oriented Adverbs

Agent-oriented adverbs such as *intentionally* and *deliberately* seem to take scope over sentence-final temporal adverbials on the Event time reading,

but not on the Reference time reading. In (46), on the reading where *at 3:00* modifies the Event time, *intentionally* has scope over *at 3:00*; the meaning is where the intention is to leave the room at 3:00 (47a), not just to leave the room (47b). However, when *at 3:00* modifies the Reference time, *intentionally* does not take scope over the adverbial; the meaning is where the intention is to leave the room (48a), not to leave the room sometime before 3:00 (48b).

(46) *Mary had intentionally left the room at 3:00.*

(47) a. The intention of Mary was to leave the room at 3:00.
b. *At 3:00, the intenttion of Mary was to leave the room.

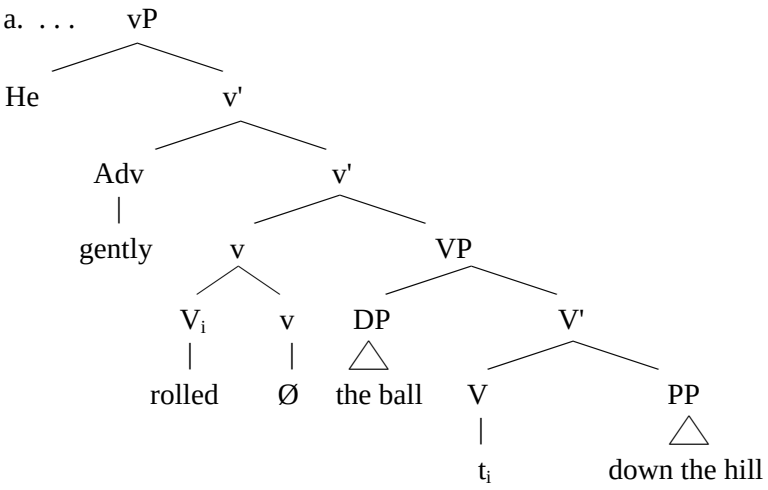
(48) a. Sometime before 3:00, Mary intentionally left the room.
b. *The intention of Mary was to have left the room sometime before 3:00.

This contrast is explained on the present account, if we assume Radford's claim (1997: 372) that agent-oriented adverbs are associated with vP. The evidence for this structure comes from contrasts in the distribution of agent-oriented and manner adverbs, illustrated in (49a)–(49d) (Radford's (18a) and (18b)).

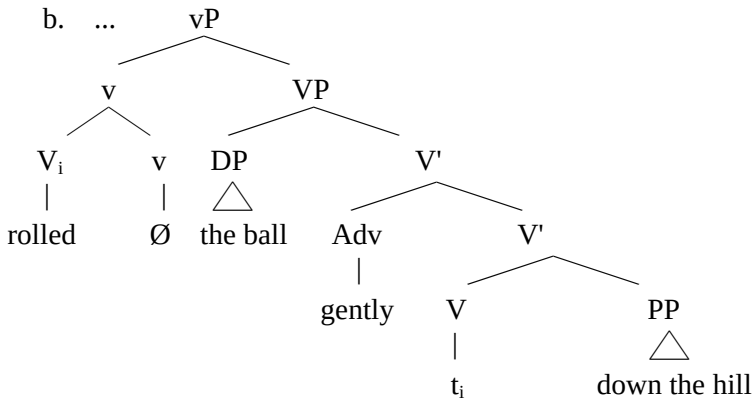
(49) a. *He had gently rolled the ball down the hill.*
b. *He had rolled the ball gently down the hill.*
c. *He had deliberately rolled the ball down the hill.*
d. **He had rolled the ball deliberately down the hill.*

Radford proposes that the structure in example (49a) is as in (50a); and the structure in (49b) is as in (50b):

(50) a. . . .



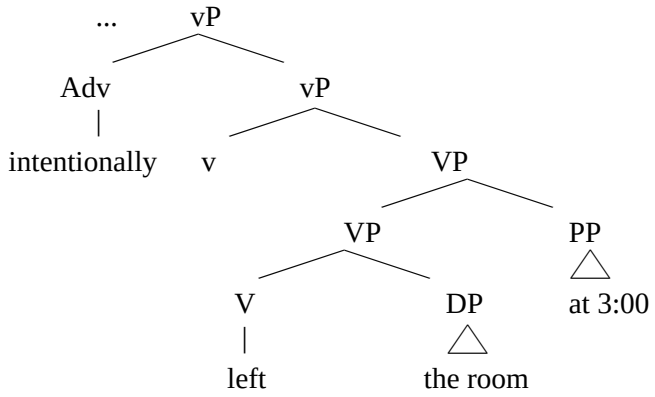
b. ...



Since *gently* may either be adjoined to a projection of vP or VP, it may occur in the two positions. However, because *deliberately*, due to its semantics, can only be an adjunct to an agentive verb, it may only occur adjoined to a projection of vP, which Radford takes to be the locus of agentivity.

Thus, on the Event-time reading of (46) as in (47a), *at 3:00* is adjoined to VP and is hence within the scope of *intentionally*, as shown in (51).

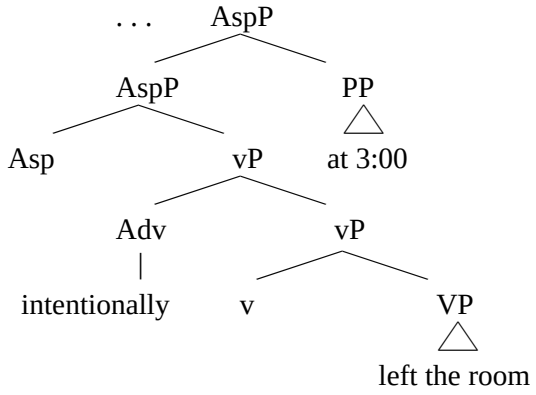
(51) *Mary had intentionally left the room at 3:00.*
(Event-time reading)



On the other hand, on the Reference time reading of *at 3:00*, it is adjoined to AspP, in a position outside the scope of *intentionally*, as in (52):

(52) *Mary had intentionally left the room at 3:00.*

(Reference-time reading)

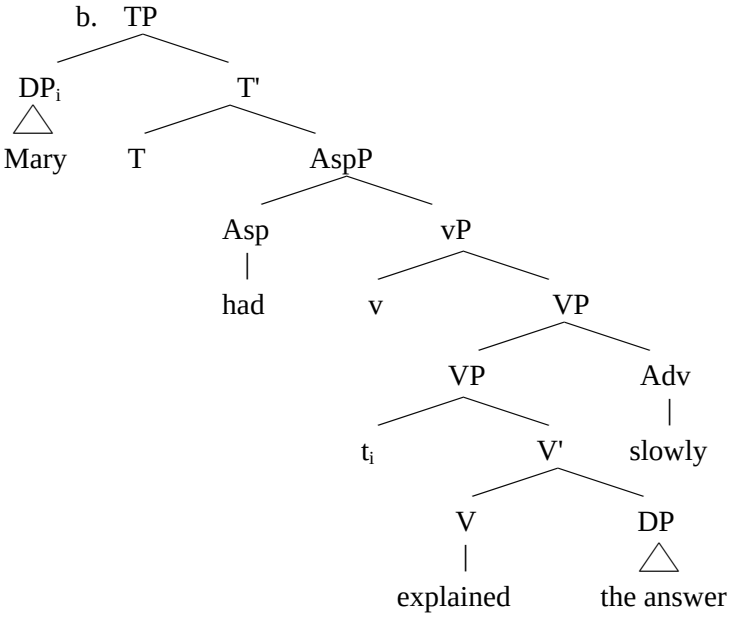


2.12.2 Manner Adverbs

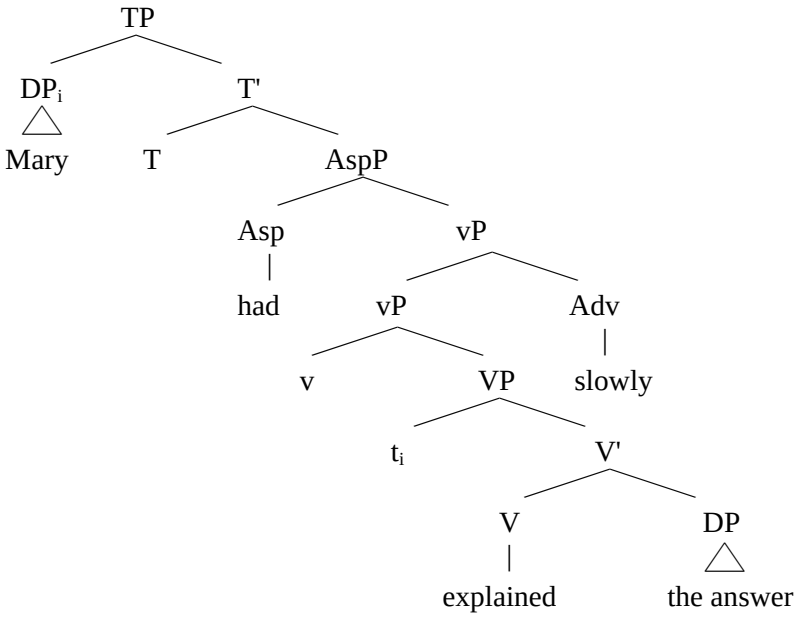
The position of temporal adverbials with respect to manner adverbs lends further support to this analysis. Following the analysis of Radford (1997) discussed in section 2.12.1, I assume that the manner adverb *slowly* is adjoined to VP or to vP in an example such as (53a), as in (53b) and (53c).

(53) a. *Mary had explained the answer slowly.*

b.



c.



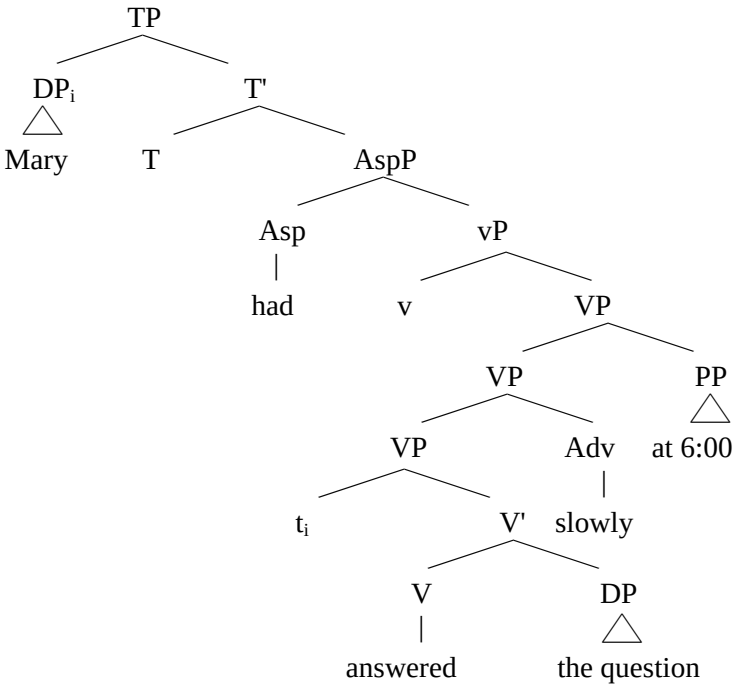
(54a), with a manner adverb preceding a temporal adverbial, is ambiguous; it can mean that the event of answering the question at 6:00 is a slow event (Event time reading), or that the event of answering the question sometime before 6:00 is a slow event (Reference time reading). However, (54b), with the manner adverb following the temporal adverbial, is unambiguous; it can only mean that the event of answering the question at 6:00 is a slow event; it cannot mean that the event of answering the question sometime before 6:00 is a slow event.

(54) a. *Mary had answered the question slowly at 6:00.* (ambiguous)
b. *Mary had answered the question at 6:00 slowly.* (Event time reading only)

Since *slowly* may be VP-adjoined, it may precede a temporal adverbial on an Event time reading (VP-adjoined) or a Reference time reading (AspP-adjoined), as in the structures in (55b) and (56b), respectively.[16]

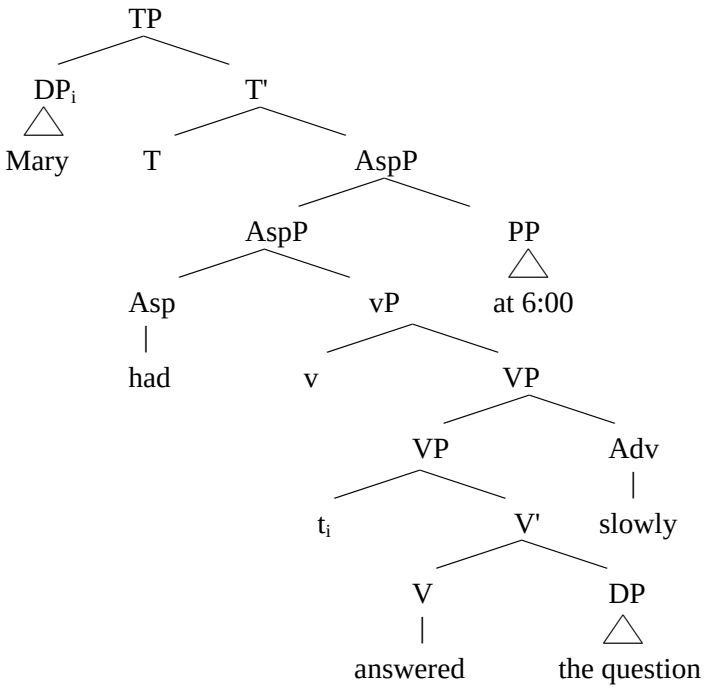
(55) a. *Mary had answered the question slowly at 6:00.* (E-time reading)

b.



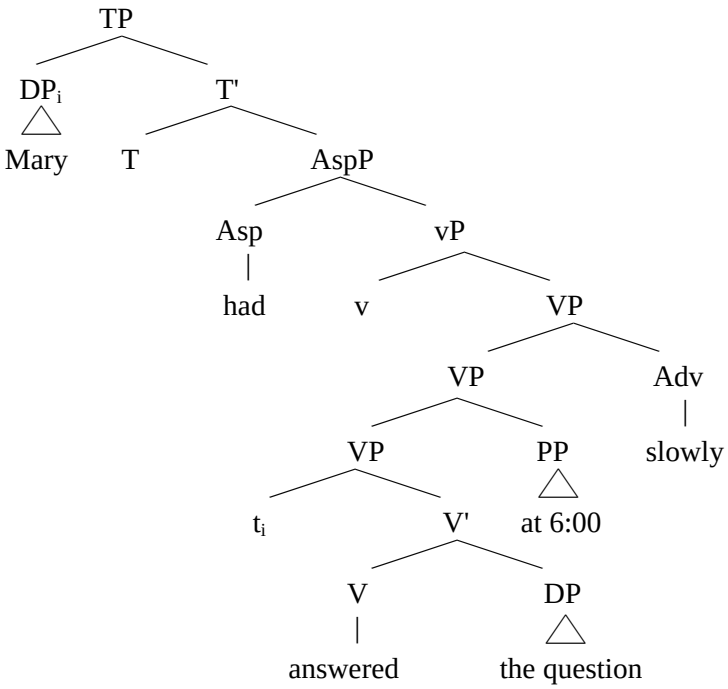
(56) a. *Mary had answered the question slowly at 6:00.*
(Reference-time reading)

b.



However, when *slowly* follows a temporal adverbial, this adverbial must be VP-adjoined, as in the structure in (57), and hence only receives an Event time reading. A Reference time-modifying adverbial is adjoined to AspP and thus may not appear to the left of a VP or vP-adjoined manner adverb.

(57) *Mary had answered the question at 6:00 slowly.*



2.13 Clause-initial Temporal Adverbials

Clause-initial temporal adverbials allow only a reading where the adverbial modifies the Reference time; (58) permits only a reading where the event of leaving takes place sometime before, and not at, 3:00 (see Hornstein 1990; Inclán 1991; Nakajima 1991).

(58) *At 3:00, John had left the store.*

The analysis proposed here explains this data naturally. Assuming that clause-initial adverbials are moved to this position, this lack of ambiguity is predicted by the Shortest Movement Condition (Chomsky 1995: chapter three). Movement is permitted only from AspP adjoined position, by the following reasoning: there are two possible derivations for a sentence with a clause-initial temporal adverbial; one in which the adverbial has moved from VP-adjoined position, and one in which the adverbial has moved from AspP-adjoined position. These two derivations have the same array (the same choice of lexical items), and hence are comparable with respect to

economy considerations. However, the derivation in which the adverbial moves from AspP-adjoined position rules out the derivation in which the adverbial moves from VP-adjoined position, because the derivation where the adverbial moves from AspP-adjoined position involves movement which is shorter than the movement involved if the adverbial moves from VP-adjoined position.[17] Hence, locating the Reference time-modifying adverbial structurally higher than the Event time-modifying adverbial, in combination with the Shortest Movement Condition, provides an account for the lack of ambiguity of initial temporal adverbials.

2.14 An Ambiguity with Durative Adverbials

The analysis discussed in this chapter can be extended naturally to durative time adverbials. It has been observed that present perfect sentences with a durative time adverbial are ambiguous (Dowty 1979; Richards 1982; Mittwoch 1988; Abusch and Rooth 1990; Iatridou, Agagnostopoulou, and Izvorski 2001). The sentence in (59) may have what is called the "Existential" reading, where the sentence means roughly "There is a two-week period in the past throughout which John is in Boston", or what is called the Universal or Up-to-Now reading, with the meaning "John is in Boston throughout the two-week period ending at the Utterance time".

(59) *John has been in Boston for two weeks.*

(60) a. Existential Reading
There is a two-week period in the past throughout which John is in Boston.
b. Up-to-Now Reading
John is in Boston throughout the two-week period ending at the Utterance time.

The account developed here predicts this data strightforwardly. The Up-to-Now reading results when the adverbial is interpreted as modifying the Reference time, and is therefore AspP-adjoined. Reference time modification results in the Up-to-Now reading since, as shown in (61), in the present perfect, the Reference time is associated with the Speech time.[18]

(61) E _ S , R
|
for two weeks

The Existential reading results when the adverbial is adjoined to VP, and hence modifes the Event time. In this configuration, the event occurs just at some point in the past, since the Event time is not linked to the Speech time in the present perfect, as shown in (62):

(62) E _ S , R
|
for two weeks

Interestingly, as noted by Dowty (1979), the sentence loses the existential reading when the adverbial occurs in initial position. The sentence in (63) can only mean "John has been in Boston for the last two weeks"; the Up-to-Now reading.

(63) *For two weeks, John has been in Boston.*

This follows from the analysis presented here, since, as discussed in section 2.12, the fronted adverbial must have moved from AspP-adjoined position in order to obey the Shortest Movement Condition.

2.15 In Favor of an Adjunction Analysis of Temporal Adverbials

Recent work on the syntax of adjuncts has pursued the idea that these elements are in fact not in an adjoined position, but are instead in complement and/or specifier position (see Larson 1988; Alexiadou 1997, 2000; Cinque 1999). Much of this work is influenced by the antisymmetric approach to syntax of Kayne (1994), which argues that left-adjunction is permitted while right-adjunction is not. In this section, I discuss this approach to the syntax of temporal adverbials.

Evidence in favor of the claim that temporal adverbials are complements of the main verb has been discussed from c-command tests (see Alexiadou 2000). The fact that temporal adverbials seem to be in the c-command domain of the direct object is explained if the temporal adverbial is in complement position. However, recall from section 2.10 that this effect is predicted if we assume that the direct object raises out of VP at LF to

Spec, vP, where it c-commands into the VP-adjoined adverbial. (Recall also that it is only Event time-modifying adverbials which are within the scope of the direct object, since only they are associated with VP.) Thus the c-command effects can be explained on an adjunction analysis.[19]

Alexiadou (2000) discusses evidence that temporal adverbials are in complement position from Antecedent-Contained Deletion structures, where a temporal adverbial may be construed as being part of the elided VP, as in (64) (Alexiadou's (8b)).

(64) *On what day did Mary see everyone that Bill did?*

However, if we assume that the adverbial is adjoined to VP, this data is explained, since what (64) indicates is that the adverbial is somewhere within VP.

Alexiadou shows that temporal adverbials behave like arguments, as opposed to adjuncts, with respect to extraction from islands; they are sensitive to strong islands (65a), but not weak islands (65b) (data from Giorgi and Pianesi 1997: 126).

(65) a. **In quale giorno hai trovato qualcuno che voleva partire?*
in which day did find somebody who wanted to.leave
'On which day did you find somebody who wanted to leave?'
(Complex NP Constraint)

b. *?Quale giorno non hai mangiato?*
which day not have eaten?
'On which day didn't you eat?'
(Negative Island)

It has been discussed in the literature that temporal and manner WH-expressions seem to behave like arguments and unlike cause and reason adjunct WH-expressions with respect to extraction facts (Rizzi 1990). However, Rizzi argues that this is explained by the fact that they are adjoined to VP while cause and reason expressions are located higher up in the clause structure. It seems that it is thus not necessary to claim that temporal adverbials are arguments of the verb in order to explain their extraction behavior.

Note that extraction out of temporal adverbials seems to pattern differently from extraction out of complements, as is shown by the contrast in (66), as is expected if temporal adverbials are in fact in adjunct position.

(66) a. *?Which lecture did he forget the time of?*
b. **Which lecture did he sleep at the time of?*

The adjunction analysis can also account for the fact that more than one temporal adverbial is permitted in a clause, as shown in (67) (see section 2.6). (Note that, as discussed in footnote 7, in these examples it is not the case that the two phrases are plausibly a single unit, modifying a single time, but are two distinct phrases modifying different times.)

(67) *John had left a week ago on Monday.*

It is also not clear on a complement analysis of temporal adverbials why it is that with a sequence of two post-verbal temporal adverbials, the first must modify the Event time and the second the Reference time, as discussed in section 2.6 and shown in the contrast between (68a) and (68b).

(68) a. *John had left a week ago on Monday.*
b. **John had left on Monday a week ago.*

In addition, it seems that the main verb does not c-command into a temporal adverbial, as is shown by the fact that while a negative verb licenses a Negative Polarity Item in a complement clause (69a), it does not license a Negative Polarity Item in a temporal adverbial (69b–c).

(69) a. *John denied that anyone had left.*
b. **John denied the claims at any time.*
c. **John denied the claim on anyone's birthday.*

This fact is explained if temporal adjuncts are adjoined above the verb, but is unexpected if they are complement to the verb.

To summarize, I have argued in this section that the traditional right-adjunction analysis of temporal adverbials is superior to a complement analysis of temporal adverbials.[20]

2.16 Conclusion

To summarize, in this chapter, I have proposed a syntax for tense according to which the Speech time is associated with the head of TP, the Reference time with the head of AspP, and the Event time with the head of VP. Tem-

poral adverbials which modify the Event time are adjoined to VP, and temporal adverbials that modify the Reference time are adjoined to AspP.

Evidence for this syntax for temporal adverbials comes from linear order restrictions on temporal adverbials, as well as restrictions on coordination and preposition stranding with temporal adverbials. Various VP constituency tests provide further support for the analysis: pseudoclefting, *though*-movement, and VP fronting all reveal the predicted structural effects with temporal adverbials.

The interpretation of temporal adverbials with respect to scope of the direct object and sentential negation, as well as sentential and manner adverbials, is predicted by the present analysis. Finally, a restriction on the interpretation of temporal adverbials in initial position is accounted for, and the analysis accounts for an ambiguity of durative adverbials with the present perfect.[21]

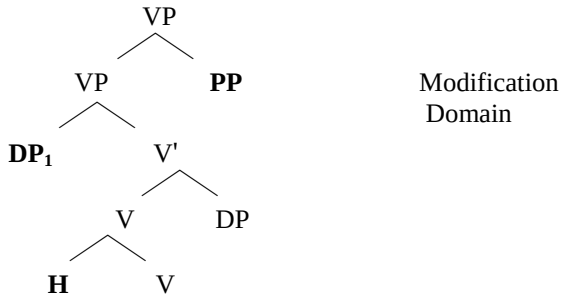
Notes

1. The default semantic value of the Speech time is the utterance time.
2. We may assume the following definition of government:

   (i) α governs β iff α is a head and α c-commands β and β c-commands α

3. The definition of modification domain (Chomsky's (1995:chapter 3) definition of checking domain) is illustrated in (i), where the modification domain of V includes DP1, the adjunct PP, and H, but not DP2:

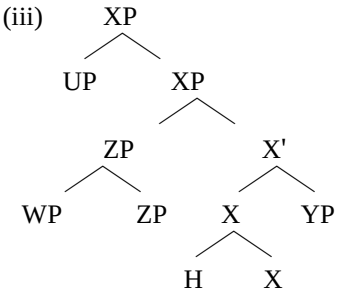
   (i)



   The definition of modification domain assumes the definitions below (from Chomsky 1995, chapter 3:178).

(ii) a. the domain of α is the set of nodes contained in Max(α)that are distinct from and do not contain α
b. the complement domain of α is the subset of the domain reflexively dominated by the complement of the construction
c. the minimal residue (modification domain) of (a head) α includes the elements within the domain of α that are not within the complement domain of α

(iii)



The complement domain of X in (iii) is YP and whatever it dominates.
The domain of X in (iii) is: {UP, ZP, WP, YP, H}.
The minimal residue of X in (iii) is {UP, ZP, WP, H}.

4. Since adverbials do not have formal features which force displacement for checking, they are prohibited by economy considerations from moving. However, this reasoning does not disallow movement of adverbials in constructions such as Topicalization, Focus movement, and WH-movement, as shown respectively in (ia)-(ic). Adverials are not prohibited from having features which induce movement; they just do not have intrinsic features which need to be checked.

(i) a. *Timewise, John is really pressed.*
b. *(Now) at **3:00**, I have to leave.*
c. When are you leaving?

5. The sentence in (i) (uttered in the context of leaving a message on someone's answering machine, for example) is not a counterexample to this claim, since in this case the adverbial *at 3:00* modifies the Reference or the Event time, which are construed in the present tense as contemporaneous with the Speech time.

(i) *I am calling you at 5:00.*

6. Further evidence for the claim that the Speech time can not be directly modified comes from the fact that there seems to be a limit of two temporal adverbials per clause, as is seen by the contrast between the acceptability of (ia) and the unacceptability of (ib-c) below (Hornstein 1990:31-32). This restriction can be accounted for if we assume that times can be modified by at most one adverb, and that only the Reference and Event times can be modified.

(i) a. *A week from tomorrow, John will leave in a month.*
b. **From tomorrow, John, in a week, will leave in a month.*
c. *In a week, John, from tomorrow, will leave in a month.

7. As mentioned above, temporal adverbs with simple tenses are not ambiguous:

(i) a. *John left at 3:00.*
b. *John will leave at 3:00.*

This is explained by the fact that in these tenses, the Reference and Event times are interpreted as contemporaneous; therefore, when one time is modified, the other is modified also (see Hornstein 1990:38). As shown in (2) in the text, this is in contrast to the perfect tenses, which are characterized by noncontemporaneous Reference and Event times, and hence show an ambiguity depending on which time is modified.

8. A reviewer raises the question of whether *a week ago on Monday* may be in fact a single constituent in these constructions. Evidence that there are two separate phrases comes from the examples in (ia), where *on Monday*, the Reference time-modifying adverbial, appears in initial position. Notice that *a week ago*, the Event time-modifying adverbial, is not possible in this position, as shown in (ib):

(i) a. *On Monday, John had left a week ago.*
b. **A week ago, John had left on Monday.*

This effect is explained by the present analysis, since clause-initial adverbials may not receive a Reference-time reading, as is discussed in detail in section 2.13.

9. Simple tenses obey the same restrictions on ordering of adverbials as perfect tenses, as shown in (i). This lends support to the claim that simple tenses include a Reference time, as on the analysis adopted here.

(i) a. *John left the room a week ago Monday.*
b. **John left the room Monday a week ago.*

10. I would like to thank Paul Portner for suggesting coordination as a test for adjunction site.
11. Evidence that phrases that are semantically unlike with respect to temporal interpretation can not be conjoined comes from the unacceptability of conjoining an infinitival and a finite clause, as illustrated in (ia) and (ib).

    (i) a. ??*John said that the food was ready and to sit down.*
        b. ??*John said to sit down and that the food was ready.*

12. The lack of an Event time reading for (26a) is predicted by Shortest Moves; since it is a shorter distance for the PP to move from AspP to the front of the clause than from VP, this derivation rules out movement from VP (see section 2.13 for detailed discussion).
13. Assuming Huang's (1993) analysis of VP fronting as movement of an AgrO projection (structurally equivalent to vP in the framework of Chomsky 2000, 2001), the data discussed in this section from pseudoclefting, *though*-movement and VP fronting show that the position of Reference time-modifying adverbs (AspP) is located above AgrOP (vP), since in order to account for the contrast between Event and Reference time modification, the moved projection must be beneath the position in which adverbs modify the Reference time. Independent motivation for the claim that what moves in VP fronting is a projection beneath AspP is discussed in section 2.11 below.
14. A reviewer inquires whether it is possible in general for the temporal modifier *at the time of x* to receive an R time interpretation. The following examples indicate that this reading is available:

    (i) a. *The boss had already fired Bill at the time of his third year review.*
        b. *I had already chosen my pale beige mother-in-law wedding dress at the time of my daughter's engagement party.*

15. A reviewer inquires about examples such as in (i).
    (i) *Mary hadn't NOT considered it*

    Although the intuitions are subtle, I think that when *NOT* has scope over the adverbial, the only available reading is the Event time interpretation:

    (ii) a. *Mary hadn't (NOT considered it at 5:00), she just hadn't considered it very seriously*
         b. **Mary hadn't (NOT considered it) at 5:00, she just hadn't considered it very seriously*

This is as expected, since *NOT* is located beneath sentential negation, and therefore is predicted to not take scope over Reference time-modifying adverbials.

16. (51b) shows the structure for the Reference time reading with the manner adverb adjoined to VP; adjunction to vP is also an option.

17. This account predicts that, in general, PP fronting should disambiguate structurally ambiguous PPs in favor of the higher attachment site reading, since movement from the higher position involves shorter movement. This is shown to be the case in (i), where (ia) allows either matrix or embedded event modification. When the adverb is fronted, as in (ib), only the matrix event modification reading is possible.

(i) a. *Mary told John to read in the library.*
b. *In the library, Mary told John to read.*

18. A reviewer asks why the reading that results from the structures in (54) is one where there is a two-week interval culminating in R (and by association S), as opposed to a reading where R itself is a two-week interval. It seems to be the case that in general the Reference time cannot itself have a durative interpretation; (i) can only mean that the Event of crying takes place for two hours and cannot mean that John's crying takes place in the past with respect to a two-week period which occurs before the utterance time.

(i) *John had cried for two hours.*

19. Ernst (2002) pursues an analysis of these effects whereby the structural requirement for licensing is redefined as "x-command" plus precedence, where x-command is defined as follows:

(i) α x-commands β iff α does not dominate β and every functional clausal extended projection that dominates α also dominates β (functional clausal projections are CP, TP, PredP, lexical VP.)

He claims that temporal adverbials are adjoined to PredP, located above VP, so that the direct object within VP x-commands (and precedes) this position. However, we may avoid positing a new licensing relationship by making the standard assumption that the direct object raises out of VP to a higher Spec position.

20. See Ernst (2002) for arguments in favor of the traditional adjunct analysis of adverbials.

21. A correlate of the structural ambiguity of temporal PPs in the clausal domain discussed here may be found in the nominal domain. The phrase *many professors from the sixties* in (i) is ambiguous; the event of being a professor may hold at the time of the sixties (Event time reading), or being a professor may occur after the sixties (Reference time reading) (see Musan 1995 for discussion of temporal NP modifiers).

    (i) *I saw many professors from the sixties at that conference.*

    Given the analysis pursued here, we predict different attachment sites for the PP depending on the reading. I leave investigation of this topic for future research.

Chapter 3
Adjunct Clauses and the Structural Representation of Simultaneity

1.1 Introduction

In this chapter, I show that the present proposal for the syntax of tense makes possible a straightforward analysis of the structure of temporal adjunct clauses. I argue that these clauses are located in different positions in the clause, depending on their temporal interpretation. This account explains contrasts between different temporal adjunct clauses with respect to ambiguity of temporal interpretation, the semantic behavior of clause-initial adjuncts, the distribution of *when* clauses, and the possibility of TP ellipsis structures.

The chapter is organized as follows: in section 3.2, Geis's (1970) movement analysis of temporal ambiguity in adjunct clauses is reviewed and Larson's (1990) Case-based approach to this ambiguity is discussed. Several problems for Larson's analysis are raised. Section 3.3 proposes that temporal adjunct clauses are adjoined to VP or TP, depending on whether the event of the adjunct is interpreted as simultaneous or as nonsimultaneous with the matrix event. This analysis is shown to explain contrasts in temporal ambiguity with different prepositions, in section 3.4. Evidence for this analysis from preposition stranding with temporal adverbs is discussed in section 3.5, and section 3.6 discusses structures involving Quantifier binding and Negative Polarity Item licensing. Section 3.7 develops an account of the loss of temporal ambiguity with clause-initial adjuncts. The distribution of readings with *when* clauses is accounted for in section 3.8. Section 3.9 shows that the analysis accounts for contrasts in simultaneous and nonsimultaneous adjunct clauses with respect to TP ellipsis structures. In section 3.10, I argue that an adjunction analysis of temporal adjunct clauses is superior to a non-adjunct analysis.

3.2 Temporal Ambiguity of Clausal Adjuncts

As has been discussed in the literature, certain clausal temporal adjuncts are ambiguous, in that the temporal preposition of the adjunct may relate to the time of the clausal complement of the preposition, or to a clause embedded under this complement (Geis 1970, Larson 1987, 1990, Munn 1991). This is illustrated by the examples in (1); in (1a), the matrix event of seeing may be interpreted as taking place either before the time of claiming, the event of the least embedded clause, or before the time of arriving, the event of the most embedded clause.

(1) a. *I saw Mary in New York [before [she claimed [that she would arrive]]]*
b. *I saw Mary in New York [after [she claimed [that she would arrive]]]*

3.2.1 Movement Analysis of Temporal Ambiguity (Geis 1970)

Geis (1970) proposes a movement analysis of the ambiguity in (1), whereby a null temporal adverb moves from the most embedded clause to clause-initial position, yielding the construal of the preposition with the time of this clause. Larson (1990) notes that this movement analysis accounts for the fact that the relation between the preposition and the clause it is construed with is apparently unbounded. For example, (2) is three ways ambiguous; the preposition may be construed as relating the time of seeing to the time of saying, the time of claiming, or the time of arriving.

(2) *I saw Mary in New York [before [John said [that she claimed [that she would arrive]]]]*

Further evidence that movement is involved in these constructions is that, as Geis shows, the relation between the temporal preposition and its semantically associated complement clause is sensitive to movement restrictions. This is shown in (3), where the long distance reading is absent; *before* must be construed with the time of making the claim, and not the time of arriving. This is predicted by the movement analysis, since the long distance reading would require illicit movement of the null adverb.[1]

(3) *I saw Mary in New York [before [she made the claim [that she would arrive]]]*

Geis (1970) notes that this temporal ambiguity arises with *before* and *after*, but does not arise with *while*. This is illustrated in (4), where the event of seeing is interpreted as taking place while the event of claiming takes place, and can not have a reading where the event of seeing takes place while the event of arriving takes place.

(4) *I saw Mary in New York [while [she claimed [that she would arrive]]]*

3.2.2 Case-based Analysis of Temporal Ambiguity: Larson (1990)

Larson (1990) analyzes the contrast between *before* and *after*, on the one hand, and *while*, on the other, as being due to a difference in their Case properties. *Before* and *after* have the ability to assign Case to an object, as is shown by (5a). Assuming that a null temporal operator moves on the long-distance reading, and that this null operator needs Case, these prepositions are able to assign Case to the null operator, thus licensing the long-distance reading. However, as is shown in (5b), *while* does not have the ability to assign Case, and therefore can not Case-mark the null operator, thus not licensing the long-distance reading.

(5) a. *before/after the show*
b. **while the show*

Notice that Larson's analysis accounts for the lack of a long-distance reading with *as*, illustrated in (6a). As shown in (6b), *as* does not assign Case; therefore, it is predicted to not allow the long-distance reading.

(6) a. *I saw Mary in New York [as [she claimed [that she would arrive]]]*
b. **as the show*

Larson claims that the lack of a long-distance reading with *while* is evidence that the ability to license a long-distance reading with the null operator is not related to whether a preposition is temporal or not. The long-distance reading of a sentence with a *because* clause, as in (7a) (Lar-

son's (10b)), is unacceptable; (7a) can only mean that the reason for visiting was the dreaming, and can not mean that the reason for the visit can not mean that the reason for the visiting was Max being there. On Larson's analysis, this is due to the fact that *because* does not have the ability to assign Case, which is shown by the fact that it does not take a DP object (7b).

(7) a. *I visited New York [because [Mary dreamed [that Max was there]]]*
b. **because the fight*

3.2.2.1 Other English Connectives

However, there are exceptions from English to Larson's generalization; certain connectives which evidently assign Case do not license a long-distance reading. For example, *except* takes a DP object, as in (8a), but does not license a long-distance reading, as is shown by the fact that (8b) can only mean that what John regrets is the saying, and can not mean that John regrets the leaving.

(8) a. *John brought nothing except the wine.*
b. *John regretted nothing, except that he said that he would leave.*

Other connectives which pattern like *except* in allowing an DP object but disallowing the long-distance reading are *like*, *for instance*, and *such as*, as shown in the examples in (9).

(9) a. *John loves many things, like/for instance/such as apple pies*
b. *John remembered many things, like/for instance/such as that he said that he would leave*

In addition, if the Case-based analysis were correct, we might expect that inserting *of* in the *because* clause construction in (7a), repeated in (10a), would allow the long-distance reading, given that the sequence *because of* permits a DP complement, as indicated in (10b). However, as shown in (10c), the addition of *of* to the sentence does not make possible a long-distance reading and in fact results in unacceptablity.

(10) a. *I visited New York [because [Mary dreamed [that Max was*

there]]]

b. *because of the fight*

c. ***I visited New York [because of [Mary dreamed [that Max was there]]]***

The fact that the long-distance reading does not in fact seem to correlate with the ability of the preposition to assign Case is expected, given the standard assumption that a null temporal operator, as an adjunct element, does not need Case, just as its overt counterpart *when* does not.

3.2.2.2 German Temporal Prepositions

Another problem for Larson's Case-based analysis comes from the distribution of temporal prepositions in German[2]. In German, the possibility of long-distance readings pattern as in English; the long-distance reading is permitted with *bevor* 'before' and *nachdem* 'after', but not with *waehrend* 'while', as illustrated in (11).[3]

(11) a. *Ich habe Maria in D.C. gesehen, bevor sie behauptete, dass*
I have Mary in D.C. seen before she claimed that
sie ankommen wuerde
she arrive would
'I saw Mary in D.C. before she claimed that she would arrive.'

b. *Ich habe Maria in D.C. gesehen, nachdem sie behauptete, dass*
I have Mary in D.C. seen after she claimed that
sie ankommen wuerde
she arrive would
'I saw Mary in D.C. after she claimed that she would arrive.'

c. *Ich habe Maria in D.C. gesehen, waehrend sie behauptete, dass*
I have Mary in D.C. seen while she claimed that
sie ankommen wuerde
she arrive would
'I saw Mary in D.C. while she claimed that she would arrive.'

However, these prepositions pattern differently with respect to Case assignment from their English counterparts. As shown in (12a) and (13a), German *bevor* 'before' and *nachdem* 'after' do not allow DP complements,

and therefore Larson's analysis incorrectly predicts that they should not permit the long-distance reading. (The German prepositions used with DP complements are *vor* 'before' (12b), and *nach* 'after' (13b).) In addition, as seen in (14), German *waehrend* 'while' does allow a DP complement, and therefore Larson's analysis incorrectly predicts that it should permit the long-distance reading.

(12) a. **bevor des Krieges / dem Krieg / den Krieg*
before the war-GEN / the-DAT war / the-ACC war
'before the war'
b. *vor dem Krieg*
before the-DAT war
'before the war'

(13) a. *nachdem des Krieges / dem Krieg / den Krieg*
after the war-GEN / the-DAT war / the-ACC war
'after the war'
b. *nach dem Krieg*
after the-DAT war
'after the war'

(14) *waehrend des Krieges / dem Krieg*
while the war-GEN / the-DAT war
'during the war'

3.3 Syntax and Semantics of Temporal Adjunct Clauses

I propose that the contrast in the availability of a long-distance reading with *before* and *after* versus *while* and *as*, seen both in English and in German, is due to the different semantics of these prepositions. In the following sections, I discuss the semantics of the null operator and outline an analysis of this contrast.

3.3.1 The Semantics of the Null Operator

Given that on a Reichenbachian analysis, there are three times associated with each clause, the issue arises of which time it is that is construed with a temporal preposition. In this section, I show that the relevant time in these

constructions is the Event time. This will be shown to have syntactic consequences for the analysis of temporal adjunct clauses.

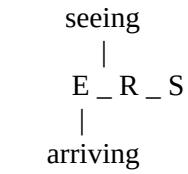
Consider the long-distance temporal interpretation of (15); the reading where the preposition *before* is construed with the most embedded clause. (It is the long-distance reading of the adjunct that is relevant here, since, as will be discussed shortly, the local reading does not involve operator movement, but instead local head movement.)

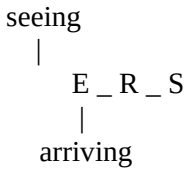
(15) I *saw Mary in New York [before [she said [that she had arrived]]]*

The most embedded clause has the past perfect tense structure in (16), where the Event time is interpreted as occurring previous to the Reference time, which in turn is interpreted as occurring previous to the Speech time.

(16) E _ R _ S

If the preposition *before* in (15) were construed with the Reference or Speech time, a possible reading of this sentence would be as in (17a), where the event of seeing occurs before the Reference and Speech times, but after the Event time.

(17) a.


b.


However, (15) does not have this reading; it can only mean that the event of seeing takes place sometime before the event of arriving, as represented in (17b). This shows that temporal prepositions are construed with respect to the Event time.[4]

The fact that it is the Event time which is construed with the preposition may be explained by the fact that, as argued by Hornstein (1990), temporal adjunct clauses in general involve linking the Reference and Speech

points of the adjunct clause to the Reference and Speech points of the matrix clause. Therefore, it is only the Event point which is available for construal with the temporal preposition.

Given that the null operator has been shown to be associated with the Event time of the tense structure of the clause, this operator is clearly purely temporal semantically. Therefore, we predict that it can only be interpreted with temporal prepositions. This explains the fact, discussed in the previous section, that connectives like *except, such as, for instance,* and *like* do not allow long-distance readings with the null operator.

In addition, this explains the behavior of locative adjunct clauses; as shown by the contrast between (18a) and (18b), locative adjunct clauses, unlike temporal adjunct clauses, do not permit long distance readings with a null operator.[5]

(18) a. *John sat down [near [where$_i$ [Mary said [that she would be t_i]]]]*
b. *John sat down [near [Op_i [Mary said [that she would be t_i]]]]

This is predicted; since the null operator is purely temporal, it can not be construed with a locative preposition.[6]

3.3.2 A Structure for Temporal Adjunct Clauses

In this section, I show that the semantic contrast among temporal prepositions that is structurally relevant and explains the contrast in the availability of long-distance readings is simultaneity.[7] *Before* and *after* force the adjunct Event time to be interpreted as nonsimultaneous with the matrix Event time; in (19), the leaving and the coming in are interpreted as occurring at different times.

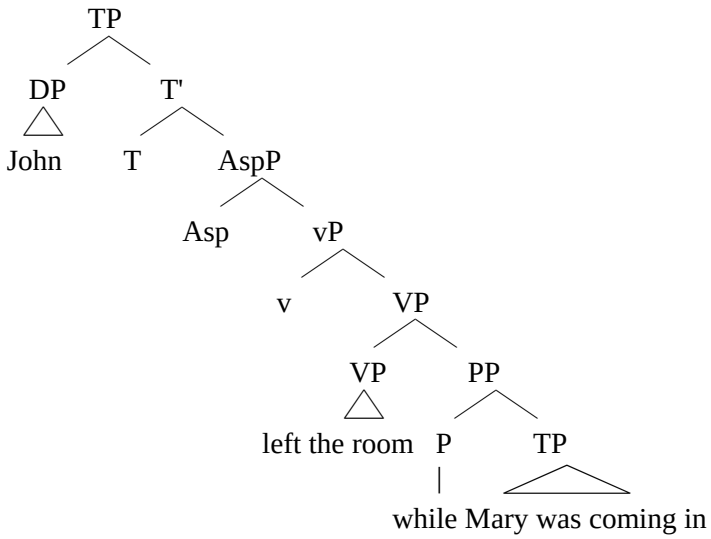
(19) *John left the room before/after Mary came in*

Temporal adjunct clauses with *while* and *as* force the adjunct Event time to be interpreted as simultaneous with the time of the matrix Event; in (20), the events of leaving and coming are interpreted as taking place at the same time.

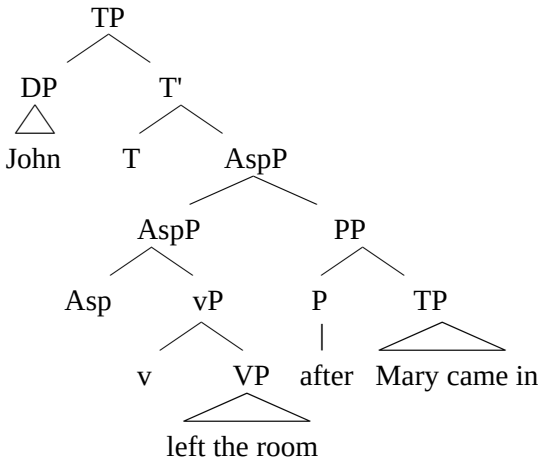
(20) *John left the room while/as Mary was coming in*

This semantic contrast in temporal adjunct clauses, combined with the syntax of tense proposed in chapter two, makes possible a structural account of the semantic difference between these temporal adjunct clauses. Given that the Event point is associated with the head of VP, I propose that a temporal adjunct clause with a simultaneous reading is adjoined to VP, while a temporal adjunct clause with a nonsimultaneous reading is adjoined to TP, as in (21) and (22).[8]

(21) *John left the room while Mary was coming in.*

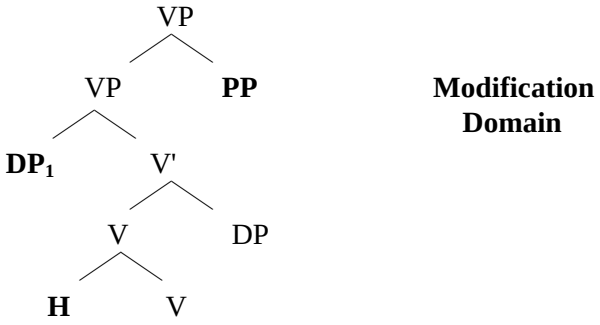


(22) *John left the room after Mary came in.*



(23) a. Condition on Simultaneous Interpretation: In order for an Event time α to be interpreted as simultaneous with an Event time β, α must be in the modification domain of β.

b.



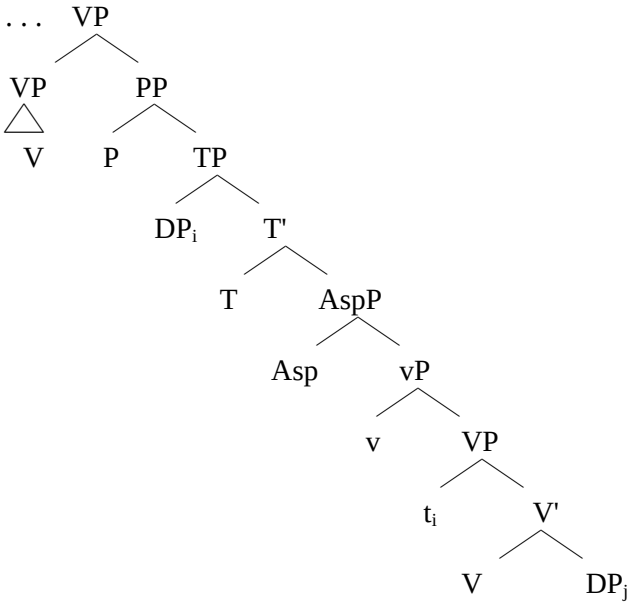
3.4 Analysis of Temporal Ambiguity

3.4.1 Simultaneous Adjunct Clauses

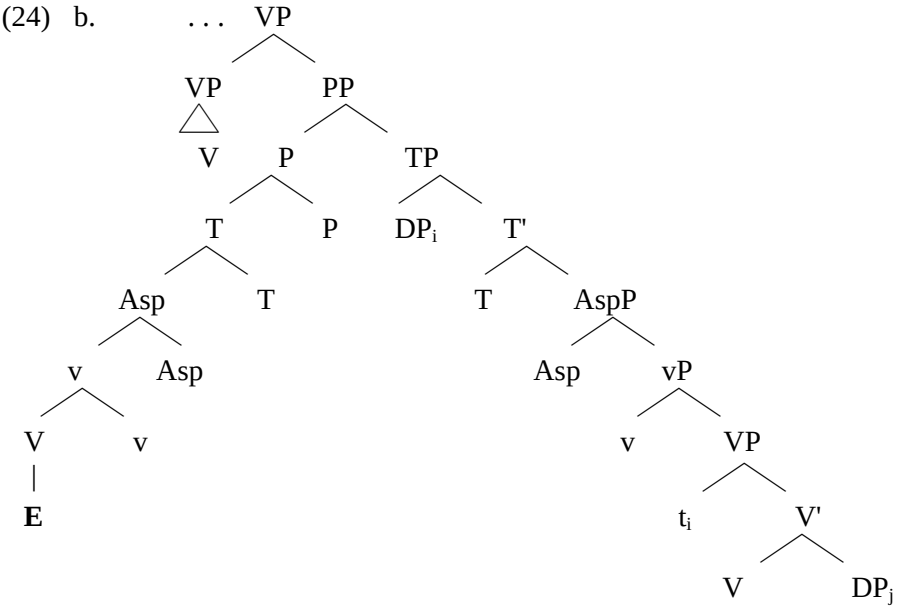
Let us first turn to the derivation of the local reading of a simultaneous adjunct clause. Following Larson (1990), I assume that the local interpretation involves head movement of the temporal information of the least embedded clause to the preposition, and not null operator movement. Assuming a structure as in (24a), I claim that this is instantiated by LF verb raising

to the Inflectional heads, followed by the highest Inflectional head incorporating into the preposition. The preposition then incorporates into the matrix verb, as in (24b).[9,10]

(24) a.



(24) b.



Due to preposition incorporation into the matrix verb, the requirement of the Condition on Simultaneous Interpretation is met for the adjunct and matrix Event points, since the adjunct Event point is in the modification domain of the matrix Event point. Thus, the two Events are interpreted as simultaneous.

Evidence for the claim that the local and long-distance readings are due to two different mechanisms – head movement and null operator movement – comes from the interaction between parasitic gaps and long-distance readings. As is shown in (25)–(26), parasitic gaps are in complementary distribution with long-distance readings. (25a), without a parasitic gap, can mean that the event of seeing takes place before the event of telling, as represented in (25b), or before the event of arriving, as represented in (25c). However, (26a), with a parasitic gap, can only mean that the event of seeing takes place before the event of telling, as in (26b), and not before the event of arriving, as in (26c).[11]

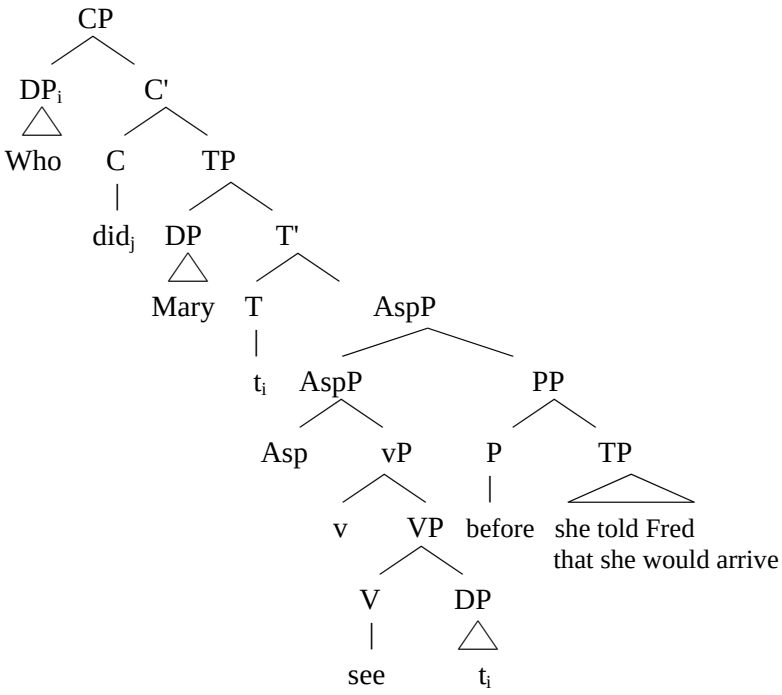
(25) a. *Who did Mary see [before she told Fred [that she would arrive]]*
b. *Who$_i$ did Mary see t$_i$ [before she told Fred [that she would arrive]]*
c. *Who$_i$ did Mary see t$_i$ [Op$_j$ before she told Fred [that she would*

arrive t_j *]]*

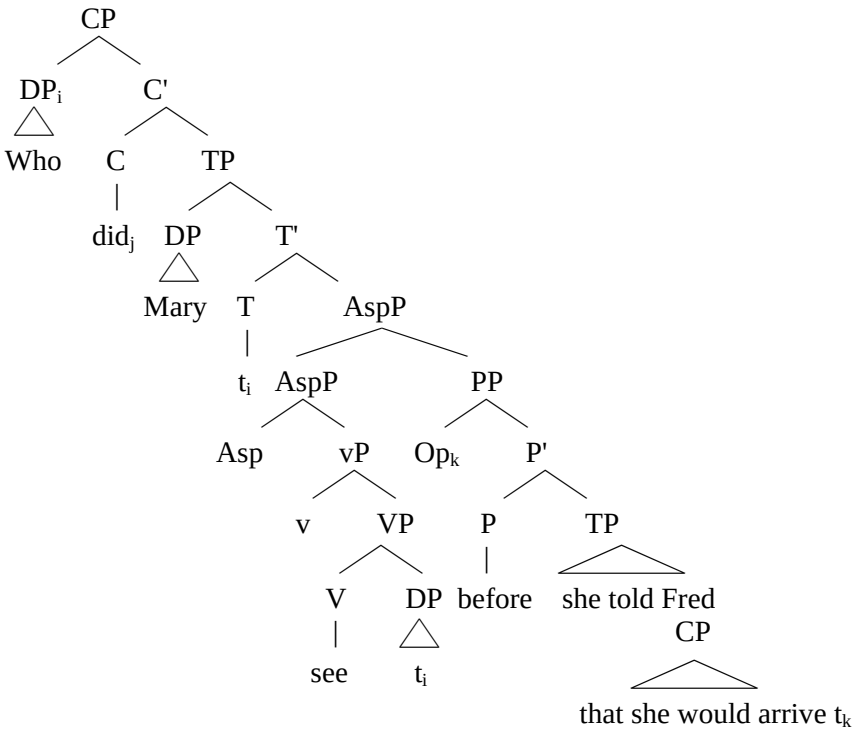
(26) a. *Who did Mary see [before she told [that she would arrive]]*
b. *Who*$_i$ *did Mary see* t_i *[* Op_i *before she told* GAP_i *[that she would arrive]]*
c. *Who*$_i$ *did Mary see* t_i *[* Op_j Op_i *before she told* GAP_i *[that she would arrive* t_j *]]*

This is explained, assuming that the null operator of the parasitic gap moves to the same position that the null temporal operator moves to; Spec, PP (contra the analyses of García-Mayo and Kempchinsky 1993, Munn 2001, who locate the two operators in different positions). The structure of the local reading of (25a) is as in (27a), that of the long-distance reading is in (27b), and the structure for the parasitic gap construction version of the sentence in (26a) is as in (28a), with a local reading. Since the local reading is possible with the parasitic gap construction, this data shows that it does not involve movement of a null temporal operator, as the long-distance reading does.

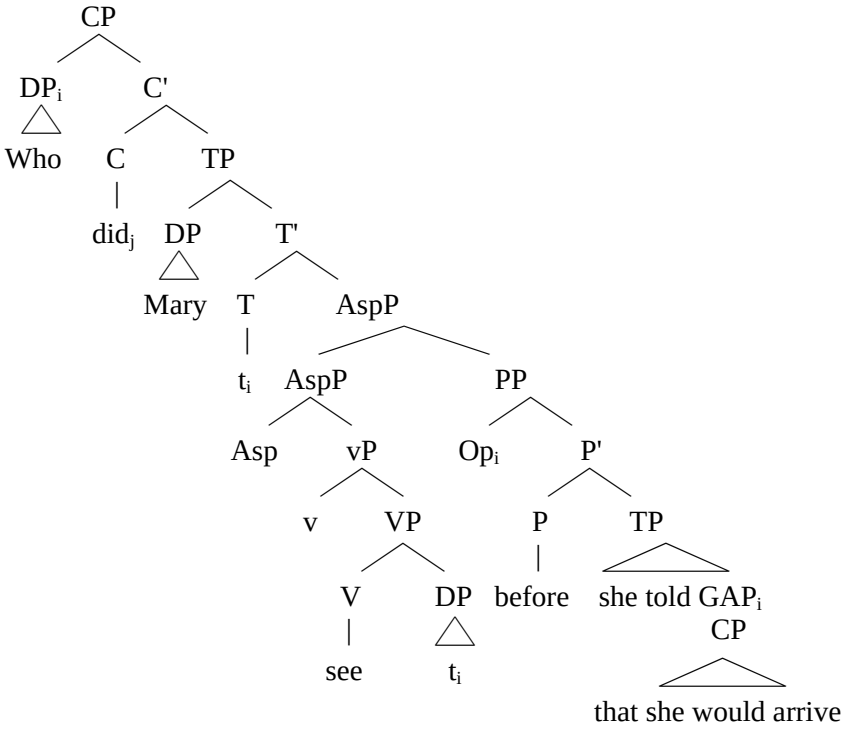
(27) a. Local Reading



(27) b. Long-Distance Reading



(28) Parasitic Gap Construction, Local Reading



The long-distance reading is not available for simultaneous adjunct clauses because if the null operator of the more embedded clause moves to Spec, PP, it can not be interpreted with respect to the matrix Event time by the preposition, since the preposition incorporates into the verb.[12]

This analysis straightforwardly predicts the facts of German discussed in section 3.2.2.2; given that German *bevor* 'before' and *nachdem* 'after' force a nonsimultaneous reading, they are predicted to permit the long-distance reading, whereas since *waehrend* 'while' forces a simultaneous reading, it is predicted to not permit a long-distance reading.[13]

3.4.2 Nonsimultaneous Adjunct Clauses

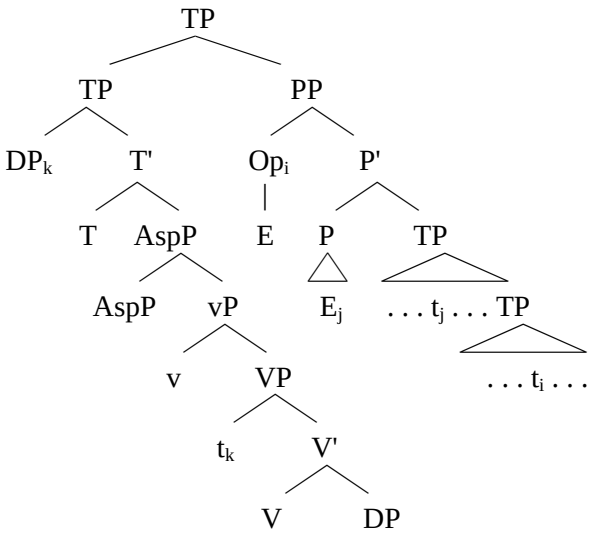
On the present analysis, simultaneous prepositions do not play a role in ordering Events; it is the local syntactic relation which results from incor-

poration which makes the simultaneous reading possible. However, nonsimultaneous prepositions obviously do play a role in ordering Events; the Event of the adjunct and matrix clauses are ordered differently depending on whether the preposition is *before* or *after*.[14]

Due to its position adjoined to TP, preposition incorporation into the matrix verb is not possible with nonsimultaneous adjunct clauses, and the Event time of the complement clause is interpreted with respect to the temporal preposition. If the temporal preposition is *before*, the matrix Event time is ordered as occurring before the adjunct Event time, and if the preposition is *after*, the matrix Event time is ordered as occurring after the adjunct Event time.

The long-distance reading with *before* and *after* is now predicted, since on this reading the null operator moves from the embedded clause to Spec, PP, and is interpreted with respect to the matrix Event by the temporal preposition. In the structure that results from this movement, shown in (29), the Event time associated with the null operator is just as local to the preposition as the Event time associated with the verb of the least embedded clause that has incorporated into the preposition, since they are both in the modification domain of the preposition. Therefore, both interpretations are possible; the preposition can either relate the time of the matrix Event to the time of the least embedded Event or to the time of the most embedded Event.

(29)



3.5 Preposition Stranding with Temporals in English

According to the analysis of temporal adjunct clauses proposed in section 3.4 above, the preposition of the VP-adjoined adjunct clause incorporates into the main verb at LF. Evidence for this incorporation with VP-adjoined temporal adjuncts, and not TP-adjoined adjuncts, comes from preposition-stranding facts with temporal PP adverbials in English that were discussed in chapter two. Recall that Braroe (1974) points out that (30) can be paraphrased as in (30a) or (30b), and she proposes a structural account of this ambiguity.

(30) *The secretary had eaten at 3 p.m.*

(31) a. *The time that the secretary actually ate was 3 p.m.*
b. *The secretary had already eaten by 3 p.m.*

In chapter two, I adopted Hornstein's claim that this temporal ambiguity is due to modification of different times, and, following the intuition of Braroe, I argue that there are two different structures associated with the two different modification possibilities. When the adverbial modifies the Event point, it is adjoined to VP, given that the Event point is associated with the head of VP, and when it modifies the Reference point, it is adjoined to AspP, since the Reference point is associated with the head of AspP.

As discussed in chapter two, preposition stranding is permitted in many dialects of English with temporal adverbs, as in (32a). However, this sentence allows only the Event point modifying reading of the adverb – it asks for the time at which the Event of leaving takes place, and can not ask for the time by which the Event of leaving takes place. This is in contrast to an equivalent question where the whole PP has been moved, as in (32b), which asks for the time by which the leaving takes place.

(32) a. *What time had John left the store at?*
b. *At what time had John left the store?*

Assuming, following Hornstein and Weinberg (1981), that extraction out of a PP requires incorporation of the preposition into the matrix verb, these facts are explained by assuming that the temporal preposition that heads the VP-adjoined PP incorporates at LF into the matrix verb. The Reference point modifying reading of the adverb is not possible when extraction takes

place, because incorporation into the verb is not possible from the AspP-adjoined position.

3.6 Direct Object/Adjunct Asymmetries

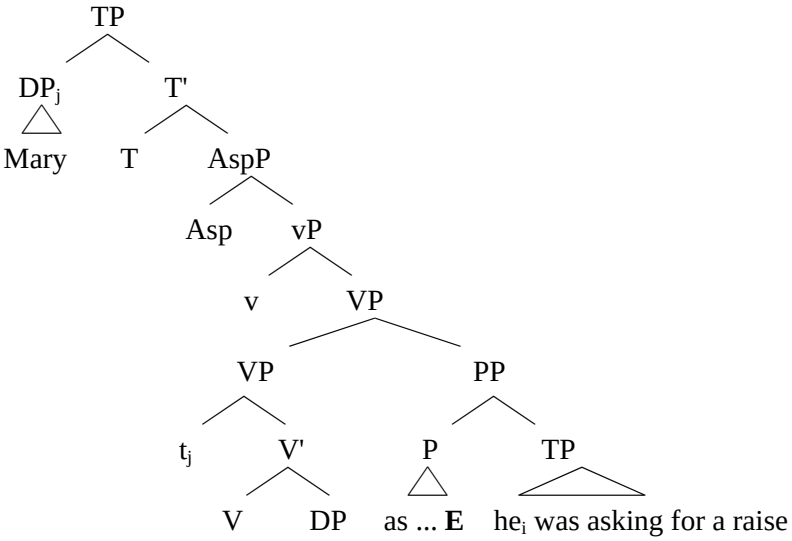
Further evidence in support of the present proposal for the syntax of different types of temporal adjunct clauses comes from structural asymmetries between direct object and adjunct. As has been discussed in the literature, certain adverbial phrases seem to be c-commanded by their direct object (Anderson 1979, Contreras 1984, Larson 1988, Stroik 1990).

Recall from chapter two that this data is accounted for by the assumption that the direct object moves out of VP at LF to Spec, vP, and hence c-commands into a VP-adjoined adjunct. Since a simultaneous temporal adjunct clause is VP-adjoined, it is predicted that the direct object should c-command into this position, whereas since a nonsimultaneous temporal adjunct is adjoined to TP, the direct object should not c-command into this position. This prediction is borne out, as shown by the data in (33) and (34). The direct object c-commands into a simultaneous adjunct clause (33a) and (34a), with a structure as in (35), and does not c-command into a nonsimultaneous adjunct clause (33b) and (34b), with a structure as in (36).

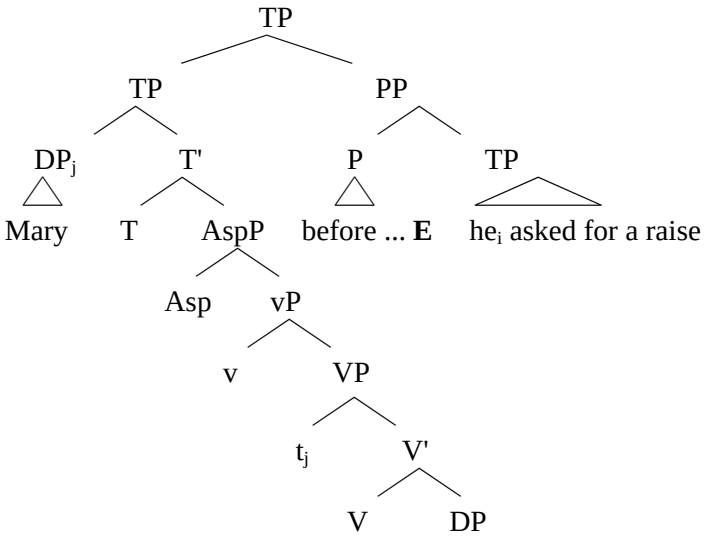
(33) Quantifier Binding
   a. *Mary saw every worker$_i$ as he$_i$ was asking for a raise*
   b. **Mary saw every worker$_i$ before he$_i$ asked for a raise*

(34) Negative Polarity Item Licensing
   a. *John identified no problems while anyone was around.*
   b. **John identified no problems after anyone left.*

(35) Simultaneous Adjunct Clause



(36) Nonsimultaneous Adjunct Clause



3.7 Clause-initial Temporal Adjuncts

As noted by Geis and Lycan (1989), whereas clause-final temporal adjuncts are ambiguous in allowing the local or the long-distance reading, as in (37a), clause-initial temporal adjunct clauses permit only the local reading; (37b) can only mean that the seeing takes place before the time of saying, and not before the time of arriving.[15]

(37) a. *I saw Mary in New York before she said that she would arrive.*
b. *Before she said that she would arrive, I saw Mary in New York.*

Given that on the long-distance reading there is a null operator located in Spec, PP, the lack of a long-distance reading in (37b) is parallel to the unacceptability of parasitic gap structures with clause-initial adjuncts, illustrated by the contrast between (38a) and (38b) (Lasnik and Uriagereka 1988:75).

(38) a. *Which book$_i$ did you file t$_i$ [Op$_i$ after reading GAP$_i$]*
b. **[Op$_i$ after reading GAP$_i$], which book$_i$ did you file t$_i$*

The ill-formedness of (38b) is explained by claiming that it violates the locality restriction on the null operator and the trace of WH-movement (see Contreras 1984, Chomsky 1986, Browning 1987 for formulations of this restriction.)

Similar to this reasoning for parasitic gap constructions, temporal adjunct clauses in initial position are predicted not to permit a long-distance reading, given that the null temporal operator will not be in a local relation with the matrix clause. This leads to the plausible claim that temporal adjunct clauses require locality between the temporal operator and the matrix tense. Given that the local reading of the temporal adjunct is possible with clause-initial adjuncts, this reading must be derived other than through null operator movement, as on the present analysis.

3.8 *When* Clauses

Further evidence for the analysis offered here comes from the distribution of *when* clauses.[16] *When* clauses are ambiguous in that they permit either a simultaneous or a nonsimultaneous reading; (39) can have a reading where

the leaving occurs at the same time as the coming in, or a reading where the leaving and coming in take place at different times.[17]

(39) *John left the room when Mary came in.*

Note that in initial position, a *when* clause has only the nonsimultaneous reading; in (40), the leaving and coming in take place at different times.

(40) *When Mary came in, John left the room.*

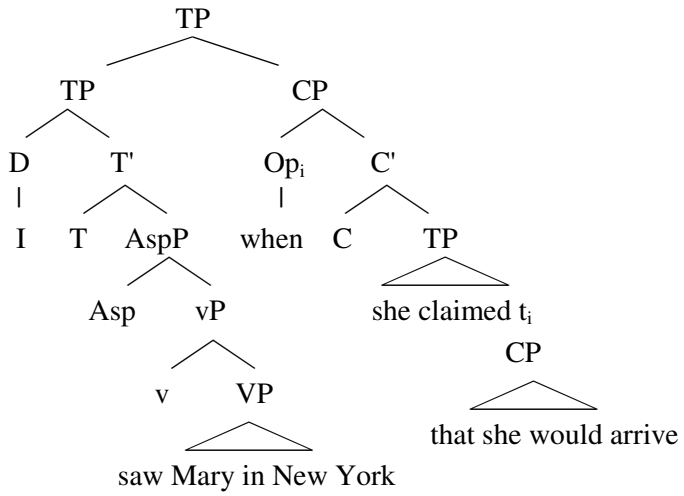
Recall from the discussion in chapter two that clause-initial temporal adverbials are unambiguous, in that they permit only the Reference time reading.

Geis (1970) notes that *when* clauses permit either the local or the long-distance reading, as shown in (41). (41) is four-ways ambiguous: it may have (a) a nonsimultaneous, local reading, where the seeing takes place before or after the time of claiming, (b) a nonsimultaneous, long-distance reading, where the seeing takes place before or after the time of arriving, (c) a simultaneous, local reading, where the seeing takes place at the time of claiming, or (d) a simultaneous, long-distance reading, where the seeing takes place at the time of arriving.

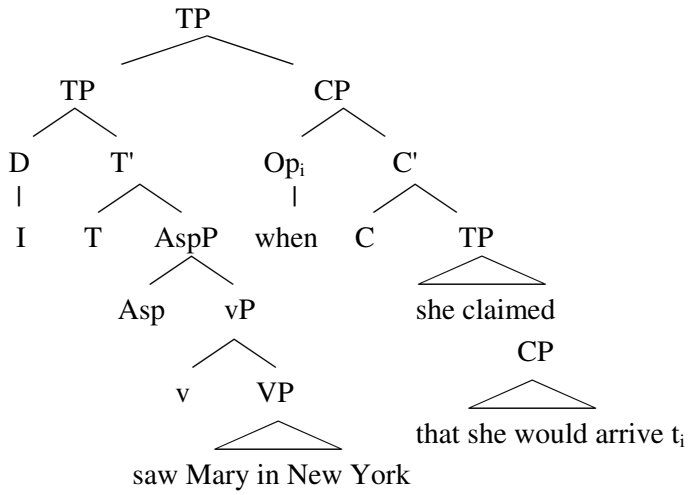
(41) *I saw Mary in New York when she claimed that she would arrive.*

The standard analysis of the ambiguity of (41) is in terms of movement; *when*, the overt counterpart of the null temporal operator that moves in examples with *before* and *after*, moves either from the least embedded or the most embedded clause, deriving the two readings. The structures of the readings for (41) are thus as in (42a–d).

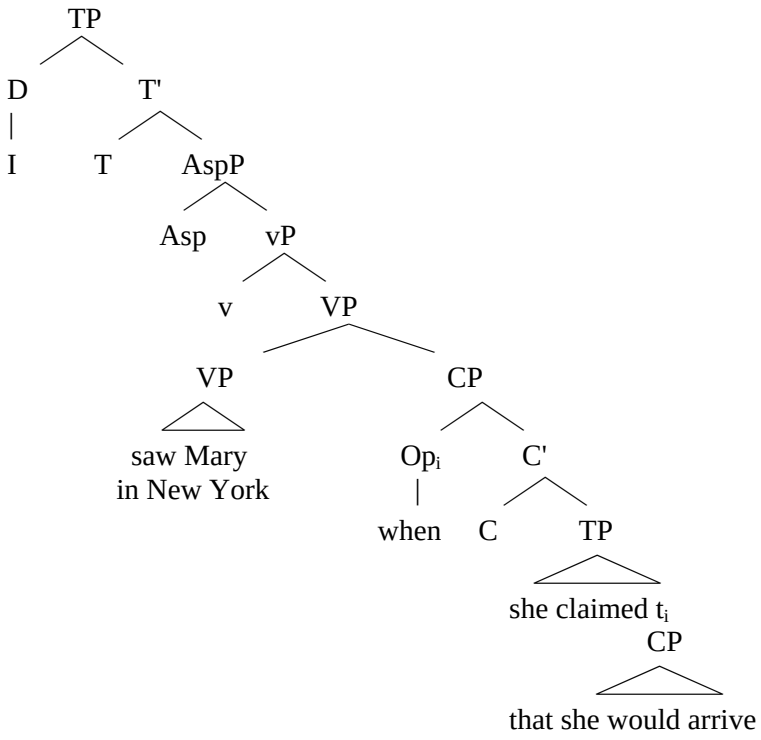
(42) a. Nonsimultaneous, Local Reading
(seeing takes place before/after claiming)



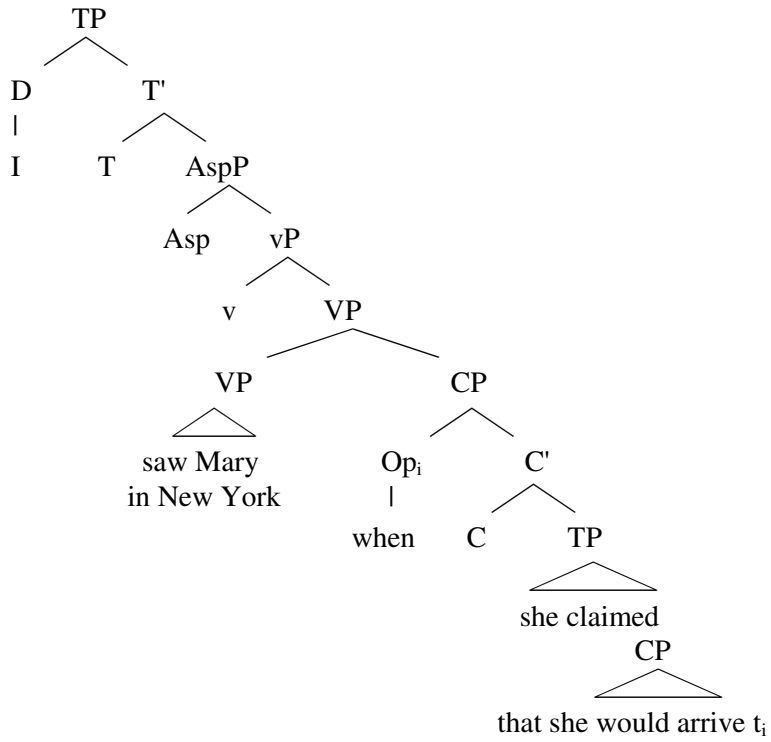
(42) b. Nonsimultaneous, Long-Distance Reading
(seeing takes place before/after arriving)



(42) c. Simultaneous, Local Reading
(seeing takes place at time of claiming)



(42) d. Simultaneous, Long-Distance Reading
(seeing takes place at time of arriving)



It may seem unexpected that a *when* clause permits a long-distance interpretation on its simultaneous reading, since we have seen that simultaneous prepositions such as *while* and *as* do not permit the long-distance reading. However, recall that what blocks the long-distance reading with simultaneous adjunct clauses on the current analysis is that the temporal preposition incorporates into the matrix verb at LF, thereby not allowing the null temporal operator in Spec, PP to be construed with the preposition. Given that with *when* clauses there is no preposition, just an overt operator, it is predicted that the long-distance reading should be possible even on the simultaneous reading; since both the local and long-distance readings are derived by operator movement, they are both compatible with a simultaneous or a nonsimultaneous interpretation. Thus, the fact that (41) permits a long-distance, simultaneous reading is predicted.

3.9 Ellipsis Structures

3.9.1 TP Ellipsis

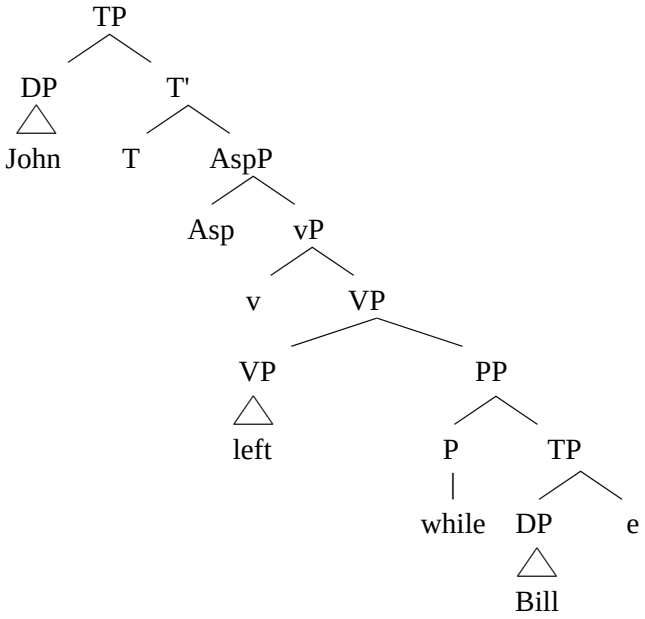
As noted by Larson (1987), temporal prepositions which permit the long-distance reading also allow ellipsis in structures such as (43a), whereas temporal prepositions which do not permit the long-distance reading also do not allow this type of ellipsis, as in (43b).

(43) a. *John left before/after Bill [e]*
b. **John left while/as Bill [e]*

The structural analysis of temporal adjunct clauses offered here explains these facts straightforwardly. What is elided in (43) is a phrase which includes not only the VP, but the temporal information of the clause as well; at least TP.[18]

The present analysis predicts these facts; since the simultaneous adjunct is adjoined to VP, copying the matrix TP into the ellipsis site within the adjunct copies in also the adjunct itself, as in (44):

(44) a. **John left while Bill [e]*
b.

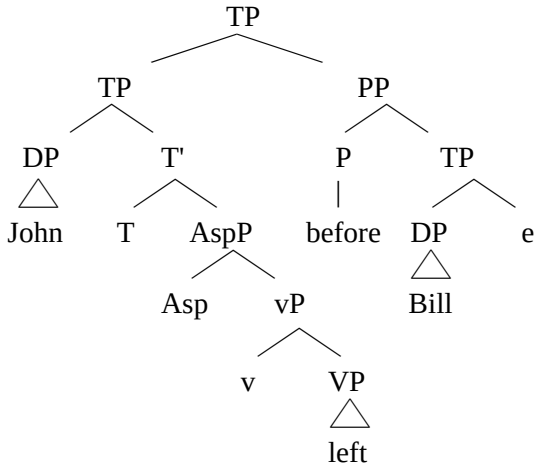


An infinite regress results, since the ellipsis site is always filled in with a structure which itself includes the ellipsis site, resulting in antecedent contained deletion.

However, these structures are acceptable with *before* and *after*, since these adjuncts are high enough in the structure to avoid the infinite regress problem. When copying takes place into the ellipsis site in these structures, it will not include the adjunct itself, since it is adjoined to TP. Hence, copying (the lower segment of) TP into the ellipsis site results in a well-formed structure, as in (45b).

(45) a. *John left before Bill [e]*

b.

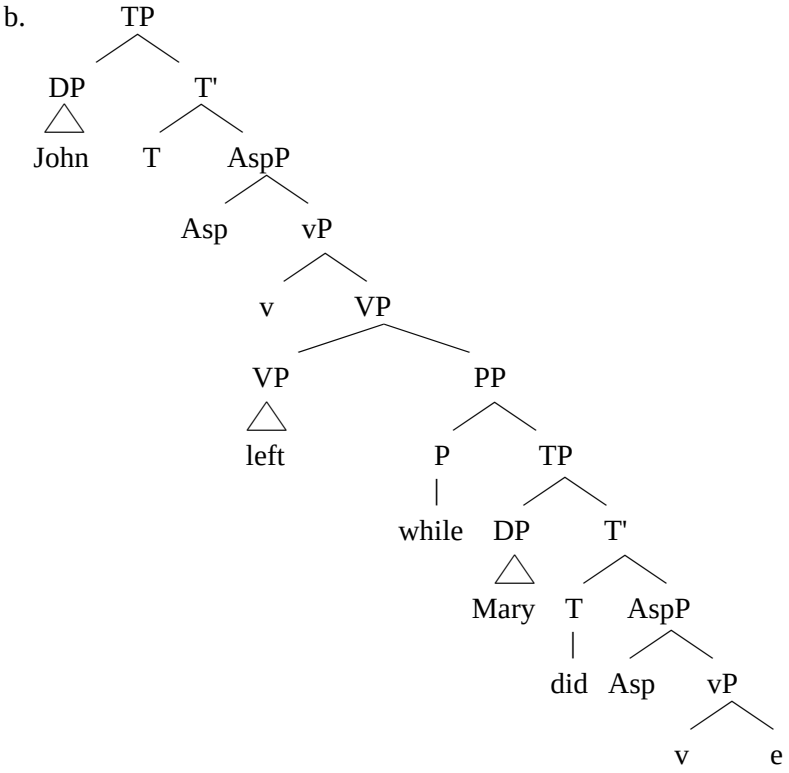


3.9.2 VP Ellipsis

This analysis predicts that simultaneous adjunct clauses should allow ellipsis, permitted that what is elided is the VP, not a higher projection. When copying takes place into the ellipsis site, it will not include the adjunct, since what is copied is (the lower segment of) VP. This prediction is borne out, as is shown in (46), where the VP is elided. As shown in (47), non-simultaneous adjunct clauses also permit VP ellipsis, as predicted.

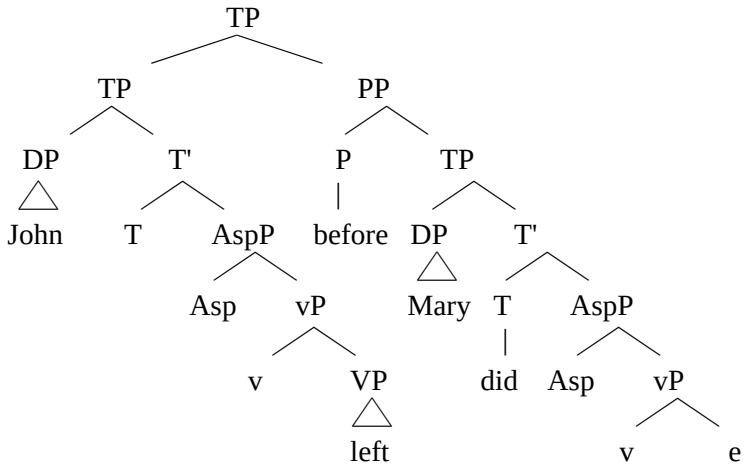
(46) a. *John left while Mary did [e]*

b.



(47) a. *John left before Mary did [e]*

b.



3.9.3 Antecedent Contained Deletion with Arguments

The same issue of infinite regress that arises with simultaneous adjunct clauses also arises in antecedent contained deletion (ACD) structures where the ellipsis site is contained in the direct object, illustrated in (48) (see Bouton 1970, Sag 1977, May 1985, Baltin 1987, Larson and May 1990, Lasnik 1993, Takahashi 1993, Hornstein 1994, Kennedy 1997, Fox 2002, Merchant to appear).

(48) *John saw [everyone that you did [e]]*

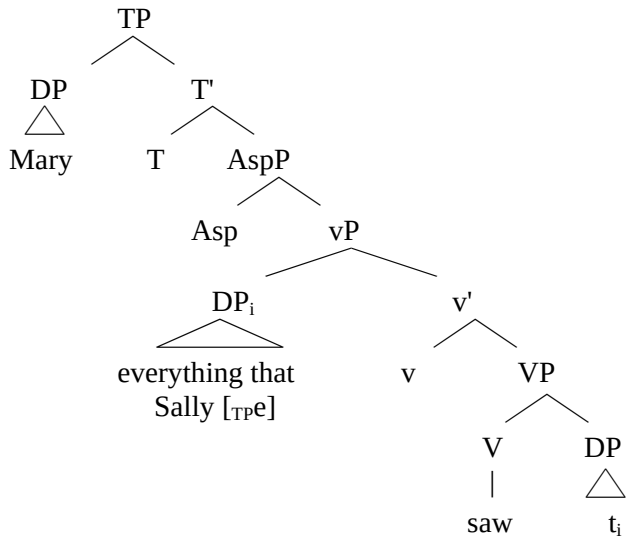
As with VP-adjoined temporal adjuncts, copying the VP into the ellipsis site creates an infinite regress, since the ellipsis site is itself contained in the VP, inside the direct object.

According to many analyses of ACD, this infinite regress is avoided by the direct object moving out of VP. Proposals within the Minimalist framework claim that this movement is driven by the need for the direct object to check its Case features (Lasnik 1993, Takahashi 1993, Hornstein 1994) – following Chomsky (2000), I assume that the landing site of the direct object is Spec, vP.

This analysis of ACD with direct objects predicts the unacceptability of TP ellipsis with direct objects, as in (49a); given that the direct object ends up in Spec, vP, it is outside VP, but within TP, as shown in (49b), and therefore the infinite regress problem results when the matrix TP is copied into the ellipsis site.

(49) a. **Mary saw everything that Sally [$_{TP}$ e]*

b.



This same type of escape route is not available for adjuncts, however, given that adjuncts do not have intrinsic features which need to be checked in the way that arguments do (see chapter two for discussion). Since they do not need to move, by Economy principles, they must not move, and hence, VP-adjoined adjuncts are trapped in an infinite regress in ACD structures in the way that arguments are not.

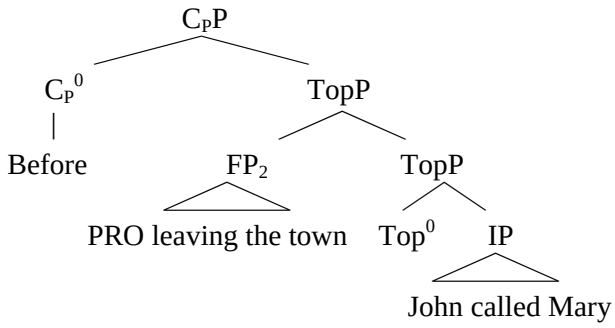
3.10 In Favor of an Adjunction Analysis of Temporal Clauses

As was discussed in chapter two, recent work on the syntax of adjuncts has pursued the idea that these elements are in fact not in an adjoined position, but are instead in complement and/or specifier position (see Larson 1988, Alexiadou 1997, 2000, Cinque 1999). In section 2.15, I argued in favor of an adjunction analysis of temporal adverbials such as *at 3:00*, and in this section I show that an adjunction analysis is superior to the non-adjunct analysis of temporal clauses pursued in Bianchi (2000).

Bianchi (2000) argues that temporal adjuncts are generated as discontinuous structures in the left periphery of the clause and that the "main clause" moves into the Specifier of the temporal conjunction head. The structure of (50a), with a clause-initial temporal adjunct, is shown in (50b), and the structure of (51b), with a clause-final temporal adjunct, is provided in (51b).

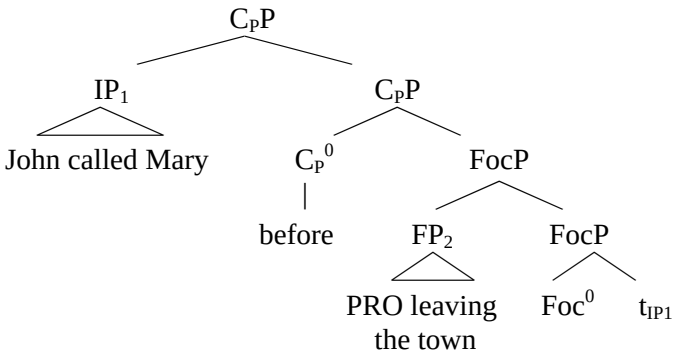
(50) a. *Before leaving the town, John called Mary.*

b.



(51) a. *John called Mary before leaving the town.*

b.



There are several empirical difficulties that this analysis faces. First, the claim that the temporal adjunct clause is not a constituent is problematic. The coordination data in (52), where two temporal adjunct clauses are conjoined, seems to indicate that the temporal adjunct clause is a structural unit.

(52) *[After the referee shouted] and [before the bell sounded], the World Heavyweight champion got in one good punch*

In addition, since the analysis claims that a clause that takes a temporal adjunct is located in the Specifier position of the temporal head, we expect that there should be systematic structural differences between a clause with a temporal adjunct and a clause without an adjunct. For example, we might expect extraction asymmetries between a clause with a temporal adjunct

and a free-standing clause. However, as seen in (53), this distinction does not seem to exist: object extraction is equally possible in both structures, and as seen in (54), adjunct extraction is also equally possible in both structures.

(53) a. *Who$_i$ did Mary see t_i?*
b. *Who$_i$ did Mary see t_i before John left the room?*

(54) a. *Where$_i$ did John sleep t_i?*
b. *Where$_i$ did John sleep t_i after Mary arrived?*

Note also that, as has been discussed in chapter two and in this chapter, there are interpretive and structural differences between clause-initial and clause-final temporal adjuncts. For example, a clause-final adjunct is sometimes temporally ambiguous, while in initial position, it is unambiguous. It is not clear how these facts can be captured within Bianchi's approach, since the temporal adjunct clause is located in the same position in the clause structure whether it appears before or after the main clause, as shown in the structures in (50)–(51).

3.11 Conclusion

To summarize, I have presented a syntactic analysis of several contrasts between simultaneous and nonsimultaneous temporal adjunct clauses. I have argued that temporal adjuncts in which the Event time is interpreted as simultaneous with the matrix Event time are adjoined to VP, while those in which the Event time is interpreted as nonsimultaneous with the matrix Event time are adjoined to TP. This approach was shown to explain the different behavior of these temporal adjuncts with respect to ambiguity of temporal interpretation and the possibility of TP ellipsis. The analysis was argued to be superior to Larson's (1990) Case theoretic approach, which was shown to make several problematic predictions. Evidence for this analysis from preposition stranding with temporal adverbs, the distribution of *when* clauses, and the semantics of clause-initial temporal adjuncts was discussed, and the analysis was contrasted with the non-adjunct approach of Bianchi (2000).

Notes

1. Henceforth, adopting Geis's movement analysis, I refer to the construal of the preposition with the event of the least embedded complement clause as the "local" reading, and the construal of the preposition with the event of a more embedded clause as a "long-distance" reading.
2. I am grateful to Beatrice Santorini for pointing out to me the relevance of the German data discussed in this section.
3. It appears that there is dialectal variation with respect to the availability of the long-distance reading with *bevor* 'before' and *nachdem* 'after', although the speakers I have consulted all find the long-distance reading with *waehrend* 'while' unacceptable. It is not clear to me how to explain this dialectal difference, although it is not accurate, as Larson (1990) claims, that German in general does not allow the long-distance reading with *bevor* 'before' and *nachdem* 'after'.
4. Note that it is possible to interpret the event of seeing as taking place after the event of arriving, if *before* is construed with *said*. However, as discussed in section 3.3.1 below, this local reading is derived not through operator movement, but by a process of head movement.
5. The operator analysis of tense (Prior 1967) is traditionally understood to be incompatible with a Reichenbachian approach. The constrained use of the temporal operator on the present analysis, whereby it represents specifically the Event time, makes it possible to incorporate the temporal operator into the Reichenbachian approach, while avoiding the complications that arise for a generalized operator analysis (see Hornstein 1990:3.3 for discussion).
6. This line of reasoning casts into doubt an analysis of the null operator as the spatiotemporal operator discussed in Kratzer (1989).
7. The analysis presented here shares with the analyses of Geis (1970), Iatridou (1991), and Munn (1991) the claim that the contrast between prepositions is due to a semantic distinction. However, according to the present analysis, the relevant semantic distinction is simultaneity, not durativity.
8. Evidence that nonsimultaneous clauses are adjoined to TP, as opposed to AspP, comes from the ellipsis structures discussed in section 3.9 below.
9. There are languages which show head movement out of temporal adjuncts overtly. Uriagereka (1988:143) reports that determiner incorporation in Galician, which he shows to be a syntactic process, is possible out of temporal adjuncts. In (ib) (Uriagereka's (109)), the determiner *o* 'the' has incorporated into the verb *vinemos* 'we came'. (This incorporation has phonological effects, as discussed by Uriagereka.)

(i) a. *Vinemos o Venres da festa do Maio.*
came-we the Friday of-the holiday of-the May
'We came the Friday of May day.'
b. *Vinemolo Venres da festa do Maio.*

10. The fact that the local reading is not permitted with the locative clause in (i) is predicted on this account. The local construal is derived differently with locatives than with temporals, since the local reading with temporals is the result of the temporal information of the least embedded clause being in a local relation with the matrix verb after V-to-I-to-P-to-V movement. Given that equivalent locative information is not associated with the inflectional projections of the clause (there is no LocP)**,** this contrast is expected.

(i) **John sat down [near [Mary said [that she would be]]]*

11. This example is slightly degraded, due to the fact that the verb of the clause containing the parasitic gap is tensed; parasitic gap constructions are improved with gerunds. However, gerunds independently block the long-distance reading, as noted by Johnson (1988).
12. Even if it were possible to interpret the preposition in its base position, given that simultaneous prepositions do not order temporal points, the temporal operator still could not be ordered with respect to the matrix Event time by the preposition. (See Nunes (1995) for discussion of the mechanism by which the interpretation site of moved elements is determined).
13. See Koizumi (1991) and Miyamoto (1993) for discussion of the VP-adjunction analysis of temporal adjuncts.
14. As pointed out to me by Juan Uriagereka, according to this analysis, whereby simultaneous prepositions are semantically empty with respect to the ordering of Event times, these structures are similar to absolute constructions, that have no preposition. Interestingly, absolute constructions require a simultaneous reading of the Events of the matrix and adjunct clauses, as shown in (i).

(i) a. *Sitting on the beach, Mary smoked a cigarette.*
b. *??Leaving the door open in the morning, I returned to a cold house.*

15. Observe that both non-simultaneous adjunct clauses (IP-adjoined) and simultaneous adjunct clauses (VP-adjoined) allow fronting:

(i) a. *After Mariam ate the cotton candy, she hid the wrapper in the drawer.*

b. *As Mirza Amin approached the basket, he threw the ball past the guard.*

Movement of a VP-adjoined adjunct clause is predicted to be possible, since it is only with respect to movement from a higher position that movement from VP position is prohibited (see section 2.13 for discussion).

16. I would like to thank Bob Frank for raising some of the issues discussed here.

17. The simultaneous reading is preferred when the adjunct clause is in the progressive, as in (i).

(i) *John cooked dinner when Mary was sleeping.*

Pragmatic considerations also influence the favored reading, as illustrated by the fact that in (ii) the nonsimultaneous reading is preferred.

(ii) *John hit the ball when Mary threw it to him.*

18. The fact that these constructions involve sentential ellipsis is shown by the fact, discussed by Larson (1987:fn.20), that in languages such as Spanish which permit overt complementizers with temporal prepositions (i), these constructions include an overt complementizer (ii).

(i) *Juan saliá antes de que Bill llegara.*
John left before of that Bill arrived
'John left before Bill arrived.'

(ii) *Juan saliá antes que Bill.*
John left before that Bill
'John left before Bill.'

Chapter 4
The Temporal Syntax of Arguments: Reduced Relatives in Subject Position

4.1 Introduction

In previous chapters, I have focused on temporal structures involving adjuncts; time point adverbials and temporal adjunct clauses. I developed an analysis of these structures based on the claim that the Reference time of tense structure is located in AspP, while the Event time is located in VP. In this chapter, I examine the syntax and semantics of gerundive relative clauses, showing that the framework adopted here for the syntax of tense accounts for their structural and interpretive properties. In particular, the structures lend support to the present proposal for the location of the Speech and Event times. This chapter also introduces a discussion of the temporal syntax of arguments. The analysis of gerundive relatives shows that reflexes of the syntax of tense are evident in the interpretation site of subjects at LF.

This chapter is organized as follows: in section 4.2, I show that gerundive relatives have a reduced tense structure, and that the temporal interpretation of gerundive relatives is dependent on the tense of the main clause. In section 4.3, assuming the syntactic representation of tense developed here, I claim that their reduced tense structure correlates with a reduced clause structure. In section 4.4, I propose that the temporal dependency of gerundive relatives is instantiated in the syntax. Assuming that the Event time is represented in VP, as well as the proposal that temporal dependency requires syntactic locality, I claim that a gerundive relative in subject position which is interpreted with respect to the Event time correlates with VP-internal interpretation of the subject. Since the Speech time is associated with TP, when the gerundive relative is interpreted with respect to the Speech time, the subject is interpreted in Spec, TP.

Evidence for this analysis of the syntax of subjects is discussed from constructions involving coordination, existential *there*, scope of quantificational and cardinality adverbials, extraposition, and presuppositionality effects, in section 4.5. I show that in constructions where the subject is

interpreted inside VP, the gerundive relative is interpreted with respect to the Event time of the clause, whereas when the subject is interpreted in TP, the gerundive relative receives a Speech time reading. I also discuss temporally dependent readings of full relatives, showing that these interpretations are predicted by the present analysis.

Section 4.6 discusses the behavior of gerundive relatives with respect to binding-theoretic reconstruction effects and section 4.7 presents a discussion of extraposition with gerundive relatives. I argue that their exceptional behavior as compared to full relatives in these constructions is explained by the structural consequences of their requirement for temporal dependency.

4.2 Interpretation of Gerundive Relatives

Enç (1987: 645) notes that the temporal interpretation of finite relative clauses is independent of the tense of the matrix clause (see also Hudson 1973; Ladusaw 1977; Dowty 1982; Abusch 1988 for discussion of the temporal interpretation of relative clauses). This is illustrated by the example in (1), where the matrix event of complaining and the gerund event of waiting are both interpreted as occurring in the past relative to the Speech time, but are temporally independent of one another; the complaining or the waiting may take place first, or they may take place at the same time.

(1) *A passenger who was waiting for flight #307 complained to the flight attendant.*

Hudson (1973) notes that in contrast to finite relative clauses, gerundive relatives are interpreted as temporally dependent on the main clause (see also Comrie 1985). The gerund event of waiting in (2) may take place at the time of the matrix event of complaining (Hudson's "derivative" reading), where the meaning is 'A passenger complained to the flight attendant while he was waiting for flight #307'. The event of waiting may also take place at the Speech time (Hudson's "deictic" reading), where the meaning is 'A passenger who is now waiting for flight #307 complained to the flight attendant'. However, a temporally independent reading, for example with the waiting taking place sometime in the past before the complaining, is not possible.

(2) *A passenger waiting for flight #307 complained to the flight attendant.*

4.2.1 Temporal Dependency of Gerundive Relatives

In order to account for the temporal dependency of gerundive relatives, in this section I analyze their tense structure. Following Hornstein (1990: 115–117), I assume that gerunds have a reduced tense structure with no Speech time, consisting of only Reference and Event times, as in (3).

(3) R , E

Evidence that gerundive relatives lack a Speech time is that they do not permit tense morphemes, as shown in (4). Since the tense morpheme orders the Reference time with respect to the Speech time, given that there is no Speech time, there can be no tense morpheme.

(4) **The passengers were waiting for flight #307 left the room.*

A tense structure may be interpreted by being temporally linked to the time of the event of utterance, the Speech time, or by being linked to another time which is in turn linked to the Speech time. Because the tense structure of a gerund cannot be anchored to a Speech time within its own clause, it must be interpreted by being linked to the matrix tense. I claim that the two readings of (2) (which is repeated in (5)) are due to interpretation with respect to different times of the matrix tense. The reading of (5) where the waiting is interpreted as occurring at the time of complaining results from the tense structure of the gerund linking to the Event time of the main clause. In contrast, the reading where the waiting occurs at the time of Speech results from linking to the Speech time of the main clause. From here on, I refer to these readings as the Event time reading and the Speech time reading, respectively (6a–b).

(5) *A passenger waiting for flight #307 complained to the flight attendant.*

(6) a. Event time reading – event of gerund (waiting) is interpreted as occurring at time of matrix Event (complaining)

b. Speech time reading – event of gerund (waiting) is interpreted as occurring at time of Speech

The tense structures of the Event and Speech time readings in (6a) and (6b) are as in (7a) and (7b), respectively. The tense structure in (7a) represents the reading where the event of waiting occurs at the time of complaining, with the tense structure of the gerund linked to the Event time of the matrix clause. (7b) shows the tense structure of the reading with the waiting occurring at the Speech time, where the tense structure of the gerund is linked to the matrix Speech time.[1]

(7) a. E , R _ S Event time reading
  |
  R , E

b. E , R _ S Speech time reading
  |
  R , E

The claim that gerundive relatives are temporally dependent on the tense of the main clause is supported by the examples with temporal adverbials in (8). The waiting of the gerund in (8a) may be interpretted as occurring in the past but not in the future, and hence is possible with *yesterday*, but not *tomorrow*, because the matrix tense is past. However, the waiting in (8b) may be interpreted as occurring in the future, but not the past, and hence can appear with *tomorrow* but not *yesterday*, since the matrix tense is future.[2]

(8) a. *A passenger waiting (yesterday/*tomorrow) for flight #307 com plained to the flight attendant*
b. *A passenger waiting (*yesterday/tomorrow) for flight #307 will complain to the flight attendant*

In this section, I have argued that when the event of a gerundive relative is interpreted as occurring at the time of the matrix event, the reduced tense structure of the gerundive relative links to the Event time of the matrix clause, and when the gerundive event is interpreted as occurring at the time of utterance, it links to the Speech time of the matrix clause.

4.2.2 Speech Time Readings

Evidence for the claim that the Speech time reading of gerundive relatives is derived by linking of the tense structure of the gerund to the Speech time of the main clause comes from the distribution of gerundive relatives in environments in which the Speech time is interpreted as a time other than the utterance time: historical present and Sequence of Tense (SOT) constructions.

4.2.2.1 Historical Present Contexts

The Speech time generally acts as a deictic element that is interpretively anchored within the speech situation. However, if a time is made sufficiently salient in the discourse, it may reorient the value of the Speech time to a time other than the utterance time (Comrie 1985; Hornstein 1990). An example of this is given in (9), where the first sentence reorients the Speech time to the seventeenth century.

(9) *Imagine that we are back in the seventeenth century. Erin is planting potatoes in the field and Sean is gathering hay for the barn. One of the little kids helping Sean is bothering the sheepdog.*

The event of helping in the gerundive relative of the last sentence of (9) is interpreted as occurring at the reoriented Speech time of the seventeenth century, and not at the utterance time of the discourse. This supports the claim made here that on the reading of a gerundive relative where the event of the relative is interpreted as occurring at the time of the utterance, the tense of the gerund is dependent on the Speech time.

4.2.2.2 Sequence of Tense Constructions

Sequence of Tense constructions present another example of a tense structure where the Speech time links to a time other than the utterance time, and the readings of gerundive relatives with this construction provide further evidence that the tense structure of gerundive relatives may link to the Speech time.

An embedded event in English may be temporally evaluated with respect to the Speech time (temporally independent reading), or with respect

to the Event time of the subcategorizing verb (temporally dependent, or Sequence of Tense, reading). The temporally independent reading is illustrated by (10a), where the embedded event of crying is interpreted as future with respect to the Speech time. A Sequence of Tense, or SOT, reading is exemplified in (10b), where the event of crying may be interpreted as present with respect to the saying event, with the crying taking place at the same time as saying (for various approaches to SOT phenomena, see Jesperson 1931; Ladusaw 1977; Comrie 1981; Enç 1987; Abusch 1988; Ogihara 1996 and references therein).

(10) a. *Mary said that John will cry.*
b. *Mary said that John was crying.*

In order to account for the "present with respect to a past event" interpretation of (10b), Hornstein claims that the embedded clause has present tense structure, and is only morphologically past tense. The temporal structure of SOT readings involves linking the embedded Speech time to the matrix Event time, yielding (11) for the "present with respect to a past event" reading of (10b).

(11) E , R _ S
|
S , R , E

A gerundive relative that occurs within a SOT clause does not show the ambiguity between an Event time reading and a Speech time reading that it does in a temporally independent clause. Consider the gerundive relative of (12a), occuring within a temporally independent embedded clause. Here, the event of waiting may occur at the Speech time, with the reading 'John said that the passenger who is now waiting for flight #307 will cry'. The event of waiting may also occur at the embedded Event time, with the reading 'John said that the passenger who will be waiting for flight #307 will cry while he is waiting for the flight'. The tense structure of the Speech time reading is in (12b), where the tense structure of the gerund is linked to the embedded Speech time, which is temporally independent of the matrix clause. The structure of the Event time reading, where the waiting takes place at the time of crying, is in (12c), where the tense structure of the gerund is linked to the embedded Event time. Since in temporally independent clauses, the Speech time is not linked to the matrix tense structure, it re-

ceives the utterance time value which the gerund can inherit by linking to this time, deriving the Speech time reading.

(12) a. *John said that the passenger waiting for flight #307 will cry.*

b. E , R _ S

S _ R , E
|
R , E

c. E , R _ S

S _ R , E
|
R , E

In contrast, a gerundive relative within a SOT clause cannot receive a Speech time reading. In (13a), on the reading where the event of crying is interpreted as occurring at the same time as the event of saying, the waiting can not be interpreted as occurring at the Speech time: (13a) cannot mean 'John said that (as he was speaking) the passenger who is now waiting for flight #307 was crying'. Instead, the waiting is interpreted as taking place at the time of saying: on its SOT reading, (13a) must mean 'John said that (as he was speaking) the passenger who was waiting at that time for flight #307 was crying'. The relevant tense structure is provided in (13b), where the tense structure of the gerund links to the tense structure of the embedded clause, which is in turn linked to the matrix clause.

(13) a. *John said that the passenger waiting for flight #307 was crying.*

b. E , R _ S
|
S , R , E
|
R , E

Since the Speech time is linked to the matrix tense structure in a SOT construction, as in (13b), it does not receive the default utterance time value, and therefore a gerundive relative within a SOT clause cannot be inter-

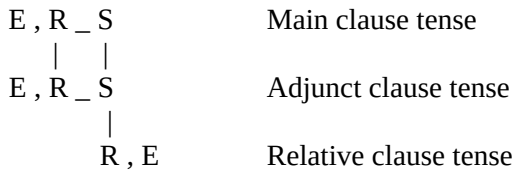
preted with respect to the utterance time by linking to the Speech time, and hence cannot receive an utterance time reading. This explanation provides evidence that a gerundive relative is interpreted with respect to the Speech time on its utterance time reading; when the Speech time is reoriented to the Event time of the main clause, the gerund is interpreted with respect to this Event time.

This analysis of gerundive relatives within SOT clauses is supported by their contrasting behavior in another type of temporally dependent clause, temporal adjuncts (see chapter three for detailed discussion of this construction). In contrast to SOT clauses, a gerundive relative within a temporal adjunct clause is ambiguous between an Event time and a Speech time reading; (14) may be interpreted with the waiting occurring at the time of complaining or at the utterance time; it may mean 'John saw Mary before the passenger complained to the flight attendant while he was waiting for the flight' (Event time reading), or it may mean 'John saw Mary before the passenger who is now waiting for flight #307 complained to the flight attendant' (Speech time reading).

(14) *John saw Mary before the passenger waiting for flight #307 complained to the flight attendant.*

The contrasting behavior of temporal adjunct and SOT constructions is due to the different time linking involved in these constructions. As discussed in chapter three, temporal adjunct clause constructions involve linking of the adjunct Speech and Reference times to the matrix Speech and Reference times. Thus the derived tense structure of (14) is as in (15).

(15)



Since the Speech time of the adjunct is reoriented to the Speech time of the matrix clause, it still receives a default utterance time interpretation (SOT clauses, on the other hand, reorient the Speech time to the Event time of the matrix clause). Therefore a gerundive relative within a temporal adjunct clause can link to the adjunct Speech time and receive an utterance time reading.

To summarize this section, although the Speech time is typically interpreted as the deictic utterance time, when it is reoriented to another value, as in historical present and SOT constructions, gerundive relatives are interpreted with respect to this reoriented time, showing that the utterance time reading results from linking to the Speech time.

4.3 Reduced Clause Structure of Gerundive Relatives

As has been discussed in the literature on relative clauses, gerundive relatives seem to have a reduced clause structure when compared to full relatives (see Williams 1975; Stowell 1982).[3] Given the present analysis of tense whereby the Speech time is associated with TP, the Reference time with AspP, and the Event time with VP, since gerundive clauses consist of only a Reference and an Event time, I propose that they are structurally AspP.

4.3.1 Missing CP Projection

Gerundive relatives, in contrast to full relatives, do not appear to have a CP projection. This is shown by the fact that they do not permit overt complementizers, while full relatives do, as illustrated in the contrast between the full relative in (16a) and the gerundive relative in (16b).

(16) a. *The passengers that were waiting for flight #307 complained to the flight attendant.*
b. **The passengers that waiting for flight #307 complained to the flight attendant.*

In addition, as shown in (17a) and (17b), gerundive relatives contrast with full relatives in that they do not permit fronted temporal PPs, although they do permit temporal PPs in final position, as shown in (17c).

(17) a. *The passengers [who at 6:00 were waiting for flight #307] complained to the flight attendant*
b. **The passengers[at 6:00 waiting for flight #307]complained to the flight attendant*
c. *The passengers [waiting for flight #307 at 6:00]complained to the flight attendant*

Fronted temporal PPs are located in a position above the subject, as is shown by the example in (18).

(18) *At 6:00, the passengers were waiting for flight #307.*

The unacceptability of gerundive relatives with overt complementizers and fronted PPs is thus predicted given the claim that gerundive relative clauses are AspPs.

4.3.2 Missing Inflectional Projections

Gerundive relatives also lack certain inflectional projections, as shown by the fact that they do not occur with sentential adverbs or modal verbs. The data in (19) show that the sentential adverb *probably* is permitted with full relatives but not with gerundive relatives (examples from Williams 1975: 251).

(19) a. *The person who was probably playing the music you heard used to be my roommate.*
b. **The person probably playing the music you heard used to be my roommate.*

When *probably* occurs between the subject and VP, it is associated with an inflectional projection, as seen by the fact that it cannot be associated with VP in VP fronting or pseudoclefting, as shown in the examples in (20).

(20) a. **John said that Mary will probably play the music and probably play the music she will.*
b. **Bill decided not to go to the party. What he did was probably sit around and listen to jazz.*

However, *probably* can occur with the inflectional projection in these constructions, as in (21a) and (21b) (see Chomsky 1965; Dresher 1976; Travis 1988; Ernst 2002 for discussion of the syntax of sentential adverbs).[4]

(21) a. *John said that Mary will probably play the music and play the music she probably will.*

b. *Bill decided not to go to the party. What he probably did was sit around and listen to jazz.*

The data discussed here is explained if the inflectional projection that *probably* is associated with (which is plausibly Modality Phrase), is absent in gerundive relatives, since gerundive relatives are composed of only an AspP. As shown by the contrast between (22a) and (22b), gerundive relatives, unlike full relatives, do not occur with modal verbs, indicating that gerundive relatives lack the relevant inflectional projection. (As in the examples in (21), this projection is plausibly Modality Phrase).

(22) a. *The passengers who should/could/may/might be waiting for the flight spoke to the flight attendant*
b. **The passengers should/could/may/might waiting for the flight spoke to the flight attendant*

In this section, we have seen that gerundive relatives consist of a reduced clause structure; in contrast to full relatives, they do not permit complementizers, fronted PPs, sentential adverbs, or modal verbs. This reduced structure is explained by the current analysis of gerundive relatives; since they include only a Reference and Event time, gerundive relatives are syntactically AspPs.[5]

4.4 Syntax of Subject Gerundive Relatives

4.4.1 A Restriction on Time Linking

We have seen in this chapter that gerundive relatives in subject position are temporally interpreted with respect to the Speech time or the Event time of the matrix clause. These readings are summarized for (23) in (24a) and (24b). Given that the Event and Speech time readings are the result of the linking of different times in tense structure, the syntactic issue is how these readings are represented in the sentence structure.

(23) *A passenger waiting for flight #307 complained to the flight attendant.*

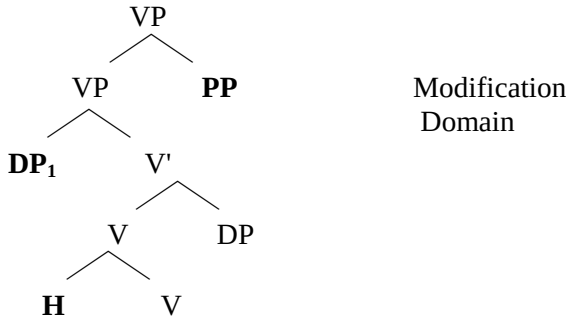
(24) a. Event time reading – event of gerund (waiting) is interpreted as occurring at time of matrix Event (complaining)

b. Speech time reading – event of gerund (waiting) is interpreted as occurring at time of Speech

I propose that the Event time reading requires the gerundive tense to be in a syntactically local relation with the Event time of the main clause, and the Speech time reading requires the gerundive tense to be local with the Speech time of the main clause. This locality requirement is formulated in (25a), the Condition on Time Linking, which states that in order for times to link in tense structure, they must be located in the same modification domain at LF. The definition of modification domain assumed here is illustrated in (25b), where the modification domain of V contains DP_1, PP, and H (see section 2.4.1 for the formal definition of modification domain).

(25) a. Condition on Time Linking – In order for time α to link to time β, α and β must be within the same modification domain at LF.

b.



Event and Speech time readings of gerundive relatives thus correlate with the position of the subject at LF. Assuming the VP Internal Subject Hypothesis, the subject is generated within VP (I assume that this position is Spec, VP), and moves from this position to Spec, TP (see Zagona 1982; Kitagawa 1986; Speas 1986; Koopman and Sportiche 1988, 1991). Gerundive relatives interpreted as temporally dependent on the Event time hence involve interpretation of the subject within VP at LF, since this is the position of the Event time. On the other hand, gerundive relatives interpreted as temporally dependent on the Speech time involve interpretation of the subject within TP at LF, since this is the position of the Speech time.[6,7]

(26)

Temporal interpretation	LF interpretation site of subject
Event time reading	Spec, VP
Speech time reading	Spec, TP

4.4.2 Locality of Temporal Interpretation

Initial evidence for the Condition on Time Linking is provided in (27a), with a gerundive relative in subject position of a matrix clause, and (27b), with a gerundive relative in subject position of an embedded clause. The gerund in (27a) and (27b) can be interpreted with respect to the Speech time or with respect to the Event time of its immediate clause only. The gerund in the matrix clause in (27a) can be interpreted with the waiting occurring at the time of the matrix event of saying but cannot be interpreted as occurring at the time of the embedded event of complaining. Likewise, the gerund in the embedded clause in (27b) can be interpreted with the waiting occurring at the time of the embedded event of complaining, but cannot be interpreted as occurring at the time of the matrix event of saying.[8] This is predicted; since a subject with a gerundive relative may be within a checking domain of a time of only its own clause, according to the Condition on Time Linking, it can only be interpreted with respect to one of these times.[9]

(27) a. *The passenger waiting for flight #307 said that Mary will complain to the flight attendant.*
b. *Mary said that the passenger waiting for flight #307 will complain to the flight attendant.*

To summarize this section, I have proposed that the Event time reading of gerundive relatives in subject position correlates with VP-internal position of the subject at LF, and that the Speech time reading of gerundive relatives correlates with Spec, TP position of the subject.[10]

4.5 Structural Evidence

In this section, I present evidence for the proposed analysis of the syntax of gerundive relatives from constructions involving coordination, existential *there*, the scope of quantificational and cardinality adverbials, extraposition, and presuppositionality effects.[11]

4.5.1 Coordination

Full relatives which are coordinated in subject position may receive independent temporal interpretations. This is illustrated in (28), where the first relative *who entered the department in 2001* is interpreted as past with respect to the Speech time (the entering takes place before the Speech time), and the second relative *who save enough money for the airfare* is interpreted as past with respect to the time of the event of going to the conference (the saving takes place before the time of going to the conference, but may be after the Speech time).

(28) *Three students [who entered the department in 2001] and [who save enough money for the airfare] will travel to the conference next month*

In contrast to full relatives, when gerundive relatives are coordinated in subject position, they must be evaluated with respect to the same time. In (29), the events of waiting and suffering may be both interpreted as occurring at the Event time, with the reading 'Three passengers called the manager at the time that they were waiting for the next ship and suffering from seasickness'. The waiting and suffering may also be interpreted with respect to the Speech time, with the meaning 'Three passengers who are now waiting for the next ship and who are now suffering from seasickness called the manager'. However, although it is pragmatically plausible, it is not possible to interpret the waiting as occurring at the time of Speech and the suffering as occurring at the time of calling the manager, with the meaning 'Three passengers who are now waiting for the next ship called the manager at the time that they were suffering from seasickness'.

(29) *Three passengers waiting for the next ship and suffering from seasickness called the manager.*

(30) a. Event time reading
'Three passengers called the manager at the time that they were waiting for the next ship and suffering from seasickness'.
b. Speech time reading
'Three passengers who are now waiting for the next ship and who are now suffering from seasickness called the manager'.
c. *Speech/Event time reading
'Three passengers who are now waiting for the next ship called

the manager at the time that they were suffering from seasickness'.

Since distinct temporal interpretations for coordinated relatives are possible with full relatives, it does not seem to be purely due to a semantic problem that coordinated gerundive relatives cannot be interpreted with respect to different times. This effect is predicted on the current analysis of gerundive relatives; since the subject including the conjoined relatives must be interpreted either in Spec, TP, or in Spec, VP, both gerunds must be interpreted either with respect to the Speech time or with respect to the Event time.

4.5.2 Existential Constructions

Support for the claim that subject gerundive relatives are interpreted within VP when they relate to the Event time and within TP when they relate to the Speech time comes from existential constructions. Note that (31a) is ambiguous; it can have an Event time reading, where the waiting is interpreted with respect to the time of storming into the room, or it can have a Speech time reading, where the waiting is interpreted with respect to the utterance time. However, the existential construction version of (31a) in (31b) does not permit the Speech time reading; the waiting here is necessarily interpreted with respect to the event of storming into the room.

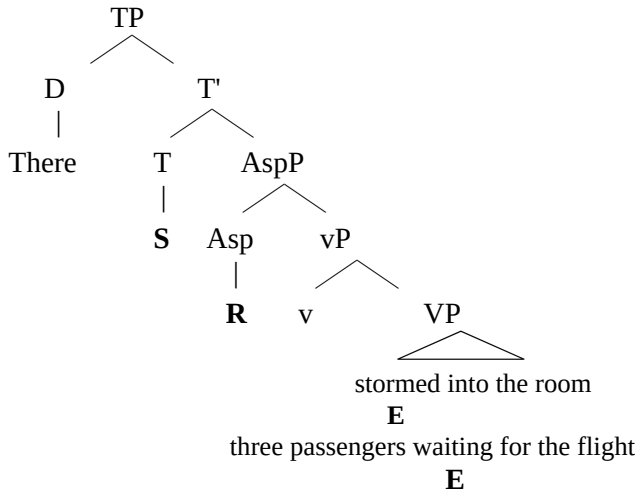
(31) a. *Three passengers waiting for the flight stormed into the room.*
b. *There stormed into the room three passengers waiting for the flight.*

I assume, following Diesing (1992), that existential constructions involve interpretation of the associate of the expletive within VP (see also den Dikken 1995 and Groat 1995). Evidence for the VP-internal position of the associate discussed by den Dikken (1995) comes from contrasts in reciprocal licensing. In (32a), the subject *some applicants* can bind *each other* in the PP, but binding is not permitted in the existential construction version of (32a) in (32b). Assuming that the reciprocal *each other* must be c-commanded at LF by its antecedent, this contrast shows that whereas the subject of (32a) c-commands the reciprocal, the associate in (32b) does not c-command the reciprocal at LF. This is explained if the associate is interpreted within VP.

(32) a. *Some applicants$_i$ seem to each other$_i$ to be eligible for the job*
b. **There seem to each other$_i$ to be some applicants$_i$ eligible for the job.*

Given that the associate of the expletive is interpreted within VP at LF, the present analysis correctly predicts that only the Event time reading is permitted in the existential construction, since when the subject is located within VP, it is in the checking domain of the Event time, as in the structure for (31b) in (33).

(33)



4.5.3 Scope of Quantificational Adverbs

Certain quantificational adverbs show a scope ambiguity with respect to the subject. This is illustrated in (34), which may be interpreted with the adverb taking scope over the subject, with the meaning 'It is usually the case that there are some three passengers or other such that they get stranded here', or may be interpreted with the subject taking wide scope, with the meaning 'There are three particular passengers such that they usually get stranded here' (see Lewis 1975; Kamp 1981; Heim 1982; deSwart 1993 for discussion of quantificational adverbs).

(34) *Three passengers usually get stranded here.*

This scope ambiguity correlates with Event or Speech time readings of gerundive relatives. When the gerund receives an Event time reading, the subject is interpreted as within the scope of the adverb. On this reading of (35), the meaning is 'There are usually some three passengers or other such that they get stranded here when they are waiting for flight #307'. It is not possible for the subject to take wide scope, meaning 'There are three particular passengers such that they usually get stranded here when they are waiting for flight #307'. However, when the gerund receives a Speech time reading, the subject is interpreted as outside the scope of the adverb; here, the meaning of (35) is 'There are three particular passengers who are waiting for flight #307 such that they usually get stranded here'. The reading with wide scope for the adverb is not possible: 'There are usually some three passengers or other who are now waiting for flight #307 such that they get stranded here'.

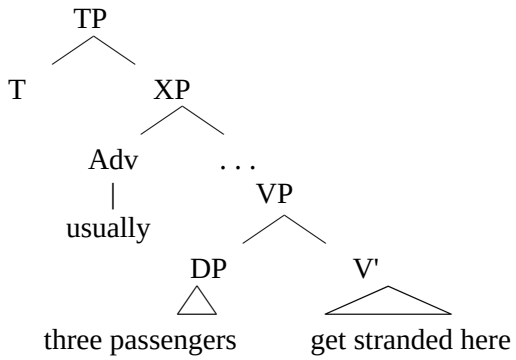
(35) *Three passengers waiting for flight #307 usually get stranded here.*

(36) Event time reading
   a. 'There are usually some three passengers or other such that they get stranded here when they are waiting for flight #307'.
   b. *'There are three particular passengers such that they usually get stranded here when they are waiting for flight #307'.

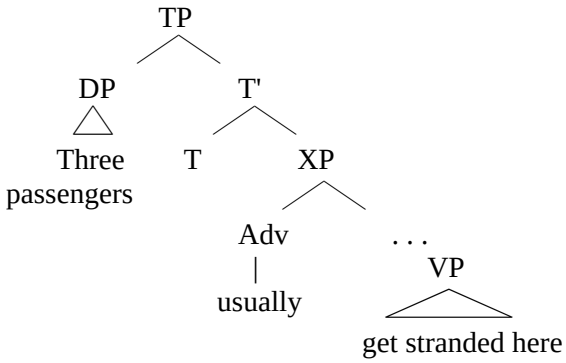
(37) Speech time reading
   a. 'There are three particular passengers who are waiting for flight #307 such that they usually get stranded here'.
   b. *'There are usually some three passengers or other who are now waiting for flight #307 such that they get stranded here'.

Given its linear order in the sentence, the quantificational adverb appears to be located between the TP subject position and VP. Therefore, since on the present analysis the Event time reading is linked to VP-internal interpretation of the subject, we correctly predict that on this interpretation the subject is within the scope of a quantificational adverb, as in the structure in (38). Conversely, given that the Speech time reading is linked to TP interpretation of the subject, on this interpretation, the subject is outside the scope of the quantificational adverb, as in the structure in (39).[12]

(38)



(39)



4.5.4 Scope of Cardinality Adverbials

A similar effect to the one observed with quantificational adverbs is seen with adverbials that specify the cardinality of an event. The example in (40) illustrates the scope ambiguity of subjects and cardinality adverbials; the adverb may take scope over the subject, with the meaning 'There are five events of three passengers complaining', or the subject may take scope over the adverb, with the meaning 'There are three passengers such that they complained five times', with up to fifteen complaining events.

(40) *Three passengers complained to the flight attendant five times.*

As expected from the previous discussion of quantificational adverbs, the narrow scope reading of the subject correlates with the Event time interpretation, and the wide scope reading correlates with the Speech time interpretation. In (41), on the reading where the waiting takes place at the time of

complaining, the meaning is 'There are five events of three passengers complaining to the flight attendant while they were waiting for their flight(s)'. It is not possible to interpret this sentence as meaning 'There are three passengers such that they complained to the flight attendant five times while they were waiting for their flight(s)'. On the interpretation where the waiting takes place at the time of Speech, the reading is 'There are three passengers who are now waiting for their flight(s) such that they complained to the flight attendant five times'. The following interpretation is not possible: 'There are five events of three passengers who are now waiting for their flight(s) complaining to the flight attendant'.

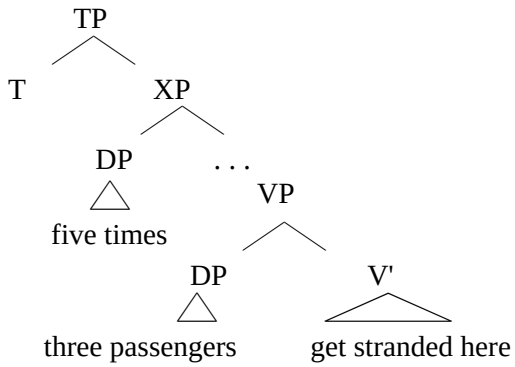
(41) *Three passengers waiting for the flight complained to the flight attendant five times.*

(42) Event Time Reading
   a. 'There are five events of three passengers complaining to the flight attendant while they were waiting for their flight(s)'.
   b. *'There are three passengers such that they complained to the flight attendant five times while they were waiting for their flight(s)'.

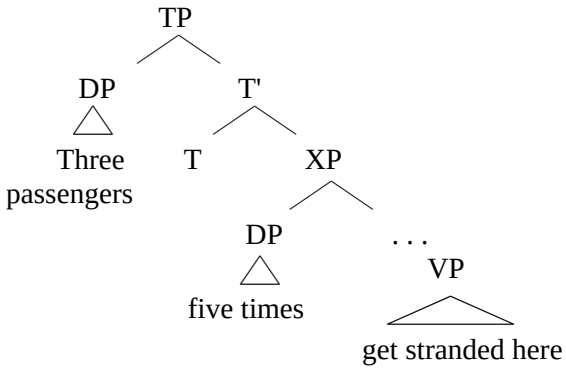
(43) Speech Time Reading
   a. 'There are three passengers who are now waiting for their flight(s) such that they complained to the flight attendant five times'.
   b. *'There are five events of three passengers who are now waiting for their flight(s) complaining to the flight attendant'.

These facts are analyzed in the same way as the data involving quantificational adverbs; assuming that the cardinality adverbial is located between the TP subject position and VP, since the Event time reading is linked to VP-internal subject interpretation, on this reading, the subject falls within the scope of the cardinality adverbial, as in the structure in (44). Since the Speech time reading is linked to TP subject interpretation, on this reading, the subject takes scope over the cardinality adverbial, as shown in the structure in (45).

(44)



(45)



4.5.5 Extraposition

Extraposition constructions provide further evidence for the proposal outlined here. Note that (46a), with a gerundive relative and an adjunct PP within the subject, is ambiguous; it permits either an Event time reading for the gerundive relative, where the waiting takes place at the time of entering the room, or a Speech time reading, where the waiting takes place at the time of Speech. However, (46b), the version of (46a) with extraposition of the PP (although slightly marginal) permits only the Event time reading; it can only mean that the waiting takes place at the time of entering the room.[13]

(46) a. *A passenger from California waiting for the announcement entered the room.*

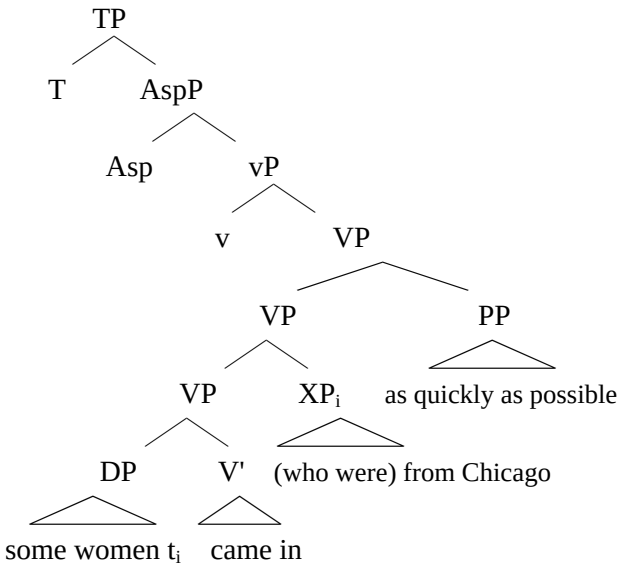
b. *?A passenger waiting for the announcement entered the room from California.*

Following Culicover and Rochemont (1990), I assume that elements extraposed from the subject are adjoined to VP. Evidence for this claim comes from VP adverbial constructions. Constituents extraposed from the subject can occur before VP adverbials, such as *as quickly as possible* in (47), which, recall from discussion in section 2.12.2 we assume are adjoined to VP. Given that extraposed constituents appear before VP-adjoined material, they must also be adjoined to VP.

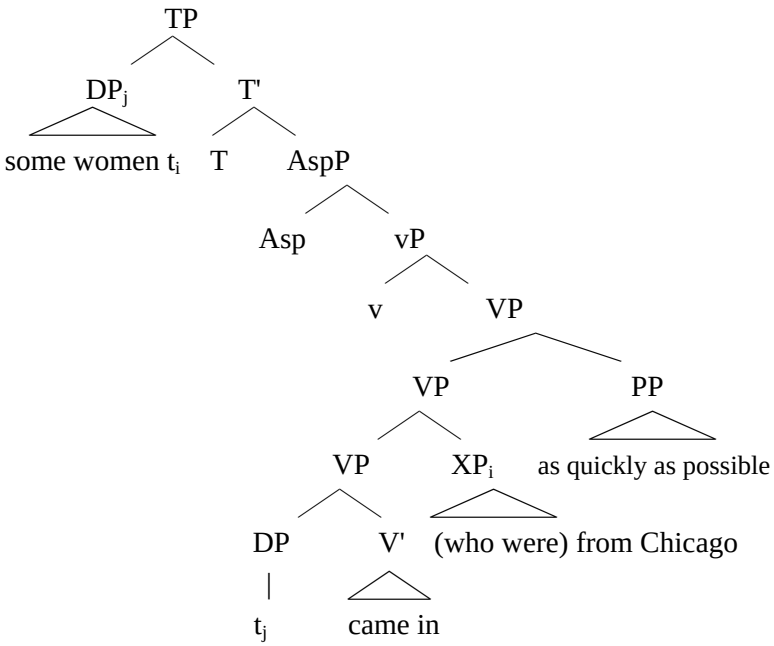
(47) *Some women came in (who were) from Chicago as quickly as possible.*

Recall from chapter two that in order for a modifier to modify an element, it must be within the modification domain of this element. Assuming that extraposed elements are VP-adjoined, a subject that has been extraposed from may be interpreted in Spec, VP; the extraposed PP is adjoined to the phrase (VP) which contains the subject, and hence modification is permitted, as shown in (48). However, interpreting a subject that has been extraposed from in Spec, TP is barred, since the extraposed PP is not adjoined to the subject in Spec, TP or to the phrase (TP) that contains the subject, and hence modification is not licensed, as shown in (49). The absence of the Speech time reading with extraposition from a subject with a gerundive relative is thus explained on the present account; since extraposition allows only the VP-internal interpretation of the subject, only the Event time reading is permitted with this construction.[14]

(48)


TP
T
AspP
Asp
vP
v
VP
VP
PP
VP
XP$_i$
as quickly as possible
DP
V'
(who were) from Chicago
some women t$_i$
came in

(49)


TP
DP$_j$
T'
some women t$_i$
T
AspP
Asp
vP
v
VP
VP
PP
VP
XP$_i$
as quickly as possible
DP
V'
(who were) from Chicago
t$_j$
came in

4.5.6 Presuppositionality Effects

The interpretation of the subject as presuppositional or cardinal influences the temporal interpretation of a gerundive relative. Cardinal subjects are compatible with the Event time reading only; in (50a) and (50b), the event of waiting is interpreted as occurring relative to the time of complaining, not relative to the time of Speech. For example, (50a) may mean 'Few passengers who were waiting for flight #307 complained to the flight attendant at the time that they were waiting ' (51a), but may not mean 'Few passengers who are now waiting for flight #307 complained to the flight attendant' (51b). This is predicted by the current analysis, if we assume, following Diesing (1990), (1992), that cardinal DPs are interpreted within VP at LF, and are therefore within the checking domain of the Event time.

(50) a. *Few passengers waiting for flight #307 complained to the flight attendant.*
b. *Passengers waiting for flight #307 complained to the flight attendant.*

(51) a. 'Few passengers who were waiting for flight #307 complained to the flight attendant at the time that they were waiting'.
b. *'Few passengers who are now waiting for flight #307 complained to the flight attendant'.

In contrast to cardinal subjects, presuppositional subjects permit both Event and Speech time readings, as shown by the examples in (52); (52a) may mean 'Every passenger who was waiting for flight #307 complained to the flight attendant at the time that they were waiting', or it may mean 'Every passenger who is now waiting for flight #307 complained to the flight attendant'.

(52) a. *Every passenger waiting for flight #307 complained to the flight attendant.*
b. *Each passenger waiting for flight #307 complained to the flight attendant.*
c. *All passengers waiting for flight #307 complained to the flight attendant.*
d. *Most of the passengers waiting for flight #307 complained to the flight attendant.*

e. *Some of the passengers waiting for flight #307 complained to the flight attendant.*
f. *All of the passengers waiting for flight #307 complained to the flight attendant.*

(53) Readings of (52a)
a. 'Every passenger who was waiting for flight #307 complained to the flight attendant at the time that they were waiting'. (Event time Reading)
b. 'Every passenger who is now waiting for flight #307 complained to the flight attendant'. (Speech time Reading)

Given that analyses of presuppositionality claim that cardinal DPs are within VP at LF, and presuppositional DPs outside VP at LF, the fact that presuppositional subjects are temporally ambiguous seems to be a puzzle. However, DeHoop's (1993) analysis of presuppositionality may explain this issue. DeHoop shows that in languages such as Dutch with overt scrambling of presuppositional DPs, scrambling is optional; although only presuppositional DPs may scramble, they also may remain inside VP. Carrying this view of scrambling over to English, which shows presupposi tionality effects at LF, the movement of presuppositional DPs can be seen as optional, accounting for the data discussed in this section.[15]

To summarize this section, I have presented data involving coordination, existential *there* constructions, the scope of quantificational adverbs and cardinality adverbials, extraposition, and ECM constructions as evidence for the proposal that a subject with an Event time reading of a gerundive relative is interpreted within VP, whereas a subject with a Speech time reading is interpreted within TP.

4.6 Reconstruction Effects and Gerundive Relatives

It has been noted in the literature that relative clauses contrast with complement clauses in that they do not show binding-theoretic reconstruction effects with WH-movement (see van Riemsdijk and Williams 1975; Freidin 1986; Lebeaux 1988 for discussion). In (54a), with the complement clause *that John was asleep*, the WH-phrase *which claim that John was asleep* behaves as if it is located in its pre-movement position; *he* cannot be coreferent with *John.* However, in (54a), with the relative clause *that John*

made, which claim that John made behaves as if it is outside the c-command domain of the subject; *he* can corefer with *John.*

(54) a. **Which claim that John$_i$ was asleep did he$_i$ say was false?*
b. *Which claim that John$_i$ made did he$_i$ say was false?*

Gerundive relatives, unlike full relatives, do not seem to circumvent reconstruction effects. This is illustrated in the contrast between (55a), with a full relative, and (55b), with a gerundive relative; in (55a), *Chomsky* and *he* can corefer, but in (55b), coreference is not permitted. The gerundive relative, unlike the full relative, behaves as if it reconstructs.

(55) a. *Which student who was reading Chomsky's$_i$ book did he$_i$ say was smart?*
b. **Which student reading Chomsky's$_i$ book did he$_i$ say was smart?*

The analysis of gerundive relatives presented here, in combination with Lebeaux's (1988) proposal for the anti-reconstruction effect of relative clauses, makes possible an explanation of this contrast between full and gerundive relatives. Lebeaux (1988) argues that the relative clause of (54b), unlike the complement clause of (54a), is not present before WH-movement takes place, but is adjoined to the WH-phrase by generalized transformation after the WH-phrase moves to Spec, CP. Since the relative clause is never in object position, it cannot reconstruct to object position.[16]

I claim that although full relatives can be adjoined by generalized transformation after WH-movement has taken place, this option is not available for gerundive relatives because they are temporally dependent on the main clause. If a gerundive relative were to adjoin to the WH-phrase after the WH-phrase moves to Spec, CP, it would not be within the checking domain of a time of the main clause, since the times are located in TP and VP. Hence the gerund would not receive a temporal interpretation. Therefore, gerundive relatives must be present before movement takes place in order to be interpreted relative to a matrix time, and thus they show reconstruction effects.

4.7 Extraposition of Gerundive Relatives

Williams (1975) notes that gerundive relatives, unlike full relatives, do not undergo extraposition, as shown in the contrast between (56a) and (56b).[17]

(56) a. *A man said hello to me who was wearing a fedora.*
b. **A man said hello to me wearing a fedora.*

This contrast is predicted by the present analysis of gerundive relatives. We have seen that gerundive relatives are interpreted with respect to the Speech or Event time of the matrix clause by being located within the checking domain of TP or VP at LF. An extraposed relative, since it is adjoined, is not within the checking domain of any time. Hence an extraposed gerundive relative cannot be temporally interpreted.[18]

Note that if an extraposed gerundive relative were permitted to reconstruct, it should be able to be interpreted with respect to the time that the subject is within the checking domain of. However, it seems that extraposition does not permit reconstruction, as shown in the binding data in (57), from Gueron (1980: 650). Coreference is possible between *Mary* and *her* in (57a), but not in (57b), with extraposition, showing that reconstruction in order to avoid a Binding Condition C violation is not possible with extraposition.

(57) a. *A picture of Mary$_i$ was sent to her$_i$*
b. **A picture was sent to her$_i$ of Mary$_i$*

The same effect is seen with extraposed relative clauses as with PPs, as seen in the contrast between (58a) and (58b).[19]

(58) a. *A picture that Rembrandt$_i$ painted was sent to him$_i$*
b. **A picture was sent to him$_i$ that Rembrandt$_i$ painted*

4.8 Conclusion

In this chapter, I have introduced consideration of the syntax of arguments to the discussion of the structure of tense. I showed that the proposal for the structure of tense introduced in chapter two is supported by the interpretation site of subjects at LF. Gerundive relatives in subject position are temporally dependent on the matrix Event or Speech time, and since the Event time is represented in VP, assuming that temporal dependence requires syntactic locality, a subject gerundive relative with an Event time reading is interpreted within VP. Since the Speech time is associated with TP, when the gerundive relative receives a Speech time reading, the subject is interpreted in Spec, TP.

Constructions involving coordination, existential *there*, scope of quantificational and cardinality adverbials, extraposition, and presuppositionality effects show that when the subject is located in Spec, VP, only the Event time reading is available, whereas when the subject is located in Spec, TP, only the Speech time reading is available.

This analysis also explains why, unlike full relatives, gerundive relatives do not circumvent reconstruction effects with WH-movement. Full relatives avoid reconstruction effects by adjoining directly to the WH-element in Spec, CP, but this adjunction is not permitted with gerundive relatives, since in Spec, CP, they are not in a local relation with either the Speech or Event time, and hence cannot receive a temporal interpretation.

The fact that gerundive relatives, in contrast to full relatives, do not undergo extraposition is also accounted for. An extraposed relative is not with the checking domain of a matrix time and hence a gerundive relative in this position cannot be temporally interpreted.

Notes

1. Note that a "Reference time reading", with the event of the gerund interpreted with respect to the Reference time of the main clause, does not seem to be available. In (i), the Reference time (the time by which the getting water event takes place) is made salient; it is 2:00. (i) may be interpreted with the leading event taking place at the time of getting some water (Event time reading), or as taking place at the time of utterance (Speech time reading); however, (i) cannot be interpreted with the leading event taking place at 2:00 (Reference time reading).

   (i) *The runner leading the race had gotten some water by 2:00.*

2. An apparent counterexample to the generalization that gerundive relatives are temporally dependent on the main clause is shown in (ia) and (ib), where the gerund receives a future tense reading, although the main clause tense is present in (ia) and past in (ib).

   (i) a. *The athletes arriving tomorrow are swimming now.*
   b. *The band playing at the Ritz tonight was in Cleveland last week.*

   However, these are not instances of true future tense interpretations, but highly restricted future readings which are available with nonfinite tenses (see Stowell 1982 for discussion). Unlike true future tense interpretations, these

readings require a scheduled interpretation, and hence are not permitted with certain predicates, as seen in (ii).

(ii) a. *The athletes arriving tomorrow are swimming now.*
b. **The men waiting for the flight tomorrow are swimming now.*

This exceptional shifted reading is limited to future tense, as seen in the contrast between (iiia) and (iiib).

(iii) a. *The men arriving tomorrow are swimming now.*
b. **The men arriving yesterday are swimming now.*

These examples thus do not constitute a counterexample to the present analysis.

3. Gerundive relatives may appear to have a small clause structure; however, they differ from small clauses in that they do not permit pronouns or names as subjects, as seen in the contrast between (ia) and (ib).

(i) a. *Me/Harry wearing a fedora is a stupid idea*
b. **I/*me/*Harry wearing a fedora walked into the room*

4. If we assume, following Huang (1993), that the projection that moves in "VP-fronting" is a functional projection above VP, then the data in (25)–(26) show that *probably* is adjoined not only above VP but also above this projection. See chapter two, footnote 12.

5. This line of reasoning is in the spirit of the Minimal Structure Principle of Bošković (1997:25), provided in (i). Since it is necessary to posit only the structure of AspP for gerundive relatives, we are led to the conclusion that the structure is only AspP (see also Law 1991 for an earlier formulation of the Minimal Structure Principle).

(i) Minimal Structure Principle – Provided that lexical requirements of relevant elements are satisfied, if two representations have the same lexical structure and serve the same function, then the representation that has fewer projections is to be chosen as the syntactic representation serving that function.

6. Recall that, as discussed in footnote 1, a "Reference time reading", with the event of the gerund interpreted with respect to the Reference time of the main clause, is not available. This is as expected, given that the subject may be interpreted in Spec, VP (Event time reading) or in Spec, TP (Speech time reading).

7. This analysis of the temporal interpretation of gerundive relatives in subject position may be extended to subject nominals in general. Musan (1995) discusses examples such as (ia) and (ib), where the subject of (ia) is interpreted either as people who were professors in the forties, or as people who are now professors, whereas (ib) allows only the reading where the people were professors in the forties (data from Musan 1995: 75–76; see also Musan 1999).

   (i) a. *In the forties, all professors were young.*
   b. *In the forties, professors were young.*

   Musan considers but rejects an analysis of this contrast according to which presuppositional subjects, such as in (ia), are interpreted in IP, and are therefore outside the scope of the tense operator, whereas cardinal subjects are interpreted within VP, and are thus within the scope of the tense operator. However, it is not clear how being outside the scope of the tense operator would result in the reading where the description is evaluated relative to the time of utterance. This proposal can be reformulated within the framework adopted here; in (ia), the subject may be interpreted within TP, where it is evaluated with respect to the Speech time, whereas in (ib), the subject may be interpreted in VP, and is therefore evaluated with respect to the Event time.
8. I use the sequence past - future tense here because it forces a temporally independent reading of the embedded clause.
9. A reviewer notes that Raising constructions such as in (i) do not permit an embedded event reading; in (i), the event of waiting is interpreted as taking place relative to the matrix tense (which is S , R , E), but cannot be understood as taking place relative to the embedded event of complaining.

   (i) *[The passenger waiting for flight #307]$_i$ t_i seems t_i to have t_i complained to the flight attendant*

   This is predicted, if we assume, following Lasnik (1998, 1999) that Raising in general does not permit reconstruction.
10. Given this correlation between Spec, TP position and the Speech time, it is plausible that what licenses Nominative Case to the subject is the Speech time, explaining why this Case is not licensed with infinitivals, which lack a Speech time. For discussion of the correlation between Case and tense, see Pesetsky and Torrego (2001), (2002), who argue that structural Case is realized as a strong tense feature on D.
11. In this chapter, I focus on the syntax of gerundive relatives in subject position and I do not consider objects. As is well-known, objects participate in determining the interpretation of the temporal contour of the event in a way in which subjects do not (see, for example, Verkuyl 1972). Recent research sug-

gests that the contribution of the object to the aspectual structure of the sentence is reflected in its syntactic position. Given the added variable of the influence of the syntax of objects in determining the temporal contour of the sentence, I put them aside here.

12. I assume here that the quantificational adverb does not raise at LF, an assumption which is in the spirit of Minimalist non-QR analyses of scope effects (see Kitahara 1992, Hornstein 1994, 1995, Beghelli and Stowell 1997 for discussion).
13. As exemplified in (i), although extraposition of full relatives is possible, extraposition of gerundive relatives is not. This is discussed in section 4.6 below.

    (i) a. *A passenger waiting for the announcement entered the room.*
        b. **A passenger entered the room waiting for the announcement.*

14. If it were possible for the extraposed PP to reconstruct to subject position, the reading where the subject is located in Spec, TP should be possible; however, as discussed in section 8 below, extraposition does not permit reconstruction.
15. Kratzer (1989) claims that the subjects of stage-level predicates are associated with Spec,VP, while the subjects of individual-level predicates are associated with Spec,IP. We may thus consider whether this correlates with the Event and Speech time readings discussed here. However, only Stage-level predicates are ambiguous between Event and Speech time readings, as shown in (i). Since individual-level predicates denote permanent properties and are interpreted as holding throughout the past and present, a Speech time reading can not be distinguished.

    (i) *Three passengers waiting for the flight were Scandanavian.*

16. Note that Lebeaux's proposal is incompatible with the raising analysis of relative clauses, whereby relatives are formed by movement of the head out of the relative clause into head position; if the head itself raised from within the relative, then the relative clause could not be adjoined by generalized transformation to the head after the head moves in WH-movement (see Vergnaud 1974, Kayne 1994, Borsley 1997, Safir 1999, Bhatt 2002 for discussion of the raising analysis of relatives).
17. It is important to note that (42b) is unacceptable on the relative clause reading of 'wearing a fedora'; an irrelevant reading may be available for 'wearing a fedora' as a secondary predicate, as is available in (i).

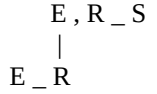
    (i) *A man walked in wearing a fedora*

18. Recall that a (non-moved) gerundive relative in subject position is adjoined to the subject, which is located within the checking domain of TP or VP at LF, and the gerundive relative is therefore within the checking domain of the relevant time at LF.

19. Reduced relatives with the *ed* form of the verb are also impossible in extraposed position, as seen in (i) ((ib) is unacceptable on the intended interpretation, where *arrested in London* modifies *three men*).

(i) a. *Three men arrested in London shot a police officer.*
b. **Three men shot a police officer arrested in London.*

I follow Hudson's (1973) analysis of these constructions whereby they involve a covert perfect tense, and therefore the tense structure of the relative clause is E _ R. The two meanings of (ia) are thus derived in the same way that the meanings for gerundive relatives are derived; the reading where the relative event of arresting takes place before the matrix event of shooting is represented by the tense structure in (iia), where the Reference time of the relative clause links to the Event time of the main clause. The reading of (ia) where the event of arresting takes place after the time of shooting is represented by the tense structure in (iib), where the Reference time of the relative tense links to the Speech time of the main clause.

(ii) a.


b.


The analysis of gerundive relatives in extraposed position thus carries over to *ed* relatives.

Chapter 5
Principles of Time in Discourse: Temporal Syntax beyond the Sentence

5.1 Introduction

Recent work on the tense structure of discourse has sought to explain how the temporal relationship between events described in successive sentences in narrative discourse is determined. These analyses differ in the role that semantics and pragmatics play in determining tense structure (see, for example, Kamp and Rohrer 1983; Hinrichs 1986; Partee 1984; Lascarides and Asher 1991; Dowty 1986). In this chapter, I focus on the contribution of the syntax to the determination of the tense structure of discourse, and show that sentence structure also plays a crucial role.

I propose an analysis of the behavior of the temporal adverb *then* in discourse which is based solely on the primitives and relations provided by the sentence-level theory of tense introduced in chapter two. I argue here that there is no need to posit independent principles to account for the discourse behavior of tense, because the same interpretive principles that hold at the sentential level also hold at the discourse level. According to this analysis, the temporal dependency induced by *then* between sentences is identical to the dependency displayed within sentences in temporal adjunct clause constructions. The present work thus provides support for a restrictive theory of the temporal structure of discourse, according to which the discourse level makes use of only the information provided by the sentence-level representation of tense.

This chapter is organized as follows. In section 5.2, I note that the interpretation of temporal *then* depends upon its position; when *then* occurs in clause-final position, the event of the clause with *then* is interpreted as cotemporal with a previous event, whereas when *then* occurs in clause-medial or clause-initial position, the two events are interpreted as ordered.

Section 5.3 discusses the syntax of temporal *then*, arguing that clause-final *then* is adjoined to VP, whereas clause-medial *then* is adjoined to AspP, and clause-initial *then* is derived by movement from medial position.

Next I turn to the semantics of *then*, proposing in section 5.4 that *then* serves to mark overtly the linking of times in tense structure. Given this semantic function of *then*, and assuming that the Event time is associated with VP, when *then* occurs in VP-adjoined position, it links the Event time of its clause with the Event time of the previous clause. This derives the cotemporal reading of clause-final then. On the other hand, when *then* occurs in AspP-adjoined position, it links the Reference time of its clause with the Reference time of the previous clause, deriving the ordered events reading of clause-medial and clause-initial *then*.

In section 5.5, I show that discourse sequences with *then* are permitted in the same restricted temporal environments in which temporal adjunct clauses are permitted. This is predicted by the present analysis, according to which sequences with *then* and adjunct clause constructions have the same tense structure. Further evidence for the analysis of *then* comes from the interpretation of *then* with perfect tenses, in section 5.6, future readings of present tense, in section 5.7, and infinitival clause constructions, in section 5.8.

5.2 Position and Interpretation of *then*

The presence of the temporal adverb *then* in a sequence of sentences in discourse influences their temporal interpretation. This is illustrated by the contrast between (1a) and (1b) (Spejewski and Carlson's 1993 (12a) and (12b)):

(1) a. *Mary went to the store. She fixed a faucet. She wrote a long overdue "thank-you" letter to her nephew. She read the morning paper.* (Grab-bag)

b. *Mary went to the store. Then she fixed a faucet. Then she wrote a long overdue "thank-you" letter to her nephew. Then she read the morning paper.* (Ordered)

As noted by Spejewski and Carlson, if we take (1a) to describe what Mary did today, this sequence has a "grab-bag" interpretation, where the events are not temporally ordered with respect to each other: that is, they may occur at different, temporally unrelated, times in the day. However, as illustrated in (1b), when *then* is present in the sentences following the first

one, the "grab-bag" interpretation is not available, and the events are ordered. I refer to this use of *then*, where it orders an event as occurring after another event, as "ordered" *then*.[1]

As has been noted by several researchers, the semantic role that temporal *then* plays depends on its position. To illustrate the point, consider (2a–b):

(2) a. *Mary will speak to the reporters. Then Bill will photograph her.*
b. *Mary will speak to the reporters. Bill will then photograph her.*
(Ordered)

When *then* occurs in clause-initial position, as in (1b) and (2a), or in clause-medial position, as in (2b), the ordered reading results (Schiffrin 1992; Glasbey 1993; Spejewski and Carlson 1993). The sequences in (2a) and (2b) are interpreted with Mary speaking to the reporters first, and after that Bill photographing her.

However, when *then* occurs in clause-final position, as in (3), the second event is interpreted as overlapping with the first event; here, Bill photographs Mary while she is speaking to the reporters. I refer to this interpretation as the "cotemporal" reading. (Two events are cotemporal if they have any overlap in time.)

(3) *Mary will speak to the reporters. Bill will photograph her then.*
(Cotemporal)

In the following sections, I propose an analysis of *then* which explains the correlation between its position and interpretation. I argue that because *then* occurs in different structural positions in the sentences in (2) and (3), it interacts with the syntactic representation of tense in different ways, resulting in different readings.

5.3 Syntax of *then*

Previous analyses of temporal *then* have focused on its semantics (Schiffrin 1992; Glasbey 1993; Spejewski and Carlson 1993). In contrast, a main goal of this chapter is to account for the interaction between the syntax and semantics of *then*. In this section, I show that the syntax of tense outlined in chapter two makes possible a natural explanation for how the position of

then affects its temporal interpretation. I propose that *then* adjoins to different projections, resulting in different readings: in clause-final position, it is adjoined to VP, in medial position, it is adjoined to AspP, and in initial position, it is fronted from medial position.

5.3.1 Clause-final *then*

The claim that clause-final *then* is adjoined to VP is supported by the data in (4a–d), where it appears with VP in VP fronting, pseudoclefting, *though*-movement, and remnant questions:

(4) a. *Mary held a press conference. Bill said that he would photo graph her then, and photograph her then he did.*
b. *Bill was sleeping. What Mary did was walk out of the room then.*
c. *Bill was sleeping. Turn down the radio then though Mary did, Bill still blamed her for waking him up.*
d. *A: Mary was feeling sick.*
B: What was she doing, throwing up then?

Adverbs adjoined to an inflectional projection have scope over clause-final *then*, which is explained, given that *then* is VP-adjoined in this position. In (5), *intentionally* has scope over *then*; the meaning is that the event of leaving the room at a particular time is intentional, not that the event of leaving the room is intentional and that this event takes place at a particular time:

(5) *Mary intentionally left the room then.*

To summarize this section, evidence from VP fronting, pseudoclefting, *though*-movement, remnant questions, and the scope of adverbs adjoined to an inflectional projection show that clause-final *then* is VP-adjoined.[2]

5.3.2 Clause-medial *then*

Medial *then* occurs between the subject and the main verb, as seen in (6):

(6) *Mary will speak to the reporters. Bill will then photograph her.*

It is thus plausible that it is adjoined to an inflectional projection or to VP. I argue here that it is adjoined to AspP.

The examples in (7) show that medial *then* cannot appear with VP in VP-fronting, pseudoclefting, *though*-movement, and remnant questions, which is explained if it is AspP-adjoined:

(7) a. **Mary will speak to the reporters. Bill said that he would then photograph her, and then photograph her he will.*
b. **Bill punched his friend. What his friend did was then punch him back.*
c. **Bill cooked dinner. Then clean up the kitchen though Mary did, Bill still accused her of not helping.*
d. *A: John punched Bill.*
*B: *What did Bill do, then punch him back?*

Medial *then* may occur with the inflectional projection in pseudoclefting and in remnant questions, as in (8a) and (8b), supporting the claim that it is adjoined to AspP:

(8) a. *Bill punched his friend. What his friend did then was punch him back.*
b. *A: John punched Bill.*
B: What did Bill do then, punch him back?

Further evidence that medial *then* is adjoined to an inflectional projection comes from its interaction with VP-adjoined material. Consider (9a–b):

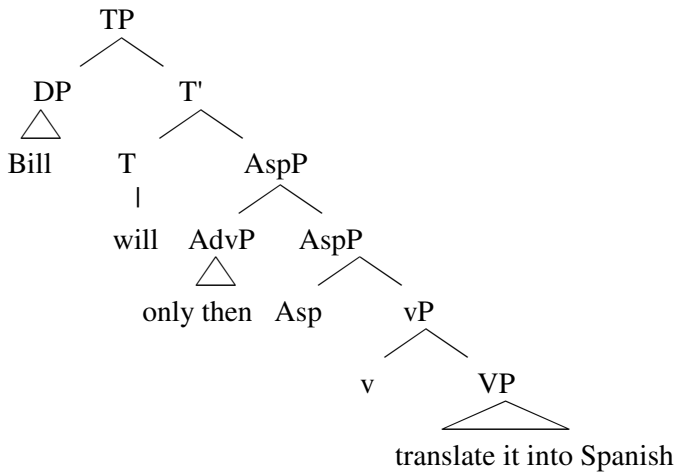
(9) a. *Mary will deliver the whole speech in English. Bill will only then translate it into Spanish.*
b. *Mary will deliver the whole speech in English. Bill will then only translate it into Spanish.*

As shown in (9a), when medial *then* occurs after the focus particle *only, only* takes scope over *then*, and not over VP material. The second sentence of (9a) means that it is only at that time that Bill will translate the speech into Spanish. It cannot mean, for example, that Bill will translate the speech into only Spanish, as opposed to other languages. However, when medial *then* occurs before *only*, as in (9b), *only* may take scope over VP

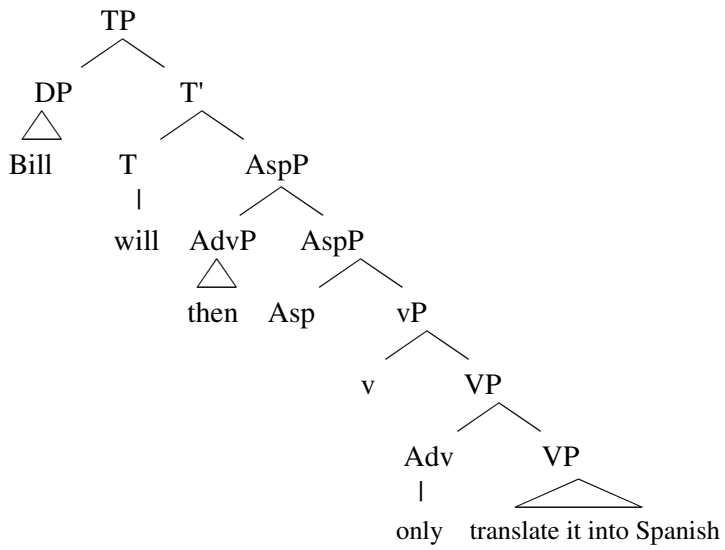
material, and the second sentence of (9b) may have this contrastive reading.

Following Jackendoff (1972) and Rooth (1985), I assume that *only* is VP-adjoined when it has scope over VP material. The readings in (9) are explained if medial *then* is adjoined to an inflectional projection and not to VP. *Only* cannot have scope over VP when it precedes *then*, as in (9a), since it cannot be adjoined to VP in this position, given that *then* is adjoined to an inflectional projection, as in the structure in (10a). (In (10a), *only* is constituent-adjoined to *then*.) When *only* occurs to the right of *then*, as in (9b), it may be VP-adjoined, and may thus take scope over VP material, as shown in the structure in (10b).

(10) a.



(10) b.



The position of medial *then* with respect to manner adverbs lends further support to the claim that it is adjoined to an inflectional projection. Following the analysis of Travis (1988), I assume that the manner adverb *slowly* is adjoined to VP in an example such as (11).

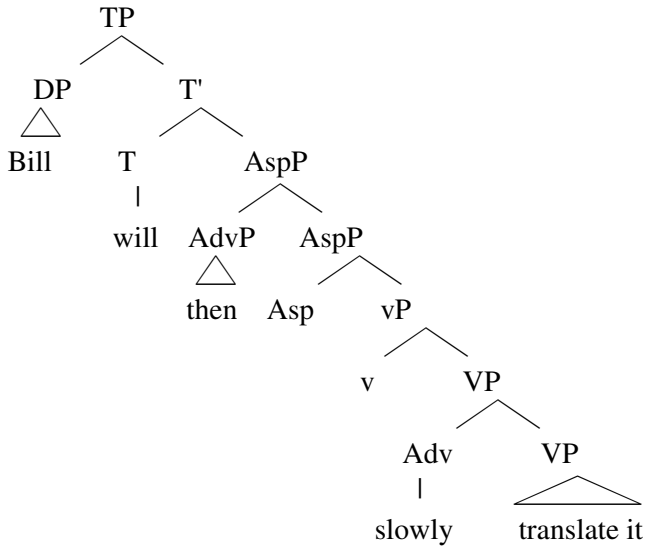
(11) *Mary will slowly write a letter.*

Left-adjoined *slowly* can follow medial *then*, but not precede it, as seen in the contrast between (12a) and (12b):

(12) a. *Mary will make the announcement in English. Bill will then slowly translate it.*
b. **Mary will make the announcement in English. Bill will slowly then translate it.*

If we assume that medial *then* is adjoined to an inflectional projection, rather than to VP, this data is explained; as shown by the structure in (13a), *slowly* can be adjoined to VP in (12a), since it is to the right of AspP-adjoined *then*, but in (12b), *slowly* cannot be adjoined to VP, since it is to the left of AspP-adjoined *then*.

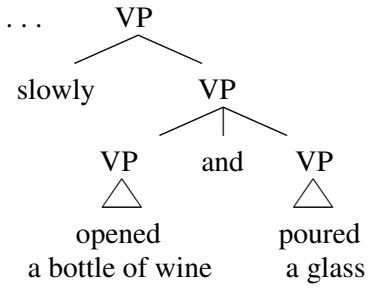
(13) a.



Conjunction structures provide further evidence for the AspP position of medial *then*. Consider (14a), where the manner adverb *slowly* appears with coordinated VPs, as in the structure in (14b):[3]

(14) a. *Mary slowly opened a bottle of wine and poured a glass.*

b.

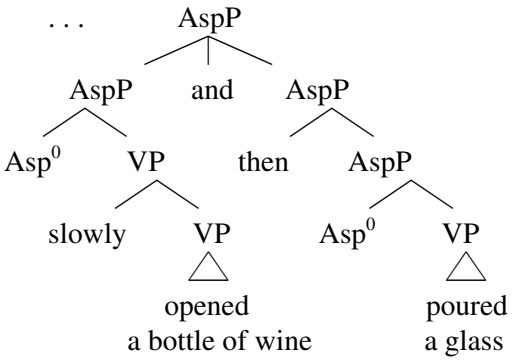


In (14a), both the event of opening and the event of pouring may be interpreted as occurring slowly. Given that *slowly* is VP-adjoined, as mentioned above, this fact is accounted for. Since the second conjunct may be a VP, the whole conjunct phrase may be VP-level, and thus both conjuncts can be modified by *slowly,* as in the structure in (14b).

(15a–b) contrast with (14a–b):

(15) a. *Mary slowly opened a bottle of wine and then poured a glass.*

b.



In (15a), with ordered *then* in the second conjunct, *slowly* modifies only the opening event, and not the pouring event. This is explained on the present analysis; since ordered *then* is adjoined to AspP, the second conjunct must include at least the AspP structure, and therefore, assuming like-category conjunction, the first conjunct must also include at least the AspP structure. Since *slowly* is a VP modifier, it is adjoined to the VP within the first conjunct, and thus does not modify the VP of the second conjunct, as shown by the structure in (15b).

Recall that I claim that medial *then* is adjoined to AspP, located between the subject and VP; it is this projection which is coordinated in (15). This explanation relies on the claim that medial *then* is adjoined to AspP; it is because *then* is adjoined to AspP in (15) that the second conjunct, and therefore the first conjunct as well, must consist of at least as much structure as AspP. Since *slowly* is adjoined to VP within the AspP structure of the first conjunct, it cannot modify the second conjunct VP. If, instead, medial *then* were adjoined to VP, it would be possible for the second conjunct of (15) to be VP, and therefore for the whole conjunct phrase to be VP, as in (15b). With this VP conjunction structure, it should be possible for the whole conjunct phrase to be modified by *slowly,* including the second VP, and thus a reading where both events are interpretted as occurring slowly would be incorrectly predicted to be possible.

To summarize this section, I have argued that medial *then* is adjoined to AspP, based on its behavior with VP fronting, pseudoclefting, *though*-movement, and remnant questions. The interaction of medial *then* with *only*, manner adverbs, and conjunction structures lends further support to this analysis.[4]

5.3.3 Clause-initial *then*

Clause-initial *then* is located in a projection above CP, as is shown by its position in questions and left-dislocation structures. (16a–d) illustrate the distribution of initial *then* with subject/auxiliary inversion structures:

(16) a. *Paul caught the ball, and then John ran to third.*
b. *Then did Bill run to home?*
c. *Did Bill then run to home?*
d. **Did then Bill run to home?*

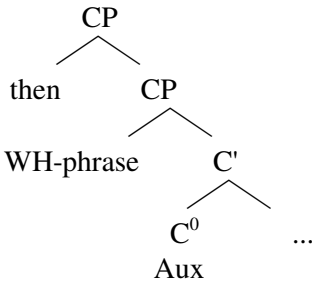
As seen in these examples, initial *then* obligatorily precedes the inverted auxiliary in subject/auxiliary inversion. The continuations of (16a) in (16b), with initial *then* preceding an inverted auxiliary, and (16c), with medial *then*, are acceptable. However, the continuation of (16a) in (16d), with initial *then* following an inverted auxiliary, is unacceptable. (Sentence (16c) shows that it is possible for ordered *then* to appear within the scope of an inverted auxiliary in a question.)

The examples in (17a-d) show that initial *then* occurs before WH-moved phrases:

(17) a. *On her trip to Latin America, Mary went to Brazil, continued on to Paraguay, and visited Argentina next.*
b. *Then where did she go?*
c. *Where did she then go?*
d. **Where then did she go?*

The continuations of (17a) in (17b), with initial *then* preceding a WH-phrase, and (17c), with medial *then*, are acceptable. In contrast, the continuation of (17a) in (17d), with initial *then* following a WH-phrase, is unacceptable.[5] (Sentence (17c) shows that it is possible for ordered *then* to occur in the scope of a WH-phrase.) Assuming that inverted auxiliaries are in the head of CP, and that WH-elements are in Spec-CP, it seems plausible that initial *then* is adjoined to CP, as in (18):

(18)



However, the position of *then* with respect to left-dislocated elements shows that it is located higher than CP. Left-dislocated elements occur before WH-moved phrases, as illustrated by the contrast between (19a) and (19b). They are thus adjoined to CP or are in pre-CP position:

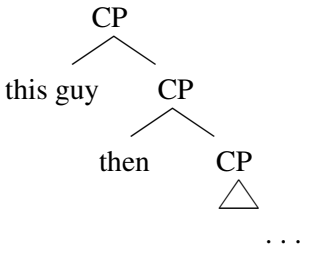
(19) a. *This book, who did Mary recommend to read it?*
b. **Who, this book, did Mary recommend to read it?*

Initial *then* precedes left-dislocated elements, as seen by the contrast between the acceptability of (20a), where initial *then* comes before a left-dislocated phrase, and the unacceptability of (20b), where *then* follows a left-dislocated phrase. Sentence (20c) shows that ordered *then* can occur after left-dislocated elements:

(20) a. *Then, this guy, John just punches him right in the face.*
b. **This guy, then John just punches him right in the face.*
c. *?This guy, John then just punches him right in the face.*

Given that initial *then* precedes left-dislocated phrases, it is plausibly located higher in the clause structure than CP. I assume that this position above CP is the landing site of the movement of *then*. If, on the other hand, it were the case that both left-dislocated phrases and *then* were adjoined to CP, the order in (20b) should be acceptable, with the structure in (21):

(21)



Clause-initial *then*, like medial *then*, induces an ordered interpretation, in contrast to clause-final *then*, which induces a cotemporal interpretation. One way to explain the fact that clause-initial and clause-medial *then* result in the same interpretation is to relate these positions through movement.[6] Given that downwards movement is not permitted, *then* could not have moved from initial to medial position. Let us *then* assume that initial *then* has moved from medial position. Assuming a movement analysis of initial *then*, the question becomes why movement can take place only from AspP, and not from VP (in which case initial *then* would permit a cotemporal reading).

The fact that initial *then* can only move from AspP is predicted by the explanation offered in chapter two for why clause-initial temporal adverbs can only modify the Reference time. Recall that this is due to the Shortest Movement Condition (Chomsky 1995: chapter three), on the following reasoning: there are two possible derivations for a sentence with clause-initial *then*; one in which *then* has moved from VP, and one in which *then* has moved from AspP. However, the derivation in which *then* moves from AspP-adjoined position rules out the derivation in which *then* moves from VP-adjoined position, because the derivation with movement from AspP involves shorter movement than the derivation with movement from VP. Hence, the structurally higher position of ordered *then* as compared to cotemporal *then*, in combination with the Shortest Movement Condition, provides an account for why initial *then* has only the ordered reading.

To summarize, clause-initial *then* moves from AspP-adjoined position to a pre-CP position and therefore has the same semantics as medial *then*. The Shortest Movement Condition explains why clause-initial *then* can be fronted from AspP (medial position), and not VP (final position).

5.4 Semantics of *then*

Intuitively, the semantic role of *then* is to introduce a temporal relation between two sentences. I argue here that this temporal relation receives a natural analysis within the Reichenbachian theory of tense adopted here. Recall that times may be related in tense structure by linking, where two linked times are interpreted as cotemporal. This linking occurs in constructions involving temporal dependency, such as temporal adjunct clauses and infinitival clauses.

I propose that the temporal dependency introduced by *then* between clauses is in fact another instance of the temporal relation of time linking in tense structure. The idea that the semantic role of *then* is to link times is natural, since if we assume the relation of linking, the default expectation is that overt marking of this linking relation should exist in some language. The discourse-level representation of tense thus makes use of the same semantic relation as the sentence-level representation of tense.

Given the structure of tense outlined in chapters one and two and the syntax of *then* proposed above, I will show that this analysis of the semantics of *then* explains the correlation between the position and the interpretation of *then* summarized in (22):

(22)

Syntax of *then*	Interpretation of *then*
Clause-final *then* is adjoined to VP	Cotemporal reading
Clause-medial *then* is adjoined to AspP	Ordered reading
Clause-initial *then* is fronted from AspP	Ordered reading

Let us first examine clause-final *then*. Given that the Event time is associated with VP, as discussed in chapter two, and assuming that *then* is an overt marker of time linking, I claim that when *then* is adjoined to VP, in clause-final position, it links the Event time of its clause with the Event time of the previous clause.[7] This linking results in the tense structure in (23b) for the sequence in (23a), with the tense structure of the first sentence on the top line and that of the second sentence on the bottom line:

(23) a. *Mary will speak to the reporters. Bill will photograph her then.*

b.
```
S _ R , E
|       |
S _ R , E
```

Note that in the tense structure in (23b), in addition to the Event times, the Speech times are also linked. I assume here, following Nunes (1994), that the sentences of a discourse sequence have identical deictic reference for their Speech times. In addition, I propose that this identification is realized by the linking of the Speech times of the sentences; in this way, the sentences of the discourse are strung together as a unit temporally.[8] Since linked times are interpreted as cotemporal, the tense structure in (23b) correctly represents the interpretation of (23a), where the event of speaking is interpreted as overlapping with the event of photographing.

Let us now turn to the representation of clause-medial *then*, where an ordered reading results. Assuming that medial *then* is adjoined to AspP and that AspP is the location of the Reference time, medial *then* links the Reference time of its clause to the Reference time of the previous clause. This linking of Reference times results in the tense structure in (24b) for (24a):

(24) a. *Mary will speak to the reporters. Bill will then photograph her.*

b. S _ R , E
| |
S _ R , E

Since the Event times of (24b) are not linked, they are interpreted as noncotemporal, and the ordered reading of (24a) results.[9,10]

An example of clause-initial, ordered *then* is provided in (25a), with its tense structure in (25b):

(25) a. *Mary will speak to the reporters. Then Bill will photograph her.*

b. S _ R , E
| |
S _ R , E

The tense structure in (25b), which is the result of the presence of initial *then*, is identical to the tense structure that results with medial *then*; initial *then* moves from AspP and is interpreted in AspP-adjoined position. It thus links the Reference time of its clause with the Reference time of the previous clause, as in (25b), correctly deriving an ordered reading of events.

Evidence for the claim that ordered *then* links Reference times comes from adverbial modification structures. Consider the sequence in (26a), with the tense structure in (26b):

(26) a. *At 6:00, John had left the office. Then Mary had fixed the car.*

b.
```
      at 6:00
         |
   E _ R _ S
      |    |
   E _ R _ S
```

In (26a), *at 6:00* modifies the Reference time of the first sentence; the leaving takes place sometime before 6:00. The event of fixing the computer in the second sentence is also interpreted as occurring sometime before 6:00. The tense structure in (26b), where ordered *then* links the two Reference times, correctly represents the interpretation that the fixing is prior to 6:00.

To summarize, I have claimed that, semantically, *then* is an overt marker of time linking in tense structure. Assuming that clause-final *then* is adjoined to VP and that the Event time is associated with VP, it links the Event time of its clause with the Event time of the previous clause, resulting in a cotemporal reading for the events of the sentences. Since clause-medial and clause-initial *then* are interpreted adjoined to AspP, the location of the Reference time, they link the Reference time of their clause with the Reference time of the previous clause, resulting in an ordered reading for the events of the sentences.[11,12]

5.5 A Restriction on Tense Structures

In this section, I show that the temporal environments in which *then* is permitted in discourse are the same environments in which temporal adjunct clauses within sentences are permitted. Hornstein (1990) proposed the Constraint on Derived Tense Structure to account for the behavior of tense in adjunct clause constructions. I claim that this principle is in fact a more general restriction which holds for the derivation of tense structures both at the discourse and the sentential levels. Along with the present analysis of *then* as an overt marker of time linking, the claim that the Condition on Time Linking is operative at the discourse, as well as at the sen-

tential level, explains the parallel behavior of tense in discourse sequences with *then* and temporal adjunct clause constructions.

The distribution of discourse sequences with *then* is more restricted than the distribution of sequences without *then*, as is illustrated in the contrasts between (27a), on the one hand, and (27b-d) on the other:

(27) a. *Mary spoke to the reporters. Bill will photograph her.*
b. **Mary spoke to the reporters. Bill will then photograph her.*
c. **Mary spoke to the reporters. Then Bill will photograph her.*
d. **Mary spoke to the reporters. Bill will photograph her then.*

Sentence (27a) shows that the sequence past–future is permitted in discourse. However, as shown in (27b–d), the addition of *then* to the second sentence results in unacceptability.[13]

The sequence past–future is also impossible with temporal adjunct clause constructions, as shown in (28):[14]

(28) **Mary spoke to the reporters before/after/while/as Bill will photograph her*

Recall from the discussion in chapter three that Hornstein (1990) proposes a restriction on the manipulation of tense structures which accounts for the unacceptability of (28). He claims that the derivation of tense structures is subject to the Constraint on Derived Tense Structure (or CDTS), provided in (29) (Hornstein: 15):

(29) Constraint on Derived Tense Structure: Derived Tense Structure must preserve Basic Tense Structure, where Basic Tense Structure is preserved iff:
(i) No times are associated in Derived Tense Structure that are not associated in Basic Tense Structure.
(ii) The linear order of times in Derived Tense Structure is the same as that in Basic Tense Structure.

Hornstein argues that temporal adjunct clauses require linking of the Reference and Speech times of the matrix and adjunct clauses. The derivation of the tense structure of (28), repeated in (30a), is thus as in (30b), with the basic tense structure on the left and the derived tense structure on the right. Linking Reference and Speech times violates the second half of

the CDTS, because it requires changing the linear order of the times of the adjunct.

(30) a. **Mary spoke to the reporters before/after/while/as Bill will pho tograph her*

b. E , R _ S → *E , R _ S
S _ R , E S _ R , E

The CDTS was originally introduced as a constraint on the derivation of sentence-level tense structures. I propose that the CDTS is in fact a more general restriction which governs the derivation of tense structures, both at the discourse and the sentential levels. Along with the claim outlined earlier that the presence of *then* requires linking of Event or Reference times, this extension of the CDTS explains the more restricted distribution of discourse sequences with *then* as compared to those without *then*.

The derivation of the tense structure of the sequence in (31a), without *then*, is as in (31b). The Speech times are linked, but, since *then* is not present, the Reference and Event times do not link. Thus there is no violation of the CDTS.

(31) a. *Mary spoke to the reporters. Bill will photograph her.*

b. E , R _ S → E , R _ S
S _ R , E S _ R , E

Let us now examine the tense structure that represents a past tense sentence followed by a future tense sentence with *then*:

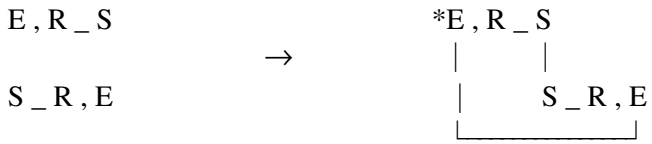
(32) a. **Mary spoke to the reporters. Then Bill will photograph her.*

b. E , R _ S → *E , R _ S
S _ R , E S _ R , E

The derivation of (32a), shown in (32b), is identical to the derivation of the temporal adjunct clause construction in (30b). Recall that in (30b), linking Reference and Speech times violates the CDTS because it requires changing the linear order of the times of the adjunct.[15]

The structure in (33b) shows the derivation of the sequence in (33a), where cotemporal *then* entails linking of Event times. The CDTS is violated here again, since linking Event times requires reordering the times of the second sentence.

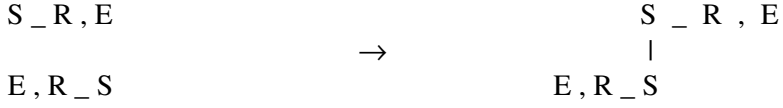
(33) a. **Mary spoke to the reporters. Bill will photograph her then.*

b.


The reverse ordering, future tense − past tense, is predicted to behave the same way as past tense − future tense, since the tense structure is the mirror image, with future on the top and past on the bottom. Therefore, the sequence future tense − past tense should be impossible with temporal adjunct clauses, as well as with sequences of sentences with *then*, but should be permitted without *then*. This is the case, as is shown by (34a–d):

(34) a. *Mary will speak to the reporters. Bill photographed her.*
b. **Mary will speak to the reporters before/after/while/as Bill photographed her.*
c. **Mary will speak to the reporters. Then Bill photographed her.*
d. **Mary will speak to the reporters. Bill photographed her then.*

The derivation of the tense structure of (34a) is as in (35a), where Speech times link and the CDTS is obeyed:

(35) a.


(35b) shows the derivation of the temporal adjunct clause construction in (34b) and the sequence with initial *then* in (34c). As in (32b), linking Reference times violates the CDTS:

(35) b. S _ R , E → *S _ R , E
E , R _ S E , R _ S

The derivation of the sequence in (34d), with cotemporal *then*, is given in (35c), and, as in (33b), the CDTS is violated:

(35) c. S _ R , E → *S _ R , E
E , R _ S E , R _ S

Sequences with the future perfect tense support the claim that ordered *then* induces linking of Reference times, while cotemporal *then* induces linking of Event times. The future perfect followed by the future is possible in discourse and with ordered *then*, but not with cotemporal *then*, as shown in (36a–c):

(36) a. *Mary will have spoken to the reporters. Bill will photograph her.*
b. *Mary will have spoken to the reporters. Then Bill will photograph her.*
c. **Mary will have spoken to the reporters. Bill will photograph her then.*

d. S _ E _ R → S _ E _ R
S _ R , E S _ R , E

e. S _ E _ R → *S _ E _ R
S _ R , E S _ R , E

The derivation of (36b) is as in (36d), where linking Speech and Reference times obeys the CDTS. However, the derivation of (36c) provided in (36e), where Speech and Event times are linked, violates the CDTS, since in this derivation the times of the second sentence are reordered.

The relevant examples for additional series of tenses is provided in (37) – (41), which are organized as follows: example (a) provides the se-

quence of sentences without *then*, (b) the temporal adjunct clause construction, (c) the sequence with ordered *then*, (d) the sequence with cotemporal *then*, (e) the derivation for the temporal adjunct clause and ordered *then*, and (f) the derivation for cotemporal *then*. Sequences with perfect tenses in the second sentence are discussed in the following section.

(37) Past – Present[16]

a. *Mary spoke to the reporters. Bill is photographing her.*
b. **Mary spoke to the reporters before/after/while/as Bill is photographing her.*
c. **Mary spoke to the reporters. Then Bill is photographing her.*
d. **Mary spoke to the reporters. Bill is photographing her then.*

e. E , R _ S → *E , R _ S
S , R , E S , R , E

f. E , R _ S → *E , R _ S
S , R , E S , R , E

(38) Present – Past

a. *Mary is speaking to the reporters. Bill photographed her.*
b. **Mary is speaking to the reporters before/after/while/as Bill photographed her.*
c. **Mary is speaking to the reporters. Then Bill photographed her.*
d. **Mary is speaking to the reporters. Bill photographed her then.*

e. S , R , E → *S , R , E
E , R _ S E , R _ S

f. S , R , E → *S , R , E
E , R _ S E , R _ S

(39) Past perfect – Past[17]

a. *Mary had spoken to the reporters (at 5:00). Bill photographed her.*
b. *Mary had spoken to the reporters (at 5:00) before/after/while/as Bill photographed her.*
c. *Mary had spoken to the reporters (at 5:00). Then Bill photographed her.*
d. *Mary had spoken to the reporters (at 5:00). Bill photographed her then.*

e. E _ R _ S → E _ R _ S
E , R _ S E , R _ S

f. E _ R _ S → E _ R _ S
E , R _ S E _ R _ S

(40) Past perfect – Present

a. *Mary had spoken to the reporters (at 5:00). Bill is photographing her.*
b. **Mary had spoken to the reporters (at5:00)before/after/while/as Bill is photographing her.*
c. **Mary had spoken to the reporters (at 5:00). Then Bill is photographing her.*
d. **Mary had spoken to the reporters (at 5:00). Bill is photographing her then.*

e. E _ R _ S → *E _ R _ S
S , R , E S , R , E

f. E _ R _ S → *E _ R _ S
S , R , E S , R , E

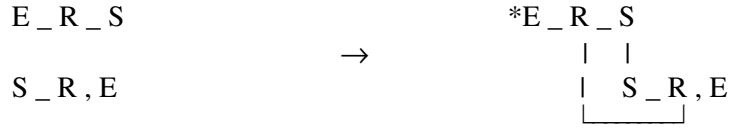
(41) Past perfect – Future

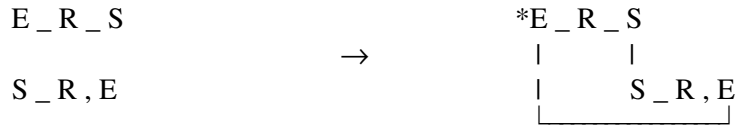
a. *Mary had spoken to the reporters (at 5:00). Bill will photograph her.*

b. **Mary had spoken to the reporters (at5:00) before/after/while/as Bill will photograph her.*

c. **Mary had spoken to the reporters (at 5:00). Then Bill will photograph her.*

d. **Mary had spoken to the reporters (at 5:00). Bill will photograph her then.*

e.


f.


To summarize, in this section I have shown that the temporal environments in which *then* is permitted to occur in discourse are the same environments in which temporal adjunct clauses within sentences are permitted. This distribution is explained by the present analysis, according to which cotemporal *then* induces linking of the Event time of its clause with the Event time of the previous clause, and ordered *then* induces linking of the Reference time of its clause with the Reference time of the previous clause. Thus, the tense structures that represent temporal dependency between clauses are the same as those that represent temporal dependency within clauses, and they are both constrained by the Constraint on Derived Tense Structure.

5.6 Perfect Tenses with *then*

The present analysis of temporal *then* has thus far been based on its presence in sentences with simple tenses. Given that this analysis assigns the Reference time a central role, it makes clear predictions for the distribution of temporal *then* with perfect tenses, where the Reference time is made salient. In this section, I show that the present proposal, in combination

with certain parsing considerations, predicts the behavior of temporal *then* with perfect tenses. The interaction of temporal *then* with perfect tenses lends support to the claim that ordered *then* manipulates the Reference time in tense structure.

Consider the interpretation of the sequence of sentences in (42a):

(42) a. *Mary spoke to the reporters. Bill had photographed her then.*

b.
```
E , R _ S                    *E , R _ S
                        →     |     |
E _ R _ S                     E , R _ S
```

Unlike the examples with clause-final *then* discussed thus far, this sequence does not have a cotemporal reading; it cannot be interpreted with the events of speaking and photographing occurring at the same time. The lack of this interpretation is predicted by the analysis I presented in section 5.5, in which clause-final *then* induces linking of the Event time of its clause to the Event time of the previous clause. Given this analysis, the tense structure derivation of (42a) is as in (42b). This derivation is correctly ruled out by the first part of the CDTS, since the Event time of the second sentence becomes associated with the Reference time.

Sentence (42a) does, however, have an interpretation, namely one in which the event of speaking occurs before the event of photographing.[18] This reading is correctly represented by the tense structure in (43), where Reference times are linked:

(43)
```
E , R _ S                    E , R _ S
                        →       |   |
E _ R _ S                    E _ R _ S
```

The tense structure in (43) for (42a) is supported by the sequence with ordered *then* in (44), which receives the same reading as (42a):

(44) *Mary spoke to the reporters. Then Bill had photographed her.*

In (44), as in (42a), the event of speaking occurs before the event of photographing. As argued in section 5.5, ordered *then* induces linking of Reference times, resulting in the tense structure in (43b).

Further evidence that final *then* with a perfect tense induces linking of Reference times comes from the behavior of already, which forces a Reference time reading for temporal adverbials. This interpretation is illustrated in (45), where *at 3:00* can modify only the Reference time; the sentence means that it was some time before 3:00 that Mary left the office, and cannot mean that the event of Mary leaving the office took place at 3:00 (the Event time reading):

(45) *Mary had already left the office at 3:00.*

Consider now the sequences in (46a–b):

(46) a. *Mary spoke to the reporters. Bill had already photographed her then.*
b. **Mary spoke to the reporters. Bill already photographed her then.*

(46a), in which final *then* occurs with a past perfect sentence including *already*, is acceptable, since clause-final *then* can modify the Reference time.[19] Sequence (46b), with a simple past sentence including *already*, is unacceptable, since clause-final *then* cannot modify the Reference time here.[20].

Evidence that clause-final *then* with the past perfect tense modifies the Reference time and is thus adjoined to AspP comes from the remnant question construction. As seen in (47), clause-final *then* does not occur with VP in this construction:

(47) A: *Mary punched Bill in the face.*
B: **What had he done, insulted her then?*

It thus appears that although clause-final *then* with simple tenses permits linking only of Event times (as discussed in section 5.5), clause-final *then* with perfect tenses permits linking of Reference times. On the present analysis, the syntactic generalization is that clause-final *then* may be adjoined only to VP with simple tenses, while it may be adjoined to AspP with perfect tenses.

An explanation for this fact can be found in parsing considerations.[21] As has been discussed in the parsing literature, there is a processing preference for low attachment of right adjuncts (Kimball 1973; Frazier 1978;

Frazier and Fodor 1978; Frazier and Rayner 1982; Frazier 1990; Gibson 1991). This processing preference is illustrated by (48); although it is acceptable for the adverb *yesterday* to modify either the matrix event of saying or the embedded event of leaving, there is a clear preference for modification of the embedded event:

(48) *Mary said that Bill left yesterday.*

I suggest that it is the semantic difference between the simple and perfect tenses which allows the overriding of this processing preference for low attachment of clause-final *then* in the perfect tenses only. According to the Reichenbachian view of tenses, simple and perfect tenses are alike in that they both contain the Reference time. However in perfect tenses, the Reference time is distinct from the Event time, whereas in simple tenses the two times are cotemporal. Therefore, with the perfect tenses, whether a temporal adjunct modifies the Event or the Reference time creates a meaning difference, since the two times are different. In contrast, with the simple tenses there is no meaning difference if the temporal adjunct modifies the Event or the Reference time, since they are interpreted as nondistinct.

The generalization thus is that the processing preference for low attachment can be overridden if a meaning difference results from a higher attachment site. Since different attachment sites are associated with different meanings for the perfect but not the simple tenses, it follows that the perfect tenses permit AspP adjunction with clause-final *then*, but the simple tenses do not.[21]

Given that clause-final *then* may be adjoined to AspP only with perfect tenses, the account of clause-final *then* with simple tenses presented in section 5.5 remains unchanged. The derivation of the sequence in (49a), with clause-final *then* with the simple past, is as in (49b):

(49) a. *Mary will speak to the reporters. Bill will photograph her then.*

b.
```
S _ R , E
|       |
S _ R , E
```

Since there is no semantic difference if sentence-final *then* modifies the Event or the Reference time, the processing preference for low attachment

is not overridden and *then* attaches to VP, resulting in the linking of Event times.[23]

This line of reasoning entails that in determining whether a non-preferred parse has a different meaning, the processor considers only very local semantic information. In processing a sentence-final temporal adjunct with a simple tense, as in (49a), the parser makes use only of the information that the Event and Reference times are cotemporal in this tense. The parser does not have access to the information that there would be a meaning difference at the discourse level, depending on whether *then* is attached to VP (cotemporal reading) or to AspP (ordered reading). (See Walsh Dickey (2001) for discussion of a series of processing experiments which support the claim that the parser is guided by sentence-internal considerations, rather than discourse-level ones, in interpretting tense.)

An interesting question that arises from this account is whether the processing preference for low attachment can ever be overridden. For example, if low attachment with a simple tense results in a violation of the CDTS, is the processing preference overridden to derive an acceptable tense structure? This is testable with the sequence future perfect − future, discussed in section 5.5 and repeated as (50a):

(50) a. **Mary will have spoken to the reporters. Bill will photograph her then.*

The future perfect followed by the future is not possible with cotemporal *then*, since the derivation of this sequence, given in (50b), violates the CDTS by reordering the times of the second sentence. If it were possible to override the processing preference for low attachment and attach *then* to AspP, (50a) should be acceptable, with the tense structure representation in (50c):

(50) b.

S _ E _ R		*S _ E _ R
	→	| |
S _ R , E		S _ E , R

c.

S _ E _ R		S _ E _ R
	→	| |
S _ R , E		S _ R , E

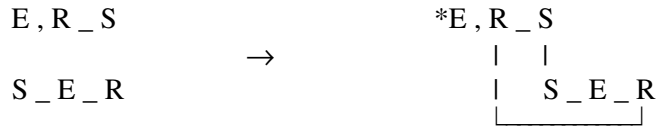
The derivation of (50a) shows that even if linking Event times with clause-final *then* in a simple tense results in a violation of the CDTS, it is still not possible to derive an acceptable tense structure by linking Reference times. This observation is in accord with the earlier observation that the parser does not make use of discourse-level information in determining the attachment site of adjuncts.

The relevant examples for additional sequences with perfect tenses are provided in (51) – (54), which are organized as follows: example (a) provides the sequence of sentences without *then*, (b) the temporal adjunct clause construction, (c) the sequence with ordered *then*, (d) the sequence with cotemporal *then*, (e) the derivation for the temporal adjunct clause and ordered *then*, and (f) the derivation for cotemporal *then*:[23]

(51) Past – Future perfect[24]

a. *Mary spoke to the reporters. Bill will have photographed her.*
b. **Mary spoke to the reporters before/after/while/as Bill will have photographed her.*
c. **Mary spoke to the reporters. Then Bill will have photographed her.*
d. **Mary spoke to the reporters. Bill will have photographed her then.*

e.


f.


(52) Present – Past perfect

a. *Mary is speaking to the reporters. Bill had photographed her (at 5:00).*
b. **Mary is speaking to the reporters before/after/while/as Bill had photographed her (at5:00).*
c. **Mary is speaking to the reporters. Then Bill had photographed her (at 5:00).*
d. **Mary is speaking to the reporters. Bill had photographed her (at 5:00) then.*

e. S , R , E → *S , R , E
E _ R _ S E _ R _ S

f. S , R , E → *S , R , E
E _ R _ S E _ R _ S

(53) Future – Past perfect

a. *Mary will speak to the reporters.Bill had photographed her (at 5:00).*
b. **Mary will speak to the reporters before/after/while/as Bill had photographed her (at 5:00).*
c. **Mary will speak to the reporters. Then Bill had photographed her (at 5:00).*
d. **Mary will speak to the reporters. Bill had photographed her (at 5:00) then.*

e. S _ R , E → *S _ R , E
E _ R _ S E _ R _ S

f. S _ R , E → *S _ R , E
E _ R _ S E _ R _ S

(54) Past perfect – Future perfect

a. *Mary had spoken to the reporters (at 5:00). Bill will have photographed her (at 9:00).*
b. **Mary had spoken to the reporters (at 5:00) before/after/while/as Bill will have photographed her (at 9:00).*
c. **Mary had spoken to the reporters (at 5:00).Then Bill will have photographed her (at 9:00).*
d. **Mary had spoken to the reporters (at 5:00). Bill will have photographed her (at 9:00) then.*

e. E _ R _ S
S _ R _ E
→
*E _ R _ S
S _ R _ E

f. E _ R _ S
S _ R _ E
→
*E _ R _ S
S _ R _ E

To summarize, in this section I have discussed the distribution of *then* with perfect tenses, showing that the present analysis of *then* predicts the correct interpretations for a variety of perfect tenses. Clause-final *then* with perfect tenses was shown to permit linking of Reference times, whereas with simple tenses it permits linking only of Event times. The correct generalization of this fact was claimed to be syntactic; clause-final *then* may be adjoined only to VP with simple tenses, while it may be adjoined to AspP with perfect tenses, due to processing considerations.

5.7 Futurate Readings

Evidence for the analysis of temporal *then* as an overt marker of time linking comes from the distribution of *then* with futurate readings, future time interpretations of present tense. Present tense sentences in English permit a future tense interpretation in certain configurations, for example, with a future adverb, as shown in (55). (For general discussion of the futurate, see Vetter 1973; Dowty 1979; Copley 2001).

(55) *Mary is leaving tomorrow.*

Assuming that the future meaning of tomorrow requires that the Reference time be ordered after the Speech time, the derivation of the tense structure of (55) is as in (56):

(56) S , R , E tomorrow → S _ R , E
tomorrow

Consider now sentences (57a–c). (57a) illustrates that a present tense sentence following a future tense sentence may be interpreted as present tense. However, when *then* is added to the present tense sentence, it must be interpreted as future, as seen in (57b) and (57c):

(57) a. *Mary will spend the day at the hotel. Bill is taking her out to eat.*
b. *Mary will spend the day at the hotel. Then Bill is taking her out to eat.*
c. *Mary will spend the day at the hotel. Bill is taking her out to eat then.*

Assuming the analysis of *then* presented here, the possible interpretations of these sentences is predicted. The tense structure derivations of (57a–c) are provided in (58a–c), respectively:

(58) a.
S _ R , E
S , R , E
→
S _ R , E
|
S , R , E

b.
S _ R , E
S , R , E
→
S _ R , E
| |
S _ R , E

c.
S _ R , E
S , R , E
→
S _ R , E
| |
S _ R , E

In (58a), only the Speech times are linked and the second sentence has a present tense reading. In (58b), Speech times are linked, and the presence of ordered *then* induces linking of Reference times. In (58c), Speech times are linked, and so are Event times, due to the presence of cotemporal *then*. Since the derived tense structures in (58b) and (58c) have the Reference time ordered after the Speech time, they result in future tense interpretations.[26]

Further evidence from futurate readings for the analysis presented here is provided in (59):[27]

(59) a. *Mary is announcing her candidacy tomorrow. Bill will then take her out to eat.*

b. **Mary is announcing her candidacy right now. Bill will then take her out to eat.*

In (59a), a future tense reading of a simple present tense may be followed by a future tense with ordered *then*. However, in (59b), a present tense reading for the first sentence of this sequence is not permitted.

The tense structure derivations of (59a) and (59b) are as in (60a) and (60b) respectively. (60a) obeys the CDTS, but (60b) violates the CDTS, since the Reference and Speech times of the second sentence become linked:

(60) a. S _ R , E → S _ R , E
| |
S _ R , E S _ R , E

b. S , R , E → *S , R , E
| |
S _ R , E S , R , E

5.8 Infinitival Clauses

Infinitival clauses with temporal *then* lend support to the analysis developed here. Hornstein (1990) proposes that infinitival clauses differ from finite clauses in that infinitivals lack a Speech time, specifying only the R,E relation. The lack of a Speech time accounts for why infinitival clauses cannot appear as main clauses, as shown by the unacceptability of (61); the tense structure cannot be anchored in the speech situation, since there is no Speech time to receive the default utterance time interpretation:

(61) **For Mary to see that movie.*

Hornstein argues that the tense structure of *to* infinitives is composed of Reference and Event times, while that of bare infinitives is composed of only an Event time. Given that the perfect tense specifies a relation between Event and Reference times (see Reichenbach 1947), this difference in tense structures predicts that the perfect tense is permitted with *to* infinitives, as in (62a), but is not permitted with bare infinitives, as in (62b):

(62) a. *Mary wanted Bill to have fixed the car.*
b. **Mary saw Bill have fixed the car.*

Assuming that cotemporal *then* involves linking of Event times, we predict that both *to* and bare infinitives permit this use of *then*, which is borne out by the data in (63a–b):

(63) a. *Mary was interviewing Bill. He wanted the other people to leave then.*
b. *Mary was interviewing Bill. He made the other people leave then.*

However, since ordered *then* involves linking of Reference times, and assuming that bare infinitives do not have a Reference time, we predict that bare infinitives do not permit this use, as is shown in (64a–b):[28] [29]

(64) a. *?Mary interviewed Bill. He wanted the other people then to leave.*
b. **Mary interviewed Bill. He made the other people then leave.*

5.9 Conclusion

As we have seen, temporal interpretation across sentences in discourse is subject to the same principles as temporal interpretation within sentences. Hence there is no need to posit independent principles to account for the discourse behavior of tense. I have argued that the temporal adverb *then* induces linking between the times of sentences in discourse, resulting in tense structures which are identical to those of temporal adjunct clause constructions. Since the derivation of tense structures at the discourse level is subject to the same contraints as those at the sentential level, the temporal environments in which *then* is permitted in discourse are the same ones in which temporal adjunct clause constructions are permitted.

I have shown that the approach pursued here explains the relation between the syntactic position of *then* and its discourse interpretation. Given that clause-final *then* is adjoined to VP and that the Event time is associated with VP, as proposed in chapter two, *then* in this position links the Event time of its clause with the Event time of the previous clause. This linking results in a cotemporal interpretation for the events of the sen-

tences. Since clause-medial and clause-initial *then* are interpreted adjoined to AspP, the location of the Reference time, they link the Reference time of their clause with the Reference time of the previous clause. This linking results in an ordered reading for the events of the sentences. The interaction of *then* with perfect tenses, future readings of present tense, and infinitival clause constructions all provide independent support for this analysis of the syntax and semantics of temporal *then*.

Notes

1. The grab-bag interpretation is not always available for a sequence of sentences without *then*; the default interpretation of the sequence depends on the tense, aspectual class, and pragmatics of the sentences (see Kamp and Rohrer 1983, Hinrichs 1986, Partee 1984, Lascarides and Asher 1991, Dowty 1986 for discussion). For example, the events in the sequence of sentences in (ia) are most naturally interpreted as occurring in a sequence, whereas the events in (ib) are interpreted as overlapping in time.

   (i) a. *John walked into the room. Mary dashed out.*
   b. *John called Mary. She was crying.*

2. We might expect clause-final *then* to be ambiguous between adjoining to VP or to an inflectional projection. This issue is discussed in section 5.3.
3. I assume a ternary branching structure for coordination here for sake of exposition. However, the analysis is compatible with alternative structures.
4. In contrast to *then*, temporal point adverbials may not occur in medial position, as seen in the contrast between (ia) and (ib).

   (i) a. *John had then left the store.*
   b. **John had at 3:00 left the store.*
   c. *John had left the store at 3:00.*

   On the analysis presented in chapter two, *at 3:00* is right-adjoined to AspP in (ic) on the reading where *at 3:00* modifes the Reference time. The impossibility of left-adjunction of *at 3:00* seems to be due to a prosodic restriction, whereby only "simple" adverbials are permitted in this position. See Ernst (2002) for discussion of the effect of prosodic weight on clause-medial adverbial position.
5. It is the temporal interpretation of *then* which is unacceptable in (17d); an irrelevant, nontemporal interpretation of *then* may be available.

6. Inasmuch as an adjunct's interpretation is determined by what it modifies (the projection it is adjoined to), if an adjunct has the same interpretation in two different syntactic positions, it is desirable to relate these positions through movement. The dubious alternative is to claim that there are two positions in the clause that have the same semantics.
7. It is due to the lexical meaning of *then* that it links two identical times; other temporal connectives may involve different combinations of times.
8. As pointed out by Nunes (1994:230), given that sentences are ordered in discourse, the notion of identical deictic reference for the utterance time of different sentences is to be understood as a cognitive representation, and not as physical reality. A sequence of sentences in discourse, such as in (i), are not interpreted as if the utterance time of the first sentence were different from the utterance time of the second sentence. Instead, the sequence is interpreted as if it involves just a single utterance time.

   (i) *John left yesterday. He will be back tomorrow.*

9. This account entails that times are interpreted as cotemporal only if they are linked; linking of Reference times in (24b) does not entail cotemporal Event times.
10. Note that the representation in (22b) does not determine that the event of the first sentence in (22a) precedes the event of the second sentence; the Reference times are linked, but the Event times are not ordered with respect to each other. This lack of temporal specification may be seen as a weakness of the system, since it is because there is no operation which orders times, only one which links them, that an ordered reading can not be unambiguously derived. However, the absence of an ordering operation is in fact desirable, because the precise interpretation of an ordered reading depends on the tense of the relevant sentences. For example, when *then* occurs with a past perfect tense after a past tense, as in (i), the event of the second sentence is interpreted as preceeding the event of the first sentence. The readings available with perfect tenses are discussed in detail in section 5.6.

    (i) *Mary spoke to the reporters. Bill had then photographed her.*

    In addition, it is obvious that linear order is relevant to determining temporal interpretation of events in discourse; a reviewer notes the contrast between (iia) and (iib):

    (ii) a. *John will chew and swallow the worms.*
         b. *!John will swallow and chew the worms.*

11. Note that the relation between the position and interpretation of *then* is not reducible to a generalization concerning the behavior of all temporal adverbials. Not all temporal adverbials which signal a cotemporal reading appear only in final position and not all which signal an ordered reading appear only in initial position. Unambiguously cotemporal adverbials such as *on the way* may appear in initial position, as seen in (ia), and unambiguously ordered adverbials such as *afterwards* may appear sentence-finally, as in (ib). The present account predicts these facts, since the unique behavior of temporal *then* is due to the fact that this adverb is a time linker.

    (i) a. *Mary went to the reception. On the way, John took pictures of her.*
        b. *Mary went to the reception. John took pictures of her afterwards.*

12. See Augusto (2000), (2003) for discussion of the acquisition of the syntax and semantics of *then* by native speakers of Portuguese, a language in which *então*, 'then', displays different properties from English, as discussed by Augusto.
13. Since clause-medial and clause-initial *then* show identical behavior with respect to the present discussion, I use only initial *then* in most instances from here on to illustrate the ordered reading.
14. The connectives *after, while,* and *as* are not permitted in (28) for pragmatic reasons. However, for completeness, I include the four temporal connectives in all temporal adjunct clause examples.
15. Note that the sequence in (32a) is acceptable if *then* is replaced with *now*, as in (i). This fact highlights the claim that it is the semantic role of *then* as a time linker, and not the semantics of temporal adverbials in general, which determines its distribution.

    (i) *Mary spoke to the reporters. Now Bill will photograph her.*

16. I use the present progressive in examples with the present tense to avoid the habitual interpretation associated with the simple present in English.
17. *At 5:00* is added to these examples because the perfect tenses are more natural with a time point adverbial.
18. I would like to thank Pier Marco Bertinetto for pointing out this reading to me.
19. Some speakers prefer the following order to the one in (46a), with *already* at the end of the sentence:

    (i) *Mary spoke to the reporters. Bill had photographed her then already.*

    Sequence (i) exemplifies the same point as (46a).

20. A reviewer notes that an alternative explanation for the contrast between (46a) and (46b) would be that the R time is not present in simple tenses. However, recall that the analysis of multiple adverbial constructions in section 2.6 (see, in particular, footnote 8) as well as the analysis of temporal adjunct clauses in chapter three supports the claim that the Reference time is present in simple tenses.
21. I would like to thank Danny Fox for discussion of these ideas. See Fox (1996) for relevant discussion.
22. For discussion of the availability of semantic information to the parser, see Forster (1979), Frazier (1978), Frazier, Clifton, and Randall (1983), Britt (1991), Crain and Steedman (1985), Ferreira and Clifton (1986). Since there is a meaning difference between the two readings of (52), the higher attachment site is possible.
23. A reviewer asks why, given parsing considerations, clause-initial position is possible for *then*, as opposed to AspP (lower position). I assume that in the derivation of a sentence with clause-initial *then*, there are relevant (topic or focus) features which induce movement of *then* to initial position.
24. The present perfect tense is not included here because it is incompatible with temporal *then*, as shown in (ia-b):

    (i) a. ... **Mary has read a book then.*
        b. ... **Then Mary has read a book.*

    This incompatability is presumably due to the well-known fact that this tense in English disallows most instances of temporal modification, as illustrated in (ic):

    (i) c. **Mary has read a book yesterday/last week*

25. As seen in (ia) and (ib), the tense sequences present - future perfect and present perfect - past perfect are not acceptable in discourse are thus not discussed here.

    (i) a. **Mary is speaking to the reporters. Bill will have photographed her.*
        b. **Mary has spoken to the reporters. Bill had photographed her.*

26. The tense structure derivation in (58c) has the Reference and Event times shifting to the right, instead of only the Event time. This is required if we make the reasonable assumption that a derived tense structure be a possible tense structure of the language. Since the derived tense structure from (58c), repeated in

(i), is a possible tense in English (the future tense), it is preferred over (ii), which is not a possible tense in English.

(i) a. S _ R , E
b. S , R _ E

27. I would like to thank Jairo Nunes for pointing out this argument to me.
28. Note that the relevant reading here is where the event of leaving in the infinitival clause is modified by *then*.
29. *Then* is unacceptable initially in infinitival embedded clauses (ia), as are other adverbs (ib):

(i) a. **Mary wanted then Bill to leave.*
b. **Mary wanted quickly Bill to leave.*

Due to this unacceptability, medial position is used in the text.

Chapter 6
The Structure of Aspect

6.1 Introduction

In chapters one through five, I have proposed and defended the thesis that there is a principled mapping between the syntax and semantics with respect to temporal interepretation. We have explored evidence from the domain of tense, involving the distribution of adverbial time modifiers, temporal adjunct clauses, reduced relatives and discourse linkers that support the claim that syntactic locality constrains the interepretation of time in natural language.

I now turn to a discussion of another component of temporal interpretation; the aspectual domain. I show in this chapter and the next that the theory developed thus far in order to account for tense phenomena also extends to explain generalizations from the aspectual domain.[1] In particular, I argue that there is evidence for the claim that the Event time is represented in VP and the Reference time in AspectP from structures involving aspectual interpretation.

Tense is traditionally understood to be the grammaticalized location of events in time, while aspect refers to the internal temporal contour of an event.[2] An example of an aspectual distinction is the contrast between (1a) and (1b); in (1a), the event of writing is viewed as continuous, whereas in (1b), the event of writing is viewed as finished.

(1) a. *Mary was writing a book.*
    b. *Mary wrote a book.*

Recall that the discussion of temporal phenomena in earlier chapters assumed an analysis of tense according to which times are semantic features associated with particular syntactic heads. I propose here that a feature-based analysis of contrasts such as (la–b) is made available in terms of feature checking; events with a definite end point such as the one in (1b) involve interpretation of the verb and either a bounded direct object or a

bounded PP in the checking domain of AspP, whereas events with no end point specified such as the one in (1a) involve interpretation in a projection lower in the clause than AspP.

Evidence for this structural distinction comes from the syntactic distribution of the ambiguous adverb *quickly,* which can modify either the manner or the end point of an event. I argue that when *quickly* modifies the manner, it is adjoined to VP, and when it modifies the end point, it is adjoined to AspP. This approach explains certain linear order restrictions and preposing facts involving *quickly.*

Next, I investigate the syntax of durative and time frame adjuncts, arguing that, depending on whether the adjunct modifies the duration or the end point of the event, it is adjoined to VP or to AspP. Data involving preposition stranding, scope of *only*, and parasitic gap constructions supports this approach. In addition, it is argued that extending Diesing's Mapping Hypothesis (Diesing 1990, 1992) to the interpretation of the objects of adjunct PPs explains a restriction on the interpretation of the objects of time frame adjuncts.

6.2 Semantic Framework

I now turn to a discussion of the semantic framework for aspect that I assume. Recall from chapter one that much semantic work on aspect assumes the Vendlerian classification of events into the four classes in (2a–5a), with an example of each in (2b–5b) (Vendler 1967).

(2) a. Accomplishments – events which have a duration and a definite end point
b. *Mary drew the circle.*

(3) a. Achievements – events which have a definite end point, but which are instantaneous
b. *Mary found the treasure.*

(4) a. States – events which are ongoing in time
b. *Mary knew French.*

(5) a. Activities – processes or 'happenings' which are ongoing in time
b. *Mary pushed the cart.*

Vendler claimed that it is the verb that determines aspectual class. However, as has been discussed by many authors, the aspectual classification of events is also influenced by the verb's arguments, as well as by adjunct PPs, morphological distinctions such as perfect-imperfect, etc. (Dowty 1979; Tenny 1987, 1994; etc.). For example, the contrast between (6a), which is an accomplishment, and (6b), which is an activity, illustrates the influence of the direct object on aspect.

(6) a. *Mary ate the apple.*
b. *Mary ate apples.*

Given that aspect seems to be determined by several different elements, much recent work has claimed that the primitives of aspect are not the aspectual classes of Vendler, but that aspect is rather the result of the combination of features of the verb, noun phrases, PP adjuncts, etc. (Verkuyl 1972, 1989, 1993; Pustejovsky 1991; Jackendoff 1991; Zagona 1993). I will assume this approach here.

The aspectual distinction that this chapter is concerned with is telicity; events that have a distinct, definite and inherent end point are telic, and those that are ongoing in time are atelic. An example of a telic event is (2b), repeated in (7a); the drawing event is interpreted as having a distinct end point, which is the point in time at which the circle is finished being drawn. The event in (5b), repeated in (7b), is atelic; the pushing of the cart does not have a particular end point specified. The study of telicity goes back to Aristotle and has a long tradition in the philosophical and semantic literature (Aristotle; Kenny 1963; Dowty 1979; Bach 1981, 1986; Mourelatos 1981; and references therein).

(7) a. *John drew the circle.*
b. *John pushed the cart.*

A test which has been widely used to distinguish telic and atelic events is illustrated in (8); *in an hour* is compatible only with telic events, and *for an hour* only with atelic events (Vendler 1967; Dowty 1979).

(8) a. *Mary ate an apple in an hour.*
b. **Mary ate an apple for an hour.*
c. *Mary walked for an hour.*
d. **Mary walked in an hour.*

I follow Jackendoff (1991), who argues that telic events have the feature [bounded] while atelic events do not have this feature; an entity is bounded if it is conceptualized as having a clear boundary in time and/or space (see also Verkuyl and Zwarts 1992). For example, individuals are bounded by having a particular shape, while portions of matter are not bounded in time or space. The direct object of (9) is an example of a temporally bounded DP.

(9) *The students performed the play.*

A key feature of Jackendoff's analysis is that the feature [bounded] applies to DPs, Vs, and PPs. This approach makes possible a unified explanation for the role of the direct object and adjunct PPs in determining the telicity of the event, in terms of the contribution of the feature [bounded].

6.2.1 Compositionality of Telicity

As discussed in chapter one, the sentences in (10a–i) illustrate the compositional nature of telicity. As is shown by their compatibility with the PPs *in an hour* and *for an hour,* (10a) is telic and (10b) is atelic. These examples illustrate the influence of the direct object on telicity; a bounded verb in combination with a definite noun phrase direct object, which is bounded, results in a telic reading, while the same verb with a bare plural direct object, which is unbounded, results in an atelic reading.

(10) a. *John built the house in a week / *for a week*
b. *John built houses *in a week / for a week*
c. *John was building the house *in a week / for a week*
d. *John walked *in two hours / for two hours*
e. *John walked to the store in two hours / *for two hours*
f. *John walked toward the store *in two hours/for two hours*
g. *John walked to stores *in two hours / for two hours*
h. *John watched the house until 3:00.*
i. *John loved Mary until last year.*

As seen in (10c), the use of the progressive results in an atelic reading. The progressive marker thus does not have the feature [bounded], while other

aspect markers compatible with telic readings have this feature. This is natural, given that many languages have aspectual morphemes which encode telicity distinctions, including the widely-studied aspectual systems of the Slavic languages (see Brecht 1984; Smith and Rappaport 1991 and references therein). In the Russian example (11a), the verb *eat* with the perfective morpheme results in a telic reading, while in (11b), the verb without the perfective morpheme results in an atelic reading (examples from Smith and Rappaport 1991: 315).

(11) a. *Ja s"el mjaso.*
I PERF-ate meat
'I ate the meat.' (telic)

b. *Ja el mjaso.*
I ate meat
'I was eating the meat.' (atelic)

The contrast between (10d) and (10e) shows that the addition of a goal phrase to an atelic event can result in a telic reading; *to the store* specifies a locative end point to the event by "defining a Path that terminates at the Thing or Place that serves as its argument" (Jackendoff: 36). Goal PPs thus have the feature [bounded] and combine with the bounded Asp head and bounded verb to result in a telic reading.

(10f) shows that the [bounded] feature of the goal PP is itself compositionally derived – the preposition must be bounded in order to result in a telic reading; *toward* only defines a Path but does not specify an end point, and is therefore unbounded. (10g) illustrates that the object of the preposition also plays a role; if the object is unbounded, the whole PP is unbounded, and can not contribute to a telic reading.

Example (10h) shows that the addition of an *until* phrase to an atelic event can also result in a telic reading; *until* "is a function that bounds an unbounded event...with a time..." (Jackendoff: 18). (10i) illustrates that statives, which are often considered incompatible with telic readings, can be telic with an *until* phrase; the [bounded] feature of the PP combines with the [bounded] features of the Asp and V to derive a telic reading.

To summarize this section, the configurations in (12) result in telic readings, and all other feature combinations result in atelic readings. In the following section, I propose a syntactic analysis which explains why only these combinations of features result in telic readings.[3,4]

(12) a. [bounded] verb, [bounded] Aspect, [bounded] direct object
b. [bounded] verb, [bounded] Aspect, [bounded] PP

6.3 A Syntax for Aspect

In this section, I show that assuming a common feature for DPs, Vs, PPs and Aspect which contribute to telic interpretations makes possible a syntactic analysis of telicity within the Minimalist framework in terms of feature-checking (Chomsky 1993,1994, 2000, 2001).

Recent work on the syntax of aspect has claimed that telic readings are reflected in a particular syntactic configuration (Tenny 1987,1994; Borer 1994; Travis 1991, 2000; Ritter and Rosen 2000, 2001; see Rosen 2000 for an overview of this work). I follow Borer, who claims that the direct object of a telic event moves to Spec, Asp(ect)P, while the direct object of an atelic event does not. I assume that AspP is located directly above vP, the position of atelic direct objects.[5]

While direct objects of telic events appear in a higher Spec position at LF in English, other languages seem to show this syntax overtly. In Scottish Gaelic, for example, the direct object of telic events appears to the left of the verb in direct case, as illustrated in (13a), while on an atelic reading, the direct object appears after the verb in genitive case, as in (13b) (examples from Ramchand 1992: 415). (*a* preceding the verb in (13a) is a particle which comes before the verbal noun in this construction).

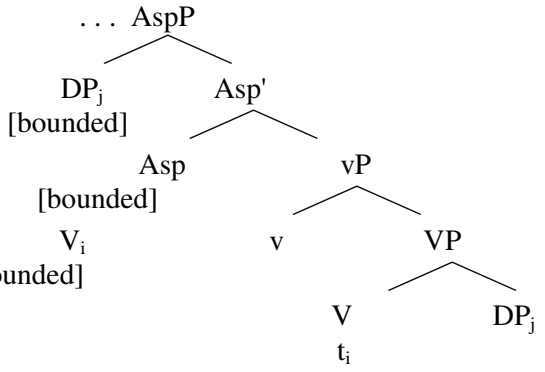
(13) a. *Bha Calum air am balach (a) fhaicinn.*
Be-PAST Calum PERF the boy-DIR 'a' see-VNOUN
'Calum had seen the boy.' (telic)
b. *Bha Calum a' faicinn a'bhalaich.*
Be-PAST Calum PROG see-VNOUN the boy-GEN
'Calum was seeing the boy.' (atelic)

Given that a telic reading results when a bounded verb, a bounded Asp, and either a bounded direct object or a bounded PP are combined, I propose that telic readings are the result of feature-checking of the [bounded] feature between the verb and Asp heads with either a direct object or a PP. Since within the Minimalist framework, feature-checking takes place only within a checking domain (Chomsky 1993), the syntactic constituents which contribute to a telic reading must be in a local relation

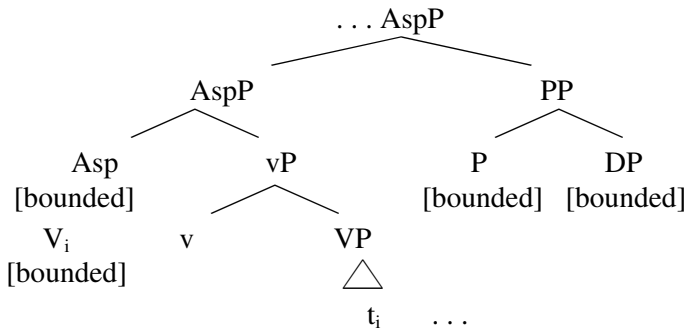
with each other at LF; they are all in the checking domain of AspP.[6,7] The configurations that result in telic readings, leaving aside details which are not relevant, are thus as in (14a), for telic readings with a bounded direct object, and (14b), for telic readings with a bounded PP.[8,9,10]

(14) Syntactic Configurations for Telic Events

a.



b.



Evidence that bounded direct objects and PPs play the same role in the syntax in contributing to telic readings (both contribute a [bounded] feature) comes from a restriction on telic readings. As noted by Jackendoff, a telic reading is not available when a telic event is combined with a bounded PP, as shown in the contrasts between (15a) and (15b) and between (15c) and (15d). Assuming, following Chomsky (1993), that features are checked only once, when a bounded direct object or PP is in the configuration for feature-checking, the feature [bounded] is checked, and can not be checked again. Thus, if there is both a bounded PP and a bounded object, one of these elements will not be able to check its feature,

and the derivation will crash.

(15) a. *John ate bagels until 3:00.*
b. **John ate the bagel until 3:00.*
c. *John walked until 3:00.*
d. **John walked to the store until 3:00.*

This feature-checking approach to telicity also correctly predicts that telic readings can be derived from atelic readings, while atelic readings can not be derived from telic readings; since telic readings are the result of feature-checking of [bounded] features, the addition of an unbounded element will not block that checking and the resulting telic reading.[11] However, the addition of a [bounded] feature can result in the shift from an atelic to a telic reading, as in (10e) and (10h–i), repeated here as (16a–c). Recall that in (16a), ((10f)), the addition of the goal phrase *to the store* to an atelic event results in a telic reading, and in (16b–c), ((10i–j)), the addition of an *until* phrase to an atelic event also results in a telic reading.[12]

(16) a. *John walked to the store in two hours / *for two hours*
b. *John watched the house until 3:00.*
c. *John loved Mary until last year.*

6.4 Syntax of *Quickly*

Syntactic evidence for the structure proposed here for telic events comes from an ambiguity that the adverb *quickly* shows. As has been discussed by Travis (1988) and Pusteovsky (1991), (17a) has two readings; it could mean that John moved fast while he was building the house, which I will refer to as the manner reading (17b), or it could mean that the whole event of building the house took a short period of time, which I will refer to as the whole event reading (17c).

(17) a. *John built the house quickly.*
b. Manner reading: John moved fast while he was building the house.
c. Whole event reading: the event of building the house took a short period of time.

The whole event reading is only available with telic events; when *quickly* occurs with atelic events as in (18a), the only reading available is that the manner in which John pushed the cart was quick ((18a) versus (18b)).

(18) a. *John pushed the cart quickly.*
b. Manner reading: John moved fast while he was pushing the cart.
c. *Whole event reading: the event of pushing the cart took a short period of time.

Given the syntax that was introduced for telic versus atelic events in section 6.3, I propose that on the whole event reading, *quickly* is adjoined to AspP, where the constituents of telic events are located at LF. In contrast, as discussed in section 2.12.2, on the manner reading of *quickly,* it is adjoined to VP or to vP.

6.4.1 Linear Order of *Quickly*

Evidence for this claim comes from linear order facts; as shown in (19a), when an unambiguous manner adverb such as *carefully* precedes *quickly, quickly* can receive either a manner or whole event interpretation. However, when *quickly* occurs before *carefully*, as in (20a), it can only receive the manner interpretation. This is predicted by the claim that on the manner reading, *quickly is* attached lower than on the whole event reading, since an unambiguous manner adverb will be attached only in the lower position.

(19) a. *John built the house carefully quickly.*
b. Manner reading: John moved fast while he was building the house in a careful manner.
c. Whole event reading: the event of John building the house in a careful manner took a short period of time.

(20) a. *John built the house quickly carefully.*
b. Manner reading: John moved fast while he was building the house in a careful manner.
c. *Whole event reading: the event of John building the house in a careful manner took a short period of time.

6.4.2 Preposing of *Quickly*

Preposing data lend support to this analysis. The only reading available for (21), where *quickly* occurs in clause-initial position, is the whole event reading.[13]

(21) a. *Quickly, John built the house.*
b. *Manner reading: John moved fast while he was building the house
c. Whole event reading: the event of building the house took a short period of time

Recall discussion of similar facts about temporal modification from chatper two, where it was shown that clause-final time point adverbials such as *at 3:00* are ambiguous between mofiying the Event and Reference times, associated with VP and AspP, respectively. In clause-initial position, only the higher, Reference time reading is possible. Similar to the reasoning for clause-initial time adverbials, if we assume that clause-initial manner adverbs are moved, the analysis proposed here explains this fact naturally, given the Shortest Movement Condition (Chomsky 1995: chapter three). Recall that movement is permitted only from AspP-adjoined position, by the following reasoning: there are three possible derivations for a sentence with clause-initial *quickly*; one in which the adverbial has moved from VP-adjoined position, one in which it has moved from vP-adjoined position, and one in which it has moved from AspP-adjoined position. These three derivations have the same array (the same choice of lexical items), and hence are comparable with respect to economy considerations. However, the derivation in which the adverbial moves from AspP-adjoined position rules out the derivations in which the adverbial moves from vP-adjoined or VP-adjoined position, because the derivation with movement from AspP involves movement which is shorter than the movement involved if movement takes place from vP- or VP-adjoined position.

The interaction of the ambiguous adverb *quickly* with telicity thus lends support to the claim that telic events are composed in AspP, while atelic events are composed lower in the structure.

6.5 Syntax of Time Frame and Durative Adjuncts

In this section, I discuss the syntax of time frame and durative adjuncts, showing that their syntactic position is predicted by the approach to the syntax of telicity adopted here. In contrast to the locative and temporal PPs *to the store* and *until 3:00,* which contribute to the aspectual composition of the event by adding a [bounded] feature, the PPs *in an hour* and *for an hour*, used as tests for telicity, do not seem to contribute a [bounded] feature; it is not possible to derive a telic event from an atelic one or vice-versa with these PPs, as shown in (22a–d).[14,15]

(22) a. *The enemy destroyed the city in two years.*
b. **The enemy destroyed the city for two years.*
c. *John slept for two hours.*
d. **John slept in two hours.*

The syntax proposed in section 6.3 for telicity makes possible a straightforward account of the syntax of these adjuncts. Given that *in* PPs specify how long it takes for the end point to come about, I propose that they are adjoined to AspP. On the other hand, given that *for* PPs describe the duration of the event without reference to an end point, I propose that these adjuncts are adjoined to vP or VP.

6.5.1 Preposition Stranding

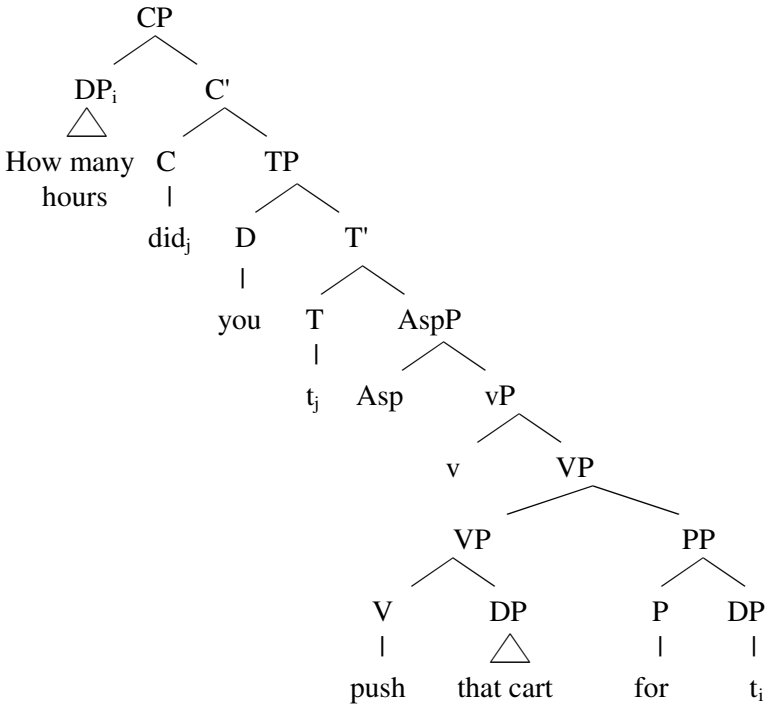
Evidence for the different structural position of *for* and *in* PPs comes from preposition stranding data. As shown by the contrast between (23a) and (23b), *for* PPs permit preposition stranding, while *in* PPs do not.

(23) a. *How many hours did you push that cart for?*
b. **How many hours did you read that book in?*

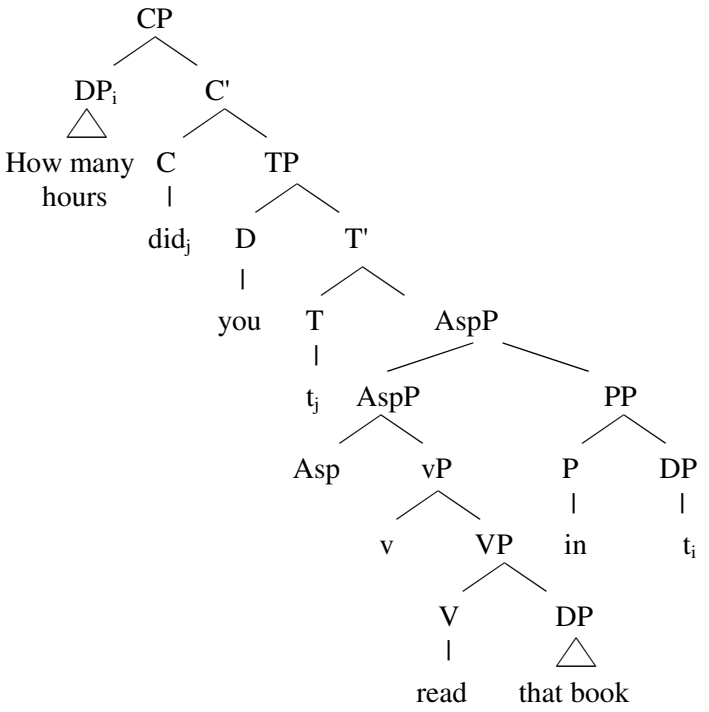
Recall from the discussion of preposition stranding with temporal PPs in chapter two that, following Hornstein and Weinberg (1981), the possibility of preposition stranding depends upon LF incorporation of the preposition into the verb. If we further assume, following Uriagereka's (1988) and Borer's (1994) proposal that at LF, the heads of all phrases within the VP incorporate into the verb, we can capture the facts. Given that *for* adjuncts

are adjoined to VP, as in the structure for (23a) in (24a), *for* will incorporate at LF, permitting stranding, while *in* will not incorporate and thus will not permit stranding, as in the structure for (23b) in (24b).

(24) a.



(24) b.



6.5.2 Scope of *only*

Further evidence for the proposal that *in* PPs are adjoined to AspP, while *for* PPs can be adjoined to VP, comes from data involving the scope of *only*. As shown in (25a–b), preverbal *only* can associate with the object of the preposition of *for* PPs, but not with the object of the preposition of *in* PPs; (25a) may mean "It was for only an hour that John pushed the cart", but (25b) may not mean, "It was in only an hour that John read the book".

(25) a. *John only pushed the cart for an HOUR.*
Meaning: It was for only an hour that John pushed the cart.
b. **John only read the book in an HOUR.*
Meaning: It was in only an hour that John read the book.

Note that the unacceptabilty of (25b) does not seem to be a purely semantic effect, given that when *only* occurs within the PP, as in (26), it can associate with the object of the preposition.

(26) *John read the book in only an hour.*

As discussed in section 5.3.2, Jackendoff (1972) and Rooth (1985) argue that preverbal *only* is adjoined to VP. Evidence for this claim, noted by Jackendoff, is that preverbal *only* cannot associate with the subject, as shown in (27) (example from Jackendoff:250).[16]

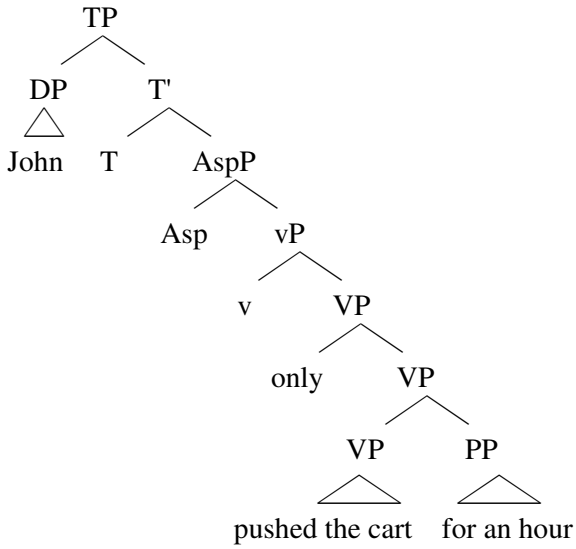
(27) **JOHN only gave his daughter a new bicycle.*

Another piece of evidence for the VP-adjunction site of preverbal *only* is that it is not possible before auxiliary verbs, as shown in the contrast between (28a) and (28b).

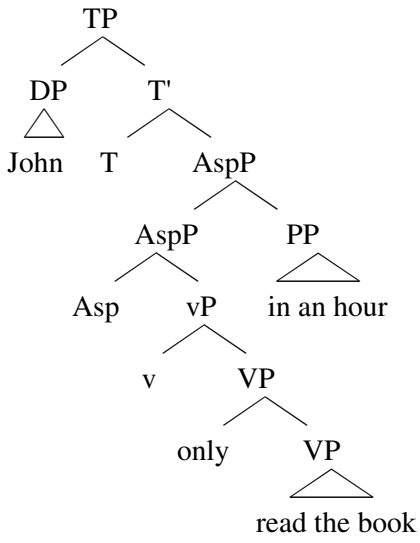
(28) a. *John will only read the book.*
b. **John only will read the book.*

Given that *only* is VP-adjoined, and assuming that the associate of *only* must be within it's c-command domain (see Jackendoff 1972; Rooth 1985; Tancredi 1990 and references cited therein), this data is explained on the present analysis, since *only* c-commands VP-adjoined *for* PPs, but not AspP-adjoined *in* PPs, as shown in the tree structures for (25a) in (29a) and (25b) in (29b).

(29) a.



(29) b.



6.5.3 Parastic Gap Constructions

I show in this section that the analysis proposed here for the structure of durative and time frame adjuncts accounts for their distribution with respect to parasitic gap constructions.

Observe that a parasitic gap is licensed within a time frame adverbial PP, as shown in (30a), while it is not licensed within a durative adverbial PP, as indicated in (30b).

(30) a. *What$_i$ did you read t$_i$ [in the amount of time it took her to write GAP]?*
b. **What$_i$ did you read t$_i$ [for the amount of time it took her to write GAP]?*

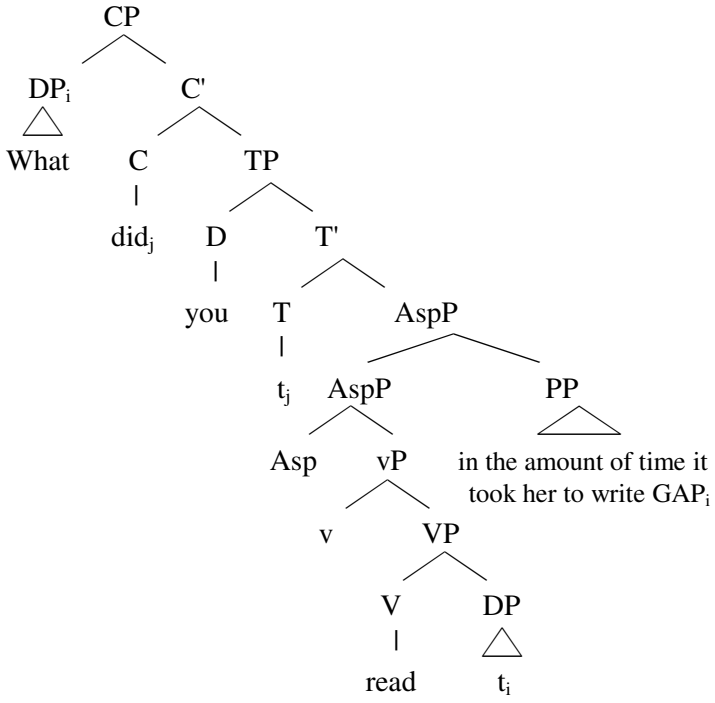
Assuming that parasitic gaps are subject to an anti-c-command requirement, as stated in (31) (see Engdahl 1983; Culicover and Postal 2001), we can account for this contrast.

(31) Anti-c-comamnd Requirement on Parasitic Gaps: A parastic gap cannot be c-commanded by the true gap.

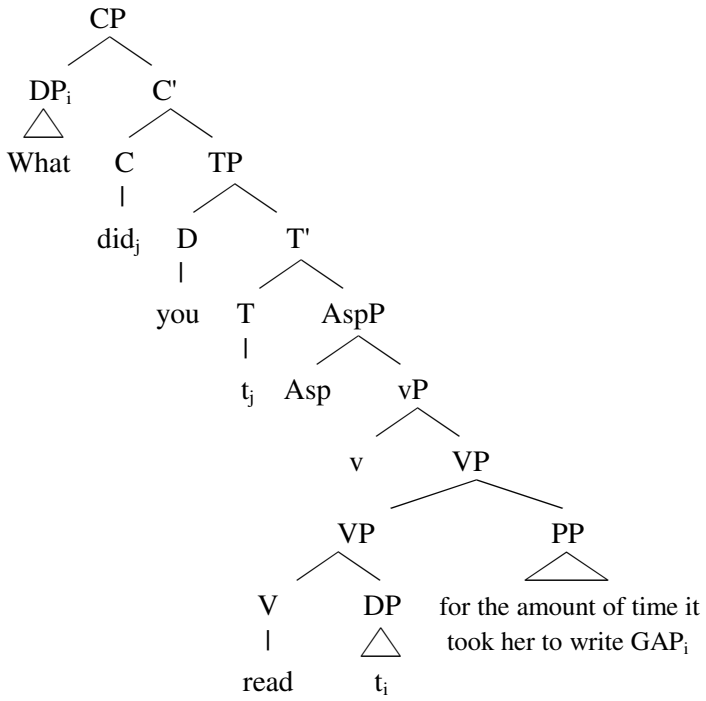
Since a time frame adverbial is adjoined to AspP, it is located outside of

the c-command domain of the direct object trace at LF, and thus the parasitic gap is licensed, as shown in (32a). However, because a durative adverbial is adjoined to VP, as in (32b), it is located within the c-command domain of the direct object trace at LF, and hence the parasitic gap is not licensed.

(32) a.



(32) b.



The distribution of parasitic gaps with durative and time frame adverbials thus supports the present claim that the time frame adverbial is adjoined to AspP, while the durative adverbial is adjoined to VP.

6.5.4 Specificity Effects with Time Frame and Durative Adjuncts

In this section, I point out contrasts in the acceptability of specific DP objects of *for* and *in* PPs, and I propose that the analysis offered here for the adjunction site of *for* and *in* PPs, in combination with applying Diesing's Mapping Hypothesis to adjunct PP objects, explains these contrasts.

As seen in the examples in (33)–(34), the DPs permitted in the object position of *in* PPs seem to constitute a narrower class than those permitted in the object position of *for* PPs; while both *for* and *in* PPs allow indefinite DP objects (33a–b) and objects with *a few* (33c–d) and a number (33e–f), *for* PPs also permit bare plural objects (34a) and objects with *many* (34c), *some* (34e), and *few* (34g), while *in* PPs do not permit these objects, as

seen in (34b), (34d), (34f), and (34h), respectively.

(33) a. *John pushed the cart for an hour.*
b. *John read the book in an hour.*
c. *John pushed the cart for a few hours.*
d. *John read the book in a few hours.*
e. *John pushed the cart for two hours.*
f. *John read the book in two hours.*

(34) a. *John pushed the cart for hours.*
b. **John read the book in hours.*
c. *John pushed the cart for many hours.*
d. *??John read the book in many hours.*
e. *John pushed the cart for some hours.*
f. **John read the book in some hours.*
g. *John pushed the cart for few hours.*
h. **John read the book in few hours.*

The incompatibility of *in* PPs with certain objects does not seem to be purely semantic, given that (35), with roughly the semantics of the *in* PP construction, is possible.

(35) *It took John hours/many hours/some hours/few hours to read the book*

Diesing (1990, 1992) proposes a mapping procedure between the syntax and semantics which divides the clause into IP and VP, as follows (Diesing: 10).

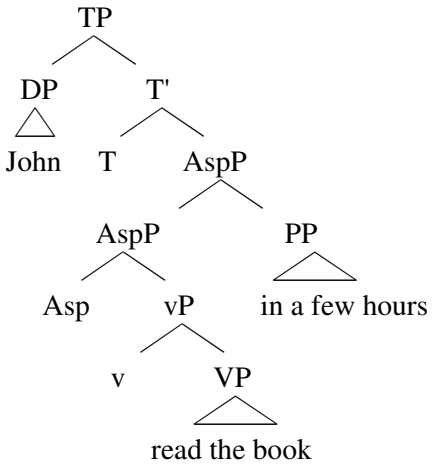
(36) Mapping Hypothesis
Material from VP is mapped into the nuclear scope.
Material from IP is mapped into a restrictive clause.

Diesing claims that indefinite DPs are ambiguous between a presuppositional and a cardinal (nonpresuppositional) reading. According to her analysis, presuppositional material is located in the restrictive clause for semantic interpretation, while nonpresuppositional material is located in the nuclear scope. Given the Mapping Hypothesis, DPs with presuppositional indefinite and strong quantifier readings are mapped to IP

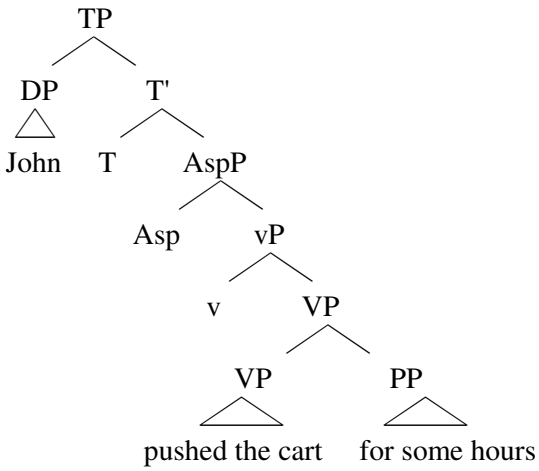
at LF, while DPs with cardinal readings remain within VP. According to Diesing, the following DPs are examples of cardinal DPs: *books, many books, some books,* and *few books* . As seen in (30), these are the types of quantified DPs that are not permitted with *in* PPs, but are permitted with *for* PPs.

Adopting Diesing's idea that cardinal DPs are located inside VP at LF and noncardinal DPs outside VP, we account for the contrast between *in* and *for* PPs; since, on the present analysis, *in* PPs are adjoined to AspP, as in (37a) and (37b), they permit only noncardinal DP objects, while, since *for* PPs are adjoined either to VP or to vP, as in (37c), they permit either cardinal or noncardinal DP objects. Thus, although Diesing's study was concerned with argument DPs, and did not investigate the role that the Mapping Hypothesis plays in the interpretation of adjuncts, this section has shown that the Mapping Hypothesis also holds for the interpretation of durative and time frame adjunct PP objects (see Hitzeman 1993 for related discussion of extending the Mapping Hypothesis to adjunct phrases).[17,18]

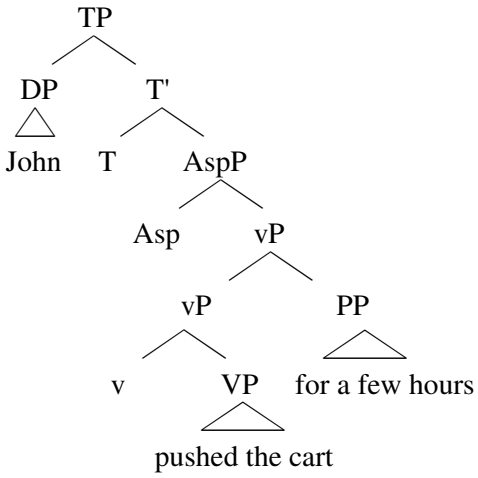
(37) a.



(37) b.



(37) c.



6.6 Conclusion

I have argued in this chapter that telic interpretations of events involve checking of the [bounded] feature in AspP by the verb and the aspectual head either with a direct object or with an adjunct PP. The verb and direct object or adjunct PP of telic events thus involves interpretation higher in the clause than the interpretation site of atelic events. Evidence for this proposal from the structural ambiguity of *quickly* was discussed; when *quickly* receives a manner reading, which is compatible with both telic and

atelic events, it is adjoined to VP. However, when *quickly* modifies the end point of an event, a reading compatible only with telic events, it is adjoined to AspP. Data involving linear order and preposing effects support this claim.

The analysis was shown to make possible a syntactic account of the semantic difference between durative and time frame adjuncts; a durative adjunct, modifying the duration of the event, is adjoined to VP, while a time frame adjunct, modifying the end point of the event, is adjoined to AspP. Preposition stranding facts, contrasts in scope of *only*, and parasitic gap data lend support to this proposal. In addition, this analysis, in combination with Diesing's Mapping Hypothesis, explains why the object of an end point adjunct is required to be noncardinal, while the object of an adjunct with a duration reading can be cardinal or noncardinal. This has the consequence that Diesing's Mapping Hypothesis is extended to include the interpretation of the objects of adjuncts.

Notes

1. See Demirdache and Uribe-Etxebarria (1997) for an analysis which unifies the tense and aspect systems.
2. The term "event" used here is a generic term intended to include different aspectual types, and does not refer to a particular aspectual class (events versus states, for example).
3. Recent work on the syntax of aspect has claimed that telic interpretations are linked to Accusative Case (see Ritter and Rosen 2000, 2001). However, as the examples in (10e), (10h), and (10i) indicate, this connection is not tenable, because it is possible for elements that do not receive Accusative Case to participate in determining a telic event. It is also possible, as noted by Borer, and illustrated in (i), for an unaccusative and a passivized subject to participate in determining a telic reading. (I assume, following Borer, that in these instances the surface subject has raised from object position through Spec, AspP.)

   (i) a. *John arrived in two seconds (flat) / *for two seconds (flat)*
   b. *The house was constructed in five months / *for five months*

4. It is standardly assumed that syntactic movement is driven by a requirement to check uninterpretable features. Pesetsky and Torrego (2000) propose that all features are interpretable, although instantiations of features may be uninter-

pretable; Nominative Case is strong Tense, which is interpretable on T and uninterpretable on D. The present analysis suggests that uniformly interpretable features present another configuration for feature-checking.

5. Some authors have argued that telic objects are licensed in Spec, AgrOP, while atelic objects are licensed inside VP (a claim that is incompatible with Chomsky's (2000) proposal that eliminates Agreement projections). However, there is evidence that the landing site of objects of atelic events, as well as those of telic events, is outside of VP. First, note that objects of atelic events support Antecedent Contained Deletion (ACD), as shown in (ia–b), as do the objects of telic events, as indicated in (ic).

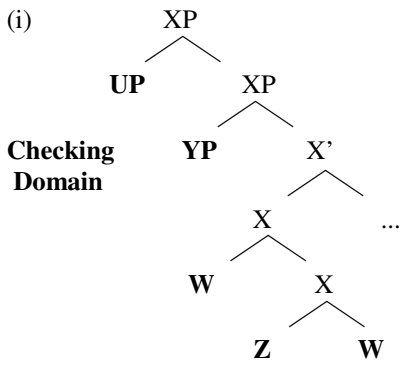
   (i) a. *I saw [the woman that you did [e]]*
   b. *I liked [the picture that Fred did [e]]*
   c. *I read [the book that Mary did [e]]*

   Copying the VP of the main clause into the ellipsis site in these examples creates an infinite regress, since the ellipsis site is itself contained in the VP, inside the direct object. I follow analyses of ACD according to which this infinite regress is avoided by the direct object moving out of VP (Lasnik 1993, Takahashi 1993, Hornstein 1994, Kennedy 1997). Therefore, given that the objects of atelic events permit ACD, they must be located outside of VP at LF. Secondly, binding data seem to indicate that an atelic object is located above VP at LF. As seen in (ii), an atelic direct object c-commands into a locative adjunct, resulting in a violation of Condition C.

   (ii) **I saw him$_i$ at John's$_i$ party*

6. The definition of checking domain is illustrated in (i), where UP, YP, W, and Z are in the checking domain of the head X (Chomsky 1993:12).

(i)



7. I assume that the external argument is base-generated in Spec, VP and raises to a higher inflectional projection. For discussion of surface subjects that participate in the aspectual composition of the event, see footnote 3.
8. Note that this proposal is in contrast to recent analyses of aspect that claim that the end state is represented lower down in the structure than the initial part of the event (Ritter and Rosen 2000, 2001, Travis 2000, Tenny 2000.) According to the present analysis, the opposite is true; the end state is represented above the initial part of the event. The arguments in sections 6.4 and 6.5 present extensive evidence for this structure.
9. Recent analyses of goal *to* PPs such as in *John ran to the store* argue that they are arguments of the verb (see Hoekstra and Mulder 1990). This view is compatible with the present analysis; if *to* PPs are arguments of the verb, they raise to Spec, AspP to participate in checking of their [bounded] feature and contribute to a bounded interpretation.
10. Travis (to appear) argues that the position of aspectual calculation, AspP, is located within vP. She shows that in German extraction is permitted from direct objects that measure out an event, such as in example (i).

    (i) *[Artikel]$_i$ habe ich schon einmal [einen t_i] in nur einer Woche*
    article have I already once one in only one week
    geschrieben.
    written
    'As for articles, I already wrote one once in only one week.'

    Assuming, following Diesing (1990), that extraction is permitted only from direct objects within VP (corresponding to vP in current theorizing), this indicates that a direct object that contributes to a telic reading, and hence the AspP projection, is located within vP. However, it is not clear that this argument goes through. Diesing claims that extraction from a direct object that is outside

of VP is illicit because it results in a violation of the Subjacency Condition, which bars extraction out of an ungoverned position. Given Travis' claim that direct objects that measure out an event move to Spec, AspP, extraction from within these phrases should be unacceptable as a violation of Subjacency. Therefore, the extraction data in (i) seems to present a puzzle to analyses which claim that objects that measure out an event move to a specifier position, which, as far as I know, includes all recent analyses.

11. For example, there is no unbounded PP which, when combined with a telic event, results in an atelic reading, comparable to bounded PPs, which can combine with an atelic event to derive a telic event.
12. The following sentences seem to be a counterexample to the claim that events may not shift from bounded to unbounded; (ia) includes a bounded event which becomes unbounded with the addition of *every day* in (ib).

    (i) a. *John ate an apple* (bounded)
        b. *John ate an apple every day* (unbounded)

    In fact, it is not the case that the sentence in (ib) has changed from unbounded to bounded; rather, as discussed by de Swart (1998), (ib) is an example of coercion. A repetitive reading is forced by the presence of the frequency adverbial *every day*, resulting in a reading with a series of events, each of which is still a bounded event. Examples of coercion are thus not a counterexample to the claim that a telic event may not become atelic.
13. Note that (20) may have another, irrelevant reading, where the time leading up to the event of building the house was a short period of time, as in, *Shortly thereafter, John built the house* (see Travis 1988 and Pusteovsky 1991 for discussion).
14. Note that it is the durative readings of the *for* and *in* PPs that are relevant to this discussion. The reading of the *in* PP in (ia), where the event of leaving is to begin five minutes from the moment of speech, and the reading of the *for* PP in (ib), where the end state of Mary being in Boston is interpreted to last for three days, are not considered in this discussion.

    (i) a. *John will leave in five minutes.*
        b. *Mary is going to Boston for three days.*

15. Following Jackendoff (1991), I here take bounding in the temporal domain to be to place a bound on the length of time of an event until it's completion; "a speaker uses a bounded constituent to refer to an entity whose boundaries are in view or of concern; one can think of the boundaries as within the current field of view" (19:1991). Assuming this approach, we can say that a *for* phrase measures the duration of an event but does not bring into view the end point.

The fact that a *for* phrase does not make direct reference to an end time is shown by the fact that it is possible to extend the duration of an event described by a *for* phrase, as in (ia), while this is not possible with an *in* phrase, as in (ib).

(i) a. *Mary pushed the cart for ten hours and kept right on pushing the cart.*
b. **Mary read the book in ten hours and kept right on reading the book.*

16. It is not clear, if we assume the VPISH, why it is not possible to interpret the subject within the scope of the focus particle, in its base position within VP. This is in line with the observation that negative polarity item subjects are not licensed by sentential negation, as shown by (i) (see Linebarger 1987 for discussion).

(i) **Anyone didn't come to the party.*

The data involving scope of *only* therefore seem to be part of a broader puzzling pattern.

17. I assume that there is an independent explanation for why the quantifiers *the*, *every*, *each* and *most* are not possible with either *in* PPs or *for* PPs, as shown in (ia) and (ib).

(i) a. **John pushed the cart for the / every / each / most hour(s)*
b. **John read the book in the / every / each / most hour(s)*

18. Another piece of evidence for the claim that *for* PPs are lower in the structure than *in* PPs is that *for* PPs can appear without the preposition in certain contexts, while *in* PPs may not, as shown by the contrast between (ia) and (ib).

(i) a. *John slept (for) an hour.*
b. *John read the book *(in) an hour.*

Assuming that these bare DP adverbials are located low in the structure (see Morzycki 2001 for evidence for this claim), we predict that only *for* adverbials are permitted in this construction.

Chapter 7
Syntax and Semantics of Aspectual Verbs

7.1 Introduction

In this chapter, I utilize the approach to the syntax and semantics of aspect developed in chapter six to explore the structure and meaning of aspectual verbs. Recall that I have argued that a telic interpretation is syntactically realized by a bounded V being interpreted inside AspP, along with another bounded XP in AspP. While evidence for this analysis presented in chapter six emphasized the position of the bounded XP, in this chapter I turn to an examination of the syntax of the verbal head. I present evidence for the correlation between the position of the verb at LF and aspectual semantics from constructions involving focus scope, existentials, extraposition, and quantifier scope ambiguities. I show that a structure with the beginning of the event structurally represented in VP, and the continuation and end of the event represented outside of VP, in the inflectional projections, accounts for the pattern of data with aspectual verbs.

This chapter is organized as follows: In section 7.2, I discuss the semantics of aspectual verbs and in section 7.3, I outline the correlation between verb placement and aspectual interpretation. In the remaining sections, I provide arguments for my claims from the syntax of focus constructions (section 7.3.1), existential constructions (section 7.3.2), extraposition constructions (section 7.3.3), as well as the interpretation of aspect with quantifier scope ambiguities (section 7.3.4).

7.2 Semantics of Aspectual Verbs

Recall from chapter six that the end of an event (the telos) plays a prominent role in the semantics and syntax of aspect. In this chapter, I show that it is possible to syntactically differentiate not only the end time of an event, but also the beginning and middle of an event. Evidence that events are

semantically composed of a beginning, a middle, and an end comes from the semantics of aspectual verbs, which make reference to these subparts of an event (Newmeyer 1975; Freed 1979; Dowty 1979; Zagona 1994; ter Meulen 1995). Aspectual verbs which pick out the onset of an event are *start, begin, commence, initiate*; those that refer to the middle of a event are *continue* and *keep*, and those that refer to the end of an event are *end, finish, terminate, halt, cease, complete.*

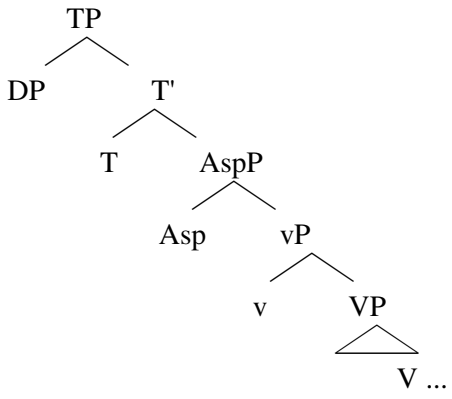
Previous analyses of aspectual verbs generally treat them in terms of their syntactic representation, or in terms of their semantics. In the following section, I propose an analysis which relates the structure and meaning of the aspectual verb constructions.

7.3 Syntax and Interpretation of Verb Movement

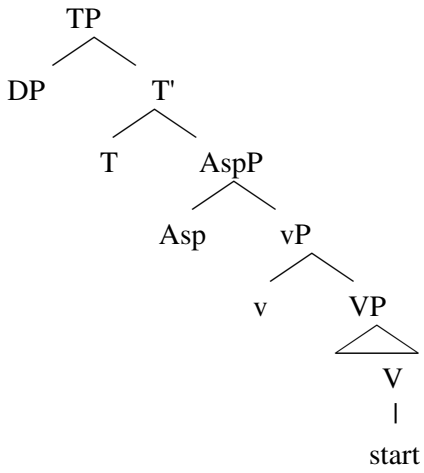
An important issue in the theory of movement has been how to determine the interpretive site of moved elements: are they interpreted in the base position or the landing site? Certain approaches have argued for interpretation at the base site, based on widely-discussed reconstruction effects, while other analyses have claimed that interpretation takes place at the landing site, which is supported by anti-reconstruction effects (see, for example, May 1985; Chomsky 1993; Fox 2000, and references therein).

Discussion in the literature on movement and interpretation mainly concerns the position and interpretation of phrases. There has been less attention paid to the interpretive position of heads (see, however, Benedicto 1997 and Zwart 2001). I would like to argue that interpretation with respect to verbal heads is possible either at the base site or at a landing site, and that the interpretation site of the verbal head has an impact on the eventive interpretation of the sentence. In particular, given that the semantic primitives of an event are the beginning, middle, and end, I claim that the beginning, middle, and end of an event are represented syntactically by the beginning, middle, and end of the verb chain created by raising from V to v to Asp, assuming a structure as in (2).

(1) Syntax of Aspectual Interpretation
The beginning, middle, and end of an event are represented syntactically by the beginning, middle, and end of the verb chain created by verb raising from V to v to Asp(ect).

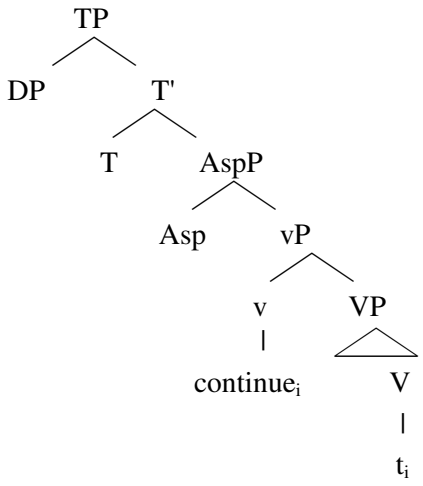
(2) ... 

This line of reasoning allows us a convincing analysis of the syntax of aspectual verb constructions. Given that verbs describing an event with a beginning have only the tail of the verb chain interpreted at LF, aspectual verbs such as *begin* and *start* involve interpretation of the verb within VP, as in (3).[1]

(3) ... 

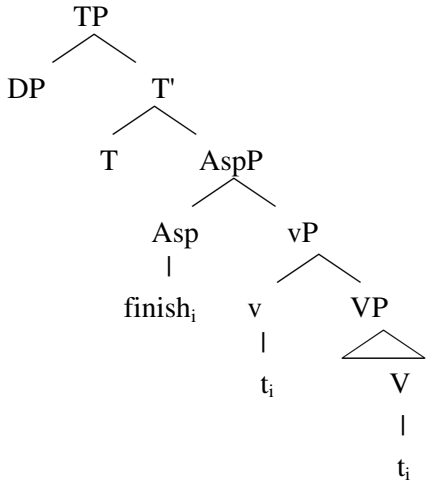
Aspectual verbs which include a beginning and middle, such as *continue* and *keep*, are associated with interpretation of the verb inside v, as in (4):[2]

(4) ...



Those aspectual verbs which involve a beginning, middle, and end, such as *finish* and *stop*, are linked to interpretation of the verb in Asp, as in (5):

(5) ...



In the following sections, this account will be shown to explain the behavior of aspectual verbs with the focus particle *only*, in existential and extraposition constructions, and the interaction of aspect with quantifier scope ambiguities.[3]

7.3.1 Association with focus

The analysis of aspectual verbs is supported by its interaction with the focus particle *only*, wich, to my knowledge, has not bee noted. As seen in (6a), with *start* or *begin*, *only* can be associated with the direct object; this is the reading where John started the book, as opposed to starting something else. Another reading is available, where *only* is associated with the verb; John starts the book, as opposed to doing something else to the book. This reading is disambiguated in (6c).

(6) a. *John only started/began the book*
b. *John started the book, as opposed to starting something else.*
c. *John started the book, as opposed to doing something else to the book.*
d. *John only started the book, he didn't finish it.*

However, aspectual verbs which refer to the middle and end of an event are not ambiguous in this way. With *continue* or *finish*, *only* can be associated just with the direct object, and not the verb; (7a) can mean that John continued the book, as opposed to continuing something else, but can not mean that John continued the book as opposed to doing something else to the book. The disambiguated version of (7a) in (7c) is not possible.

(7) a. *John only continued the book.*
b. *John continued the book, as opposed to continuing something else.*
c. **John continued the book, as opposed to doing something else to the book.*
d. **John only continued the book, he didn't finish it.*

Similarly, (8a) can have a meaning where it is only the book that John finished, but cannot have a meaning where it is only finishing the book that John did, as opposed to doing something else to the book. As with the example with *continue*, the disambiguated version of (8a) is not possible, as seen in (8c).

(8) a. *John only finished the book.*
b. *John finished the book, as opposed to finishing something else.*
c. **John finished the book, as opposed to doing something else to*

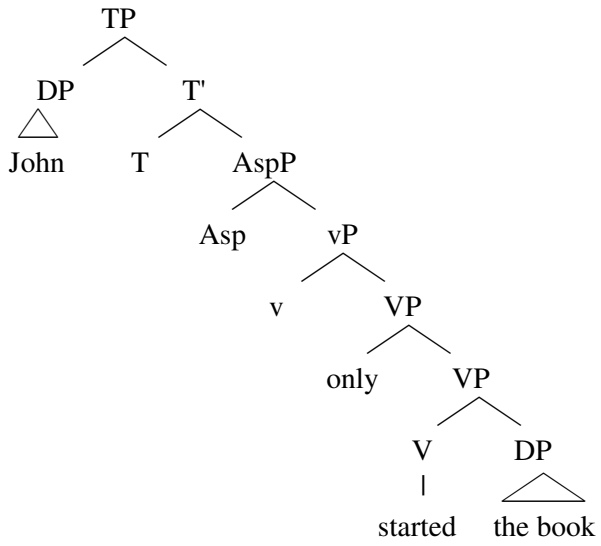
the book.

d. **John only finished the book, he didn't review the book.*

Recall from discussion of preverbal *only* in section 5.3.2 that *only* must be associated with a lexical constituent in its c-command domain, and that *only* is adjoined to VP when it takes scope over VP constituents (Jackendoff 1972; Rooth 1985; Tancredi 1990). Therefore, when the verb is interpreted within VP, as with verbs describing the beginning of the event, VP-adjoined *only* is able to c-command and take semantic scope over this verb, as in (9).

(9) a. *John only [started] the book*

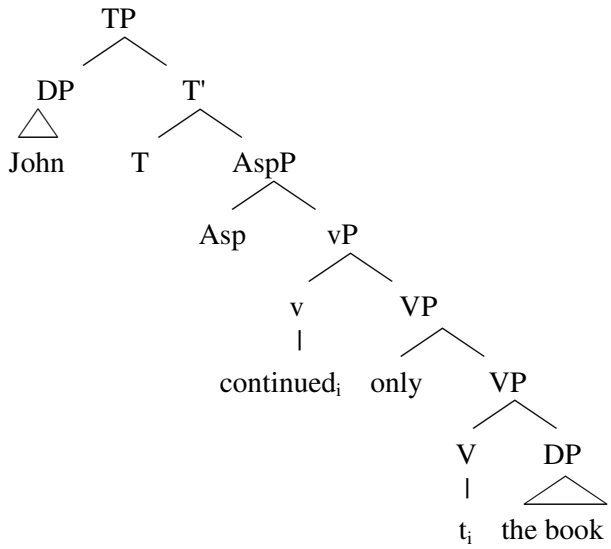
b.



However, VP-adjoined *only* does not take scope over a verb associated with an event with a beginning and middle or beginning, middle, and end, since these structures involve interpretation of the verb outside of VP and hence outside of the c-command domain of *only,* as shown in (10) and (11).

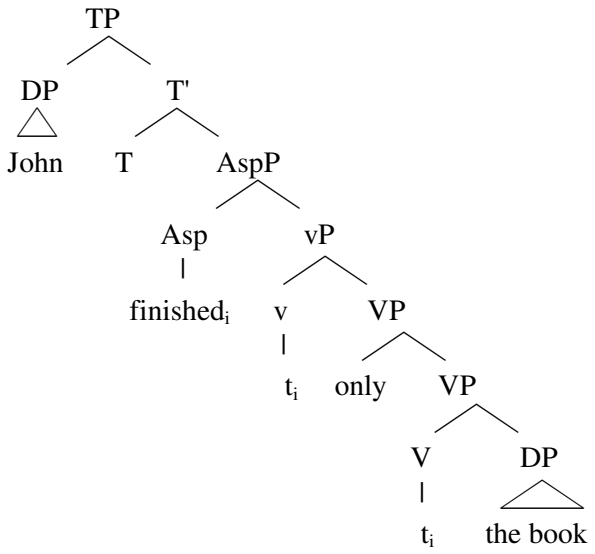
(10) a. **John only [continued] the book*

b.



(11) a. **John only [finished] the book*

b.



7.3.2 Existential Constructions

In this section, I show that existential constructions provide support for the analysis of aspectual verb constructions introduced in section 7.3. In order to investigate the syntax of aspectual verb constructions, we can examine the position of subjects associated with those verbs. Assuming the VP Internal Subject Hypothesis, the subject may be interpreted in Spec, VP or in VP-external position (see Zagona 1982; Kitagawa 1986; Speas 1986; Koopman and Sportiche 1988, 1991). I assume that a subject must be interpreted in a Spec-head relation with a link of the verb chain that is active for interpretation at LF; therefore, a subject associated with a verb describing a beginning is interpreted within VP, and a subject associated with a verb describing a middle or end is interpreted outside VP.

As noted by ter Meulen (1995), aspectual verbs involving only the beginning of an event are acceptable in existential constructions, shown in (12a), whereas aspectual verbs involving a beginning and middle are not acceptable, as shown in (12b), and those involving a beginning, middle, and end are also not acceptable, as shown by (12c).

(12) a. *There began a lecture on anaphora.*
b. **There continued a lecture on anaphora.*
c. **There finished a lecture on anaphora.*

Ter Meulen claims that this effect is due to the fact that aspectual verbs that describe the onset of an event are indefinite; they carry no presuppositions. Verbs such as *start* and *begin* do not presuppose that any stage of the event described has occurred before, whereas verbs that describe the middle or end of an event presuppose that part of the event has already occurred (ter Meulen: chapter two). Since definite, presuppositional material is incompatible with the semantics of the existential construction, the contrast in (12) follows.

However, it seems that, contrary to this analysis, it is possible to have a presuppositional verb in the expletive construction. For example, in the second sentence of (13), the verb "arrived" refers back to the event described by "arriving" in the first sentence, and yet is compatible with the expletive construction.

(13) *All sorts of beautiful people were arriving at the party when I walked in. There arrived a tall thin woman from Nigeria, and there arrived*

an exquisitely dressed gentleman from Laos who everyone was taking pictures of.

It thus appears that it is not the presuppositionality of the verb which determines whether it is compatible with the expletive construction. I would like to claim instaed that the relevant factor is the part of the subevent structure which is specified by the verb and represented in the syntax.

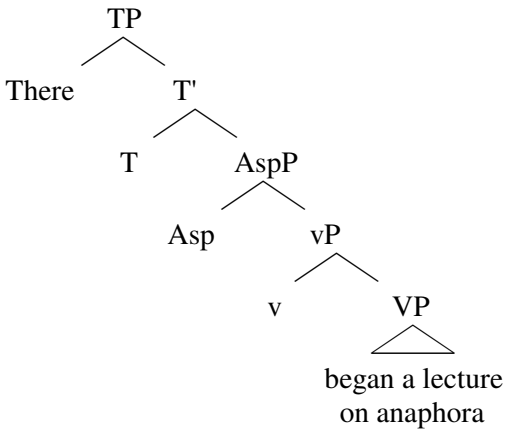
I assume, following Diesing (1990), (1992), that existential constructions necessarily involve interpretation of the associate of the expletive within VP (see section 4.5.2 for related discussion of expletive constructions). Evidence for this claim comes from contrasts in reciprocal licensing discussed by den Dikken (1995). In the raising construction in (14a), *some applicants* can bind *each other*, but binding is not permitted in the existential version of (14a) in (14b). Assuming that the reciprocal *each other* must be c-commanded at LF by its antecedent, this contrast shows that whereas the subject of (14a) c-commands the reciprocal, the associate in (14b) does not c-command the reciprocal at LF. This is explained if the associate is interpreted within VP.

(14) a. *Some applicants seem to each other to be eligible for the job.*
b. **There seem to each other to be some applicants eligible for the job.*

Given this approach, the contrasts in (12) are predicted by the present analysis. With aspectual verbs describing a beginning, interpretation of the subject is within VP, as in (15b). Aspectual verbs denoting a middle or end of an event involve interpretation of the verbal head outside of VP, and hence are not licensed in this construction, as in (16b) and (17b).

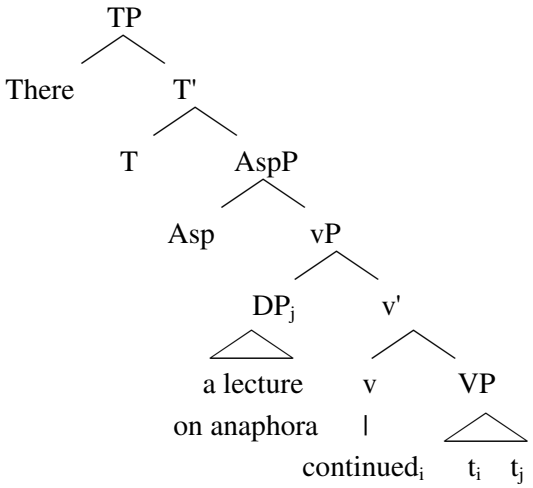
(15) a. *There began a lecture on anaphora.*

b.



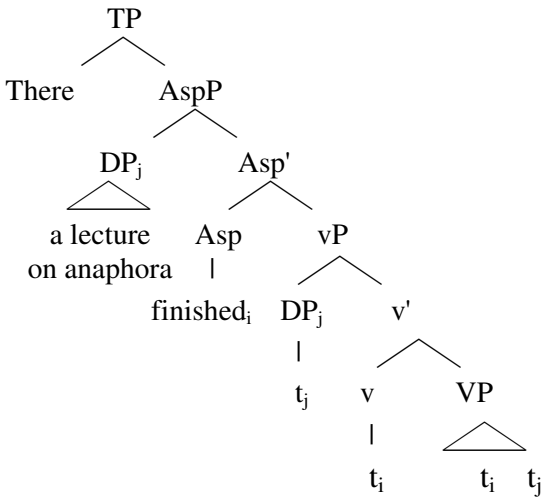
(16) a. **There continued a lecture on anaphora.*

b.



(17) a. **There finished a lecture on anaphora.*

b.



7.3.3 Extraposition

The analysis outlined here explains the behavior of aspectual verbs with extraposition from subject position. Aspectual verbs describing the beginning of an event allow extraposition from subject position, as seen in (18a), while those describing the middle or the end of an event do not permit extraposition, as shown in (18b) and (18c) (data from ter Meulen, 1995).

(18) a. *[A lecture t_i] started [on anaphora]$_i$*
b. **[A lecture t_i] continued [on anaphora]$_i$*
c. **[A lecture t_i] finished [on anaphora]$_i$*

Similar to her analysis of the expletive construction effects discussed in section 7.5 above, ter Meulen claims that these extraposition effects are explained by the semantics of the different aspectual verbs. Since aspectual verbs that describe the beginning of an event are indefinite and presupposition-free, they permit extraction from their subject, whereas the aspectual verbs that describe the middle and end of an event are presuppositional and hence do not permit extraction from their subject.

However, it is not clear why the semantics of the verb would determine extraction possibilities of the subject. Rather, it is the structural position of the subject which seems to be relevant in determining the acceptability of extraction. In addition, in some cases it is possible to have extraposition from the subject of a definite verb, as in (19).

(19) *When I arrived at the party, all sorts of beautiful people were walking in. A tall woman walked in who was from Nigeria.*

The event of walking in in the second sentence of (19) is interpreted as a subpart of the event of walking in introduced in the first sentence of (19), and is thus definite. However, as the example shows, extraposition is possible.

On the present analysis, the relevant factor determining the possibility of extraction is the subevent structure of the aspectual verb and how this interacts with the VP-internal versus VP-external position of the subject.

Following Culicover and Rochemont (1990), I assume that elements extraposed from the subject are adjoined to VP. Evidence for this hypothesis comes from VP Ellipsis constructions. VP Ellipsis may include a constituent extraposed from the subject, as shown by the examples in (20a) and (21a); (20a), for example, can be interpreted as *A man came in with blond hair, and a woman came in with blond hair too*. (Culicover and Rochemont 1990: 30). It therefore must be the case that extraposed elements are within VP.

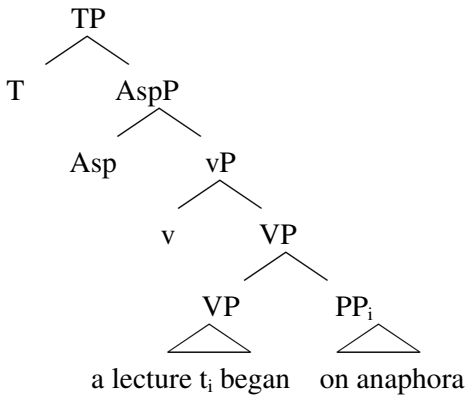
(20) a. *A man came in with blond hair, and a woman did too.*
b. 'A man with blond hair came in, and a woman with blond hair came in too.'

(21) a. *Although none of the men did, several of the women went to the concert who were visiting from Boston.*
b. 'Although none of the men who were visiting from Boston went to the concert, several of the women who were visiting from Boston went to the concert.'

The contrast in (18) is then explained on the present account; the subject of (18a), repeated in (22a), with an aspectual verb which picks out the beginning of an event, is interpreted in Spec, VP, and hence movement from this position to adjoin to VP is permitted, since the VP-adjoined land-

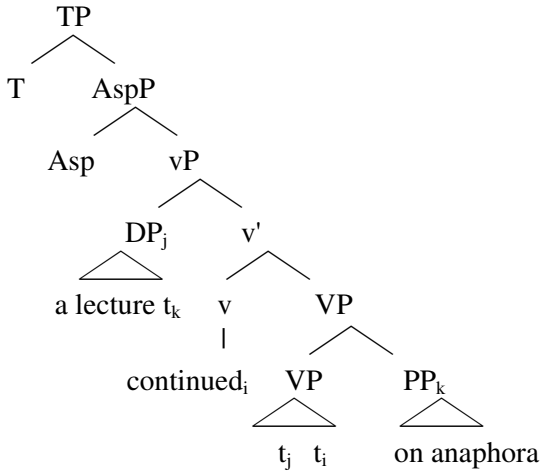
ing site c-commands the movement site, as is shown in (22b).[4]

(22) a. *A lecture began on anaphora.*

b. 

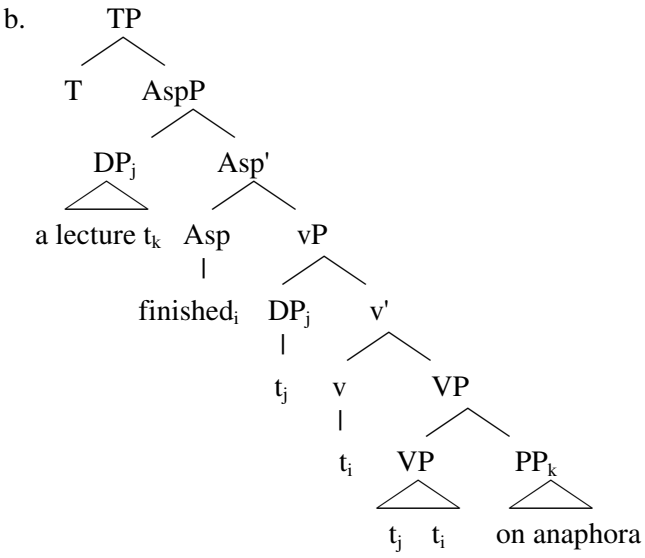
However, movement from a VP-external position, the position of the subject with an aspectual verb involving a middle or end, as in (23a) and (24a) (repeated from (18b) and (18c)), is not permitted, since the VP-adjoined landing site does not c-command into this position, as is shown in (23b) and (24b).

(23) a. **A lecture continued on anaphora.*

b. 

(24) a. **A lecture finished on anaphora.*

b.



7.3.4 Quantifier Scope Ambiguities

It is a well-known observation that subject and direct object quantifier phrases may be ambiguous in scope. In (25), it is possible for the subject to take wide scope over the object, as in (26a), or the object to take wide scope over the subject, as in (26b).

(25) *Everyone likes someone.*

(26) a. (∀x: Px) (∃y: Py) x likes y
'For each person, there is someonw or other that they like'.

b. (∃y: Py) (∀x: Px) x likes y
'There is a particular person such that everyone likes that person'.

Aspectual verbs seem to behave differently with respect to quantifier scope ambiguities of this sort. As is shown by the example in (27), the expected ambiguity arises with an aspectual verb that refers to the beginning of an event; (27) can mean that each person began a picture of their

own (28a), or that there is one picture that everyone began to paint (28b).

(27) *Everyone began a painting*

.

(28) a. (∀x: Px) (∃y: Py) x began y
'For each person, there is a painting that they began'.

b. (∃y: Py) (∀x: Px) x began y
'There is a particular painting such that everyone began that painting'.

However, these quantifier scope ambiguities do not seem to appear with aspectual verbs that refer to the middle and end of events. As shown in (29), the only reading permitted with subject and object quantifier phrases with *continue* is the subject taking wide scope over the object. (29) may mean that each person continued a picture of their own (30a), but cannot mean that there is one picture that everyone continued to paint (30b).

(29) *Everyone continued a painting.*

(30) a. (∀x: Px) (∃y: Py) x began y
'For each person, there is a painting that they continued'.

b. *(∃y: Py) (∀x: Px) x began y
'There is a particular painting such that everyone continued that painting'.

The same effect is observed with aspectual verbs that refer to the end of the event. In (31), *everyone* must take wide scope over *a painting*; (31) may mean that each person finished a painting of their own (32a), but cannot mean that there is one picture that everyone finished painting (32b).

(31) *Everyone finished a painting.*

(32) a. (∀x: Px) (∃y: Py) x began y
'For each person, there is a painting that they finished'.

b. *(∃y: Py) (∀x: Px) x began y

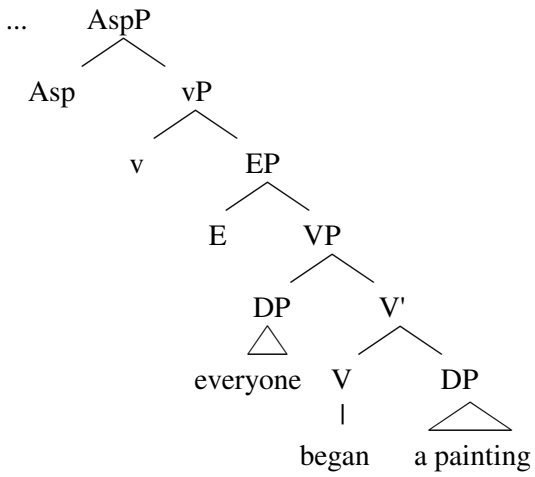
*'There is a particular painting such that everyone continued that painting'.

I follow Minimalist analyses of quantifier scope ambiguity whereby these ambiguities arise as a result of independently motivated movement of arguments out of VP at LF, as opposed to an operation of Quantifier Raising (see Kitihara 1992; Hornstein 1994; Beghelli and Stowell 1994 for discussion). A reading where an object quantifier takes wide scope over a subject quantifier results from the object being located at LF in a position above the subject.

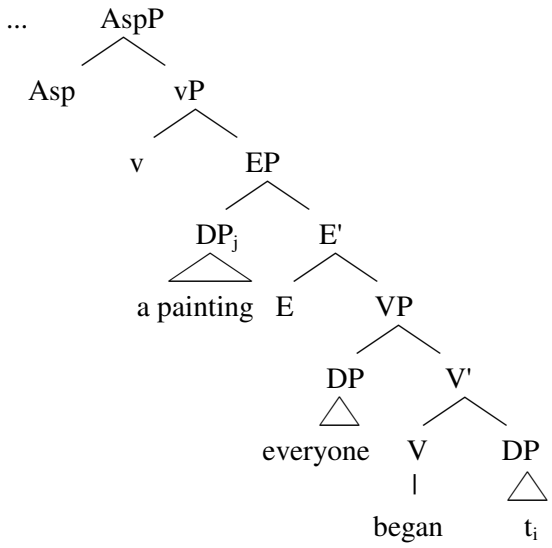
Given this approach, the puzzling lack of ambiguity with certain aspectual verbs is predicted by the present analysis. Recall that with an aspectual verb that refers to the beginning of an event, the verb is interpreted within VP, and hence the subject is in Spec, VP for interpretation. Therefore, the subject may take wide scope over the object, if the object is interpreted within VP, as in (33b), or it may take narrow scope with respect to the object, if the object is interpreted in VP-external position, as in (33c) (the VP-external position of the object is Spec, Event Phrase, located between vP and VP; see Slabokova, 2001 for discussion).

(33) a. *Everyone began a painting.*

b. (∀x: Px) (∃y: Py) x began y



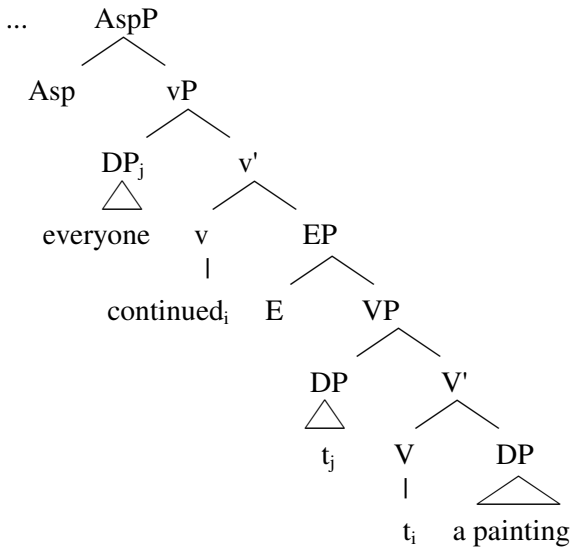
c. (∃y: Py) (∀x: Px) x began y



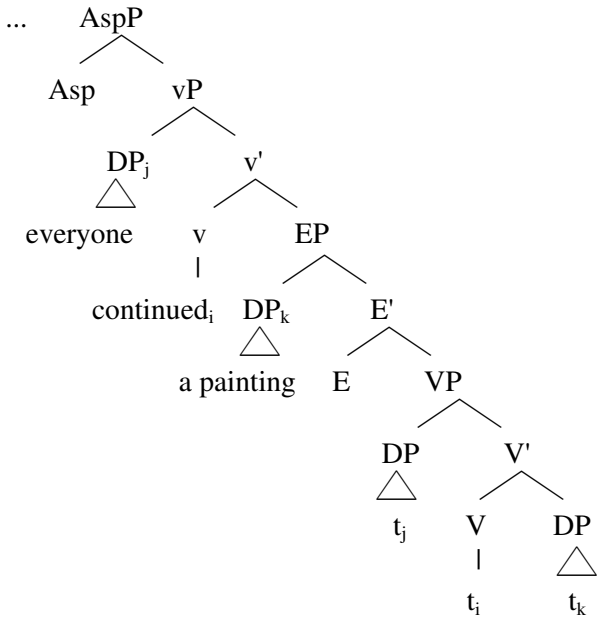
With an aspectual verb that refers to the middle of an event, the verb is interpreted within the head of vP, and hence the subject is in Spec, vP. In this position, the subject takes wide scope over the object, whether located inside VP (34b) or in its VP-external position (34c).

(34) a. *Everyone continued a painting.*

b. (∀x: Px) (∃y: Py) x continued y



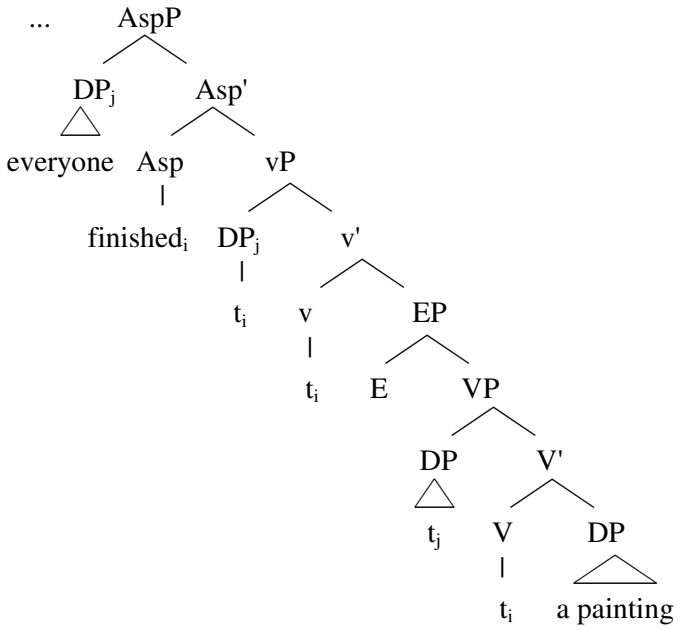
c. (∀x: Px) (∃y: Py) x continued y



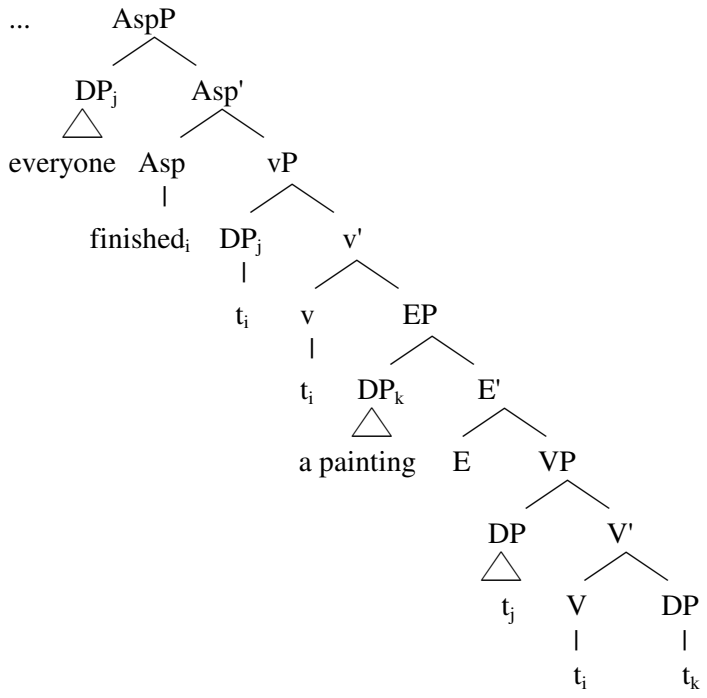
Similarly, with an aspectual verb that refers to the end of an event, the verb is interpreted from VP to vP to AspP, hence the subject is in Spec, AspP. In this position, the subject takes wide scope over the object, whether it is located inside VP (35b) or in Spec, EP (35c).

(35) a. *Everyone finished a painting.*

b. (∀x: Px) (∃y: Py) x continued y



c. (∀x: Px) (∃y: Py) x continued y



7.4 Conclusion

I have argued in this chapter that the approach to aspectual structure that was introduced in chapter six makes possible a straightforward analysis of the structure and meaning of aspectual verbs. Semantic activation of only the tail of the chain of verb movement within VP results in a reading where the beginning of an event is picked out, activation of the verbal head outside of VP, in the head of vP, results in an interpretation of an event with a beginning and middle, and activation of the verbal head within the head of AspP results in an interpretation of an event with a beginning, middle, and end.[5]

This approach made possible an analysis of the syntax and semantics of aspectual verb constructions which explains their different behavior with the focus particle *only,* in existential and extraposition constructions, and with quantifier scope ambiguities.

A significant conclusion of the present chapter is that head movement is a syntactic process, since it crucially feeds the semantic representation, contra recent analyses of Chomsky (1999, 2000) against the existence of head movement in the syntax (see Zwart 2001; Koeneman and Neeleman 2001; Spyropoulos 2003; Suranyi 2003 for arguments in favor of head movement as a syntactic process).

Notes

1. In the structures presented here, I focus on the interpretive site of the verb in terms of its aspectual semantics; it is possible that the verb raises beyond AspP to higher inflectional projections, but what is relevant for event interpretation is the movement from V to v to Asp.
2. Whether head movement involves syntactic adjunction or substitution is a question that is not examined here, as the present analysis is compatible with both structures.
3. An interesting phenomenon from the current perspective is the "verb copying" construction of Mandarin Chinese. Li and Thompson (1981) note that this verb copying is obligatory with a quantity adverbial phrase (i), a complex stative (ii), a locative phrase (iii), and a directional phrase (iv) (examples from Li and Thompson, 1981: ch. 13; see also Chang, C., 1991; Chang, J., 2001).

(i) a. **wǒ pāi le shǒu liǎng cì*
I clap PFV hand two time

b. *wǒ **pāi** shǒu **pāi** le liǎng cì*
I clap hand clap PFV two time
'I clapped my hands twice.'

(ii) a. **tā jiǎng gùshi de wǒmen dōu mèn le*
3sg tell story CSC we all bored CRS

b. *tā **jiǎng** gùshi **jiǎng** de wǒmen dōu mèn le*
3sg tell story tell CSC we all bored CRS
'S/He told stories until we were all bored.'

(iii) a. **bàba guà màozi zai yī jiàzi shang*
papa hang hat at clothes rack on

b. *bàba* ***guà*** *màozi* ***gua*** *zai* *yī* *jiàzi* *shang*
papa hang hat hang at clothes rack on
'Papa hangs his clothes on the clothes rack.'

(iv) a. * *wǒmen* *zǒu* *lù* *dào* *shìchǎng* *le*
we walk road to market CRS

b. *wǒmen* ***zǒu*** *lù* ***zǒu*** *dào* *shìchǎng* *le*
we walk road walk to market CRS
'We walked to the market.'

Note that these examples all involve obligatorily telic interpretations. The data may be analyzed as involving phonetically spelled-out copies of verb movement. Further investigation into these constructions is required.

4. Although I assume here the copy and delete theory of movement, in the following structures, I have indicated premovement positions with an indexed trace, to improve visual clarity.

5. Relevant to this discussion is research on the correlation between V movement and ellipsis. Some authors have argued that the trace of V cannot serve as an antecedent in ellipsis interpretation (see Roberts, 1998; Potsdam, 1997), while others have argued that a trace can serve as an antecedent (McClosky, 1991; Oku, 1998)). Discussion of these constructions awaits further research.

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