

On Time Adverbials

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The aim of this article is to propose a principled syntactic implementation of the idea, which has been successfully developed in the most recent semantic literature, that temporal connectives such as the conjunctions *after*, *before*, etc. express relations among sets of events.

This insight, according to which the two clauses connected by the temporal connective are independent of each other, is hard to reconcile with the familiar analyses of temporal clauses in terms of complements of the main verb or (VP-)adjuncts, which are bound to encode some form of syntactic dependency between the main and the subordinate clause. The analysis put forward here, based on Kayne's Antisymmetry Theory, assumes that temporal conjunctions are generated as designated heads in the left periphery of the clause, and give rise to predication structures by means of (overt) movement of the main clause to the Spec of this designated position. The different options concerning surface word order between main clause and subordinate temporal clause are derived by the interaction of syntactic structure (especially the hypothesis that the left periphery hosts distinct Topic and Focus projections) and the interface conditions governing stress/focus assignment. The approach proposed here is free of the contradictions detected in the competing analyses and more sensitive to the interface requirements.

1. Introduction

In this paper I will discuss the syntax of localizing time adverbials like the ones exemplified in (1)-(3). As the examples show, these adverbials occur at the left or right margin of the matrix clause:¹

- | | | |
|-----|----|--|
| (1) | a. | Before leaving the town, John called Mary |
| | b. | John called Mary before leaving the town |
| (2) | a. | After the concert, John went to a night club |
| | b. | John went to a night club after the concert |
| (3) | a. | At five o'clock, John left his office |
| | b. | John left his office at five o'clock |

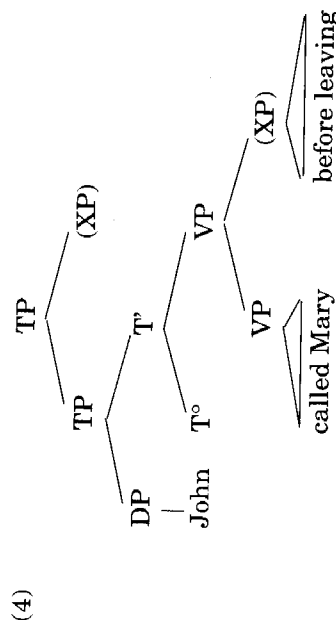
The right-hand position is usually considered the basic one, whereas the left-hand position is conceived of as the result of topicaliza-

tion. In fact, left-hand time adverbials show the typical intonational pattern of topicalized elements.

I will begin by discussing two competing analyses for right-hand time adverbials: the standard right-adjunction analysis and the more recent complement analysis (Larson 1988, 1990; Stroik 1990). According to the former, the time adverbial is external to VP; according to the latter, instead, it is c-commanded by the VP-internal constituents. I will show that the empirical evidence bearing on c-command relations gives apparently contradictory results, so that each analysis accounts for only a subset of the data (section 2). Furthermore, I will briefly describe the selectional properties of various temporal conjunctions, and argue that their ambiguous categorization as either P^o or C^o is problematic from a conceptual viewpoint (section 3). In section 4, I will then propose an alternative analysis embedded in the framework of the Antisymmetry Theory (cf. Kayne 1994), and I will sketch out some of its major consequences both on the empirical and on the theoretical side (sections 5-7).

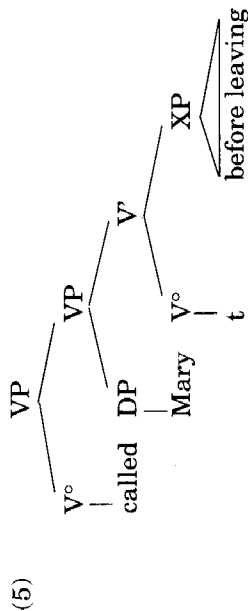
2. The syntactic position of time adverbials

The standard analysis of right-hand time adverbials takes them to be right-adjoined to VP or to some extended projection of the verb, e.g. TP, as shown in (4):



Under this analysis, adjunction realizes a relation of modification between the time adverbial and an event/time denoting category. The immediate consequence of this analysis is that the time-adverbial is not c-commanded by VP-internal constituents (whereas, depending on the level of adjunction, it may be c-commanded by the preverbal subject or not).

An alternative is the complement analysis proposed by Larson (1988; 1990). According to the latter, the time adverbial is not a modifier but the most oblique argument in the thematic grid of the verb; by the principle of argument projection P2 (Larson 1988: 382), it must be syntactically realized in the most deeply embedded position within the VP shells, so that it is c-commanded by all the less oblique verbal arguments. For instance, the representation of the matrix VP of (1b) will be as in (5):



Thus, the two analyses make opposite predictions with respect to the relative c-command relations involving the adverbial and the VP-internal arguments.

Let us consider the main types of evidence that can be used to test these predictions.² The major argument in support of the complement analysis comes from the possibility for a matrix object to bind into a time adverbial (Larson 1990; Stroik 1990):

- (6) a. I saw everyone_i [the day before he_i died] (Stroik 1990:656)
 b. Mary hit each man_i [before the other_i could intervene]
 (Cinque 1990:190)
- (7) a. I invited nobody_i [before he_i met you] (Manzini 1995)
 b. We will sell no wine_i [before its_i time] (Higginbotham 1988:124)

Starting from Reinhart (1983), it is commonly assumed that Q-binding is subject to a c-command condition whereby the bound pronoun must be c-commanded by the S-structure position of the binding quantifier (hence, by the variable in LF). This condition is satisfied in (6)-(7) only if we assume the complement analysis for the right-hand adverbial.

A completely independent kind of evidence comes from prosodic phenomena. Cinque (1993: 263 ff.) points out that in Italian, a right-hand adverbial receives the main sentence stress in the unmarked intonational pattern:

- (8) Gianni ha telefonato a Maria [prima di partire]
Gianni called Maria before leaving

In his theory, the main sentence stress is assigned to the most deeply embedded constituent in the sentence. Thus, the stress prominence of the time adverbial in (8) also supports the complement analysis.

However, other types of evidence support the adjunction analysis and give rise to a contradiction. Manzini (1994) and Williams (1994:180) point out that in an example like (9) the matrix object pronoun can corefer with an R-expression embedded in the time adverbial:

- (9) Mary shot him_i [before John_i could leave]

Since there is no Principle C violation, it must be concluded that the time adverbial is not c-commanded by the matrix object.³ This contrasts with the situation of complement clauses:⁴

- (10) * Mary told him_i [that John_i was a liar]

The possibility of coreference in (9) follows from the adjunction analysis; the complement analysis incorrectly predicts that coreference is impossible in (9) as it is in (10).⁵

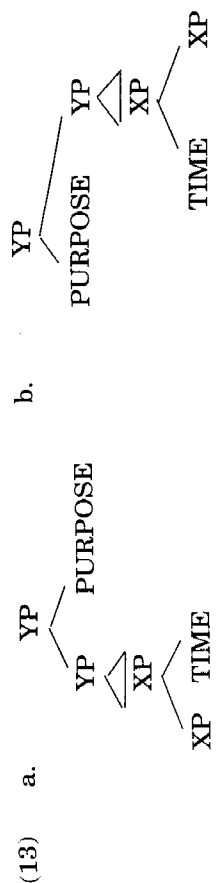
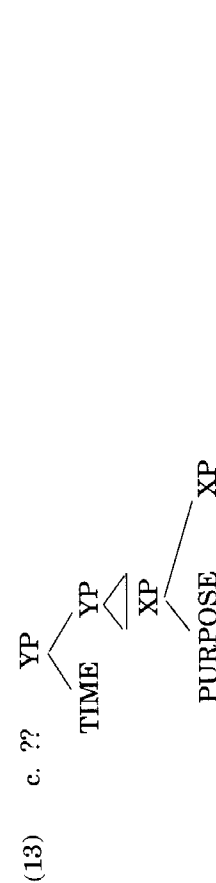
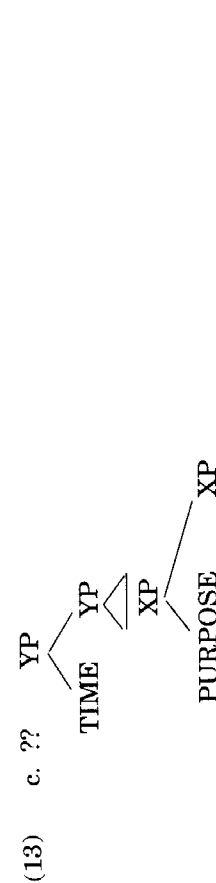
A second piece of evidence concerns the "scope" relations between two adverbials in examples like (11) (cf. Manzini 1994):

- (11) I left the party [before he arrived] [in order not to meet him]

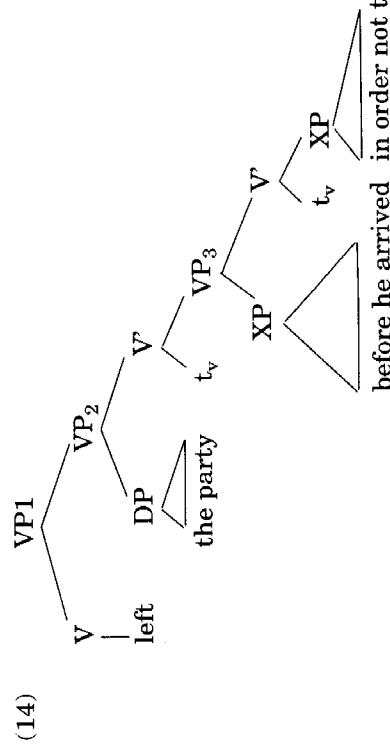
On the most natural interpretation, in (11) the rightmost purpose clause modifies the complex of the matrix and the time clause. Note that if the adverbial clauses are fronted, the same relative scope corresponds to the reverse linear order (12b):

- (12) a. ?? [Before he arrived], [in order not to meet him] I left the party
b. [In order not to meet him], [before he arrived] I left the party

This "mirror effect" follows straightforwardly from the adjunction analysis: both in (11) and in (12) the structurally higher adverbial has scope over the lower one. The symmetric linear order is a consequence of right-adjunction (13a) vs. left-adjunction (13b-c):

- (13) a.  b. 
(13) c. ?? 

According to the complement analysis, instead, the rightmost purpose clause in (11) is structurally lower than the time clause; the relative positions of the two adverbials are presumably determined by their degrees of obliqueness in the thematic hierarchy:

- (14) 
before he arrived in order not to meet him

This implies that in the right-hand position, contrary to the left-hand topic position, relative scope is not encoded by structural superiority.

Consider also the possibility of mixed orders. The scope relation encoded in (11) corresponds to the order in (15a), and not to (15b):

- (15) a. [In order not to meet him], I left the party [before he arrived]
PURPOSE MATRIX TIME

- b. ??[Before he arrived], I left the party [in order not to meet him]
- | | | |
|------|--------|---------|
| TIME | MATRIX | PURPOSE |
|------|--------|---------|

In the adjunction analysis, a possible account can be formulated in terms of relativized minimality. Suppose that (11) (=13a) represents the base structure, and the left-hand position is the result of topicalization. Then, in the derivation of (15b) the topicalized time clause has to cross the structurally higher purpose clause, which qualifies as a potential antecedent for its trace (cf. Nakajima 1992). In the derivation of (15a), instead, the purpose clause is topicalized from a position higher than that of the time clause, and no relativized minimality effect arises.

The complement analysis incorrectly predicts the opposite pattern, because the base position of the time clause in (11) (=14) is assumed to be higher than that of the purpose clause. Thus, this type of evidence favours the adjunction analysis.

In conclusion, the preceding discussion has revealed a contradictory behaviour of time adverbials with respect to various tests for command. This raises a problem not only on the empirical side, but also on the theoretical side: our theory of grammar seems to offer no structural analysis that can consistently account for all the data.

3. The syntactic category of temporal particles

The next issue that I wish to address is the syntactic category of the temporal particles introducing time adverbials. Both in the adjunction analysis and in the complement analysis, these are analysed as the head of the time adverbial.⁶ But a closer look at their selectional properties reveals that the problem of their syntactic categorization is far from trivial.

Descriptively, the class of temporal particles can be divided in two subsets: those that can license a DP, and those that cannot. The two classes are exemplified in (16) and (17) for Italian and English respectively:

- | | | | |
|------------------------------|-----------------------------|-----------------------------|-----------------------------|
| (16) | a. prima del tuo arrivo | (17) | a. before your arrival |
| b. dopo il tuo arrivo | b. after your arrival | c. fino alle quattro | c. until four o'clock |
| c. da quella sera | d. since that night | d. mentre la tua permanenza | d. *while your stay |
| d. *mentre la tua permanenza | e. *as soon as your arrival | e. appena la tua partenza | f. *as soon as your arrival |
| e. *appena la tua partenza | | | |

As for the particles in the (a-d) examples, the possibility of licensing a DP implies that they are able to assign/check the Case of that DP; therefore, they may be syntactically categorized as prepositions. On the other hand, the particles in the (e-f) examples show no Case-marking properties, and there is no positive reason to categorize them as prepositional. Since they only introduce subordinate clauses, the null hypothesis is that they belong to the category of complementizers.

The distinction is further supported by the different behaviour of the two types of particles in Standard Italian in case of selection of a finite clause. The prepositional particles select a clause introduced by the declarative *C° che*; the non-prepositional particles instead select a "bare" complementizerless clause:

- | | | | |
|------|----|-----------------------------|-------------------------------------|
| (18) | a. | prima che io partissi | before that I left |
| | b. | dopo che sono partito | after that I left |
| | c. | fino a che (non) tornerai | until that you (not) will come back |
| | d. | dacché sono partito | since-that (I) left |
| | e. | mentre (* che) dormivo | while (* that) I slept |
| | f. | appena (* che) sono partito | as soon as (* that) I left |

The data follow straightforwardly from the hypothesis that the conjunctions in the first subclass are prepositions selecting a finite CP (19). This selectional property is shared by other non-temporal prepositions, as shown in (20).

- | | |
|------|--|
| (19) | [_{PP} prima [_{CP} che IP]] |
| (20) | È venuto [_{PP} senza [_{CP} che glielo chiedessi]]
he came without that I asked him to |

The conjunctions *mentre*, *appena* in the second subclass instead fill the *C°* position and select IP, so that they compete for the same position as the declarative *C° che*. This is why the latter does not appear:

- | | |
|------|----------------------------|
| (21) | [_{CP} mentre IP] |
|------|----------------------------|

However, this reasoning does not go through in English, where all temporal particles select a complementizerless clause:

- (22) a. before (*that) I left
 b. after (*that) I left
 c. until (*that) you come back
 d. since (*that) I left
 e. while (*that) I slept
 f. as soon as (*that) I left

Dubinsky and Williams (1995) argue that all the particles in question are categorized as C^0 when they select a clause.⁷ This hypothesis is supported by two pieces of evidence. First, the purported prepositional particles in (22a-d) contrast with all other nontemporal prepositions, which cannot select any finite clause, either with or without *that*:

- (23) * John left [without (that) I told him to]

Second, in some dialects of American English (23) is grammatical with optional *that*; however, in those same dialects temporal particles are never followed by *that*.

If we adopt Dubinsky and Williams' proposal, we are led to the conclusion that the temporal particles in (a-d) are ambiguously categorized in English: in (17a-d) they are prepositions, whereas in (22a-d) they are complementizers.⁸

In conclusion, temporal particles seem to "fluctuate" between the categories P^0 and C^0 , both cross-linguistically and diachronically (and even within one language, according to Dubinsky and Williams's proposal). This raises a conceptual problem: what properties are shared by the two categories, so that they can accomplish the same syntactic function?⁹ According to the complement analysis, localizing time adverbials are thematic arguments of the verb; according to the adjunction analysis, instead, they are modifiers, i.e. predicative categories. The question is then: what is the status of the categories P^0 and C^0 with respect to the predicate/argument distinction? To the best of my knowledge, this question has never received a satisfactory answer.

In conclusion, temporal particles show non-uniform selectional properties and seem to require an ambiguous categorization as either P^0 or C^0 , or both. The two analyses take opposite stands with respect to the predicative vs. argumental status of time adverbials; but

neither of them provides an answer to the conceptual problem raised by this syntactic ambiguity.

4. An alternative analysis

In the preceding sections, I pointed out two problems with the current analyses of time adverbials: first, the problem of their structural position; second, the problem of the syntactic category of temporal conjunctions. I argued that neither the adjunction analysis nor the complement analysis provide a satisfactory solution to these problems. In this section, I wish to propose an alternative structural analysis for time adverbials consistent with Kayne's (1994) Antisymmetry Theory.

The starting point of my proposal is a suggestion by Bonomi (1995; 1997), who argues that temporal conjunctions are, from a semantic viewpoint, connectives joining two event-denoting arguments. For reasons of compositionality, Bonomi (1997:484) also sketches out a syntactic representation in which the temporal conjunction is external both to the matrix clause and to the time clause. I wish to elaborate a syntactic analysis that incorporates this basic insight. The two event-denoting categories, the matrix IP and the subordinate DP or clause, are syntactically independent of each other and are connected by the temporal conjunction/preposition. This means that both the conjunction and the subordinate clause (or DP) are generated outside the matrix IP.¹⁰ The problem is, where are they generated?

In order to answer this question, I adopt the "split Comp" hypothesis by Rizzi (1997). According to the latter, the left periphery of a clause external to IP consists of an array of functional projections, each one devoted to a specific function. Consider for instance the following example (originally due to J. Grimshaw):

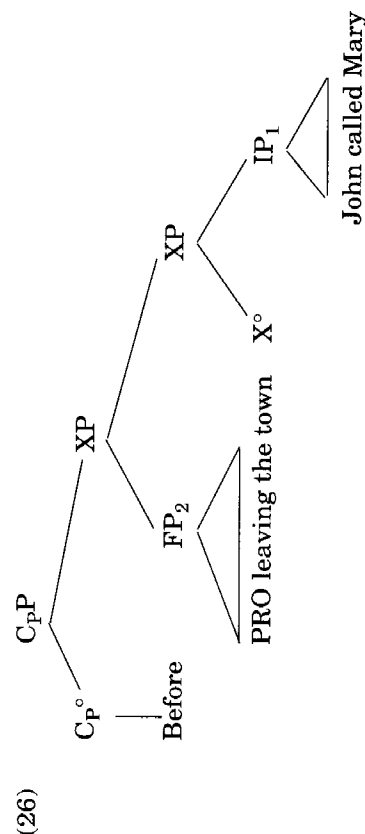
- (24) He said [_{that} [_{beans}_i [never in his life]_k [had [_{IP} he _t_{AUX} been able to stand _t_i _t_k]]]]]

The highest head of the subordinate clause is the complementizer *that*, bearing the declarative force; Rizzi dubs it Force⁰. Furthermore, the auxiliary has raised to an IP-external head position below *that*, whose Spec hosts the preposed negative phrase. Rizzi labels this intermediate position Focus Phrase, since the preposed negative phrase is necessarily focussed. Finally, he argues that the

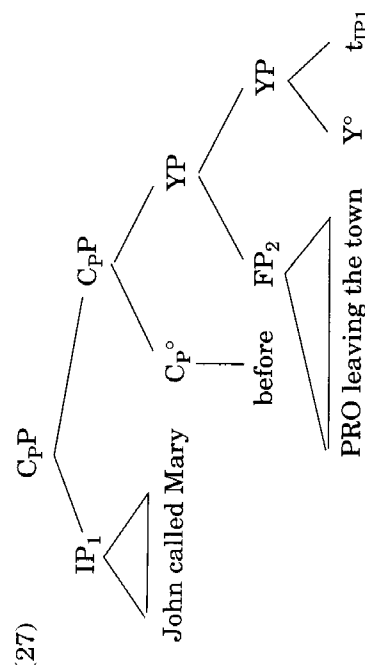
topicalized phrase to the left of the negative phrase is in the Spec of an empty functional head Topic° .¹¹ The underlying structure of the "complementizer system" is thus as in (25):

- (25) $[_{\text{FP}} \text{Force}^\circ [_{\text{TopP}} \text{XP} [\text{Topic}^\circ [_{\text{FocP}} \text{YP} [\text{Focus}^\circ \text{IP}]]]]]$ ¹²

This articulated structure provides an IP-external position for time adverbials. Specifically, I propose that the temporal conjunction is a further head of the Comp system, labelled C_P° , which selects either a Topic or a Focus Phrase. The Spec of this projection hosts the subordinate clause (or the event-denoting DP), as represented in (26):



The structure in (26) corresponds to the clause initial position of the time clause displayed in (1a). Suppose however that the main IP_1 moves overtly to the Spec of the temporal conjunction: the resulting structure is (27), corresponding to the order of constituents displayed in (1b):



The configuration in (27) structurally implements a relation of predication. The prepositional complementizer expresses a temporal relation: its external argument is the matrix IP_1 , which raises to Spec,C_P ; its internal argument is the time clause in the immediately lower specifier:

- (28) BEFORE (e_1, e_2)

The movement of IP_1 is required by the LF principle of Full Interpretation, in order to saturate the predication set up by the temporal preposition.¹³ This movement takes place overtly in (27); in (26), I propose that it takes place covertly. The choice of overt vs. covert movement is determined by independent factors, to be discussed below.

In this approach the left-hand and right-hand positions of the time clause are syntactically identified. Contrary to the adjunction and the complement analysis, the time clause is always external to the matrix IP. The hypothesis of raising of the matrix IP past the adverbial clause in (27) immediately explains why the latter is not intermingled with the constituents of the matrix clause in the right-peripheral position.

Finally, note that this analysis is consistent with the Antisymmetry Theory: in fact, it does not involve rightward adjunction, but it also avoids the structural assimilation of adverbials to complements. In conceiving of C_P as a predicate, it is close to the approach by Barbiers (1994) and Costa (1996), in which PP adverbials are analysed as predicates of VP.

At this point, I have to explain why the movement of the matrix IP takes place overtly in (27), but only covertly in (26).

The answer to this question lies in the informational structure associated to the whole sentence. Note that the two linear positions of the time clause correspond to a different partition of the sentence into focus and background.

In (26) (=1a), the left-hand time clause is defocused and is pronounced with a topic-like intonational contour (graphically indicated by the comma); focus is assigned to the main clause or to one of its constituents. In fact, (26) is an appropriate answer to the questions (29a-b), in which the time clause is backgrounded and the matrix clause or the matrix VP is the focus of the question. On the contrary, it is not an appropriate answer to (29c), where the temporal location is questioned:

- (29) a. What happened before John left? (? = matrix IP)
 b. What did John do before leaving? (? = matrix VP)
 c. When did John call Mary? (? = time)

The judgements are reversed for (27) (= 1b): this can only be used as an appropriate answer to (29c). Here is the time clause that bears non-contrastive focus.¹⁴

I wish to propose that the different status of the time clause with respect to the focus-background partition corresponds to its syntactic position within the complementizer system: in (26) the time clause is generated in the Specifier of a Topic Phrase, whereas in (27) it is generated in the Spec of a (non-contrastive) Focus Phrase:¹⁵

- (30) a. [_{C/PP} Before [_{TopP} [PRO leaving the town] [Top° [_{IP} John called Mary]]]]
 b. [_{C/PP} Before [_{FocP} [PRO leaving the town] [Foc° [_{IP} John called Mary]]]]

It remains to be explained why, when the time clause is in Spec, FocusP as in (30b), the matrix IP moves overtly to the specifier of the temporal conjunction. I propose that this overt movement to the left is obligatorily triggered by the need to syntactically de-focusalize the matrix IP. This idea can be framed in Zubizarreta's (1998) theory of prosodically driven movement, or in Adger's (1996) theory of informationally licensed overt movement.

Zubizarreta (1998) adopts Cinque's (1993) algorithm for stress assignment, by which the most prominent stress in a sentence is assigned to the most embedded element on the recursive side of the tree (cf. the discussion around (8) above). This determines the unmarked stress pattern, corresponding to an unmarked focus/background structure.

In marked contexts, however, focus may be assigned to a constituent in a position where main stress would not be assigned by the algorithm. Zubizarreta proposes a principle whereby a constituent marked as [+focus] within an intonational phrase must bear main prominence within that intonational phrase. In order to satisfy this principle, the grammar allows the option of scrambling more embedded phrases to a higher position than that of the [+focus] constituent, so that the latter can be assigned the main stress. This type of scrambling is prosodically motivated, and hence it must apply prior to spelling out.¹⁶

In (30b) the subordinate clause is marked [+focus] and it must

receive main stress. In order for this to be possible, the matrix IP must be removed from its base position, which is structurally lower and attracts the main stress. Thus, the overt movement of the matrix IP to Spec, C_PP is an instance of prosodically driven scrambling.

The same idea can be rephrased in terms of a hypothesis put forth by Adger (1996). Adger observes that in languages with "free" subject inversion, the position of the subject correlates with a specific status in the informational structure: the postverbal subject position is focussed, whereas the preverbal position implies a backgrounded (i.e. presuppositional, or discourse-linked) interpretation. Therefore, he argues that the overt movement of the subject from the base postverbal position to Spec, IP is not optional, but it is licensed at the level of informational structure.

Similarly, in (30a) the matrix IP remains in its base position and constitutes the focus by default; in (30b), since focus must be assigned to the time clause, the matrix IP must be syntactically de-focusalized by overt movement to a "subject" position - namely Spec, C_PP, the subject position of the predication expressed by the temporal conjunction.

Note that the two perspectives are compatible: they differ in considering the trigger of overt movement to be prosodic vs. informational, but the two aspects are in fact correlated. On either account, (30b) gives rise to pre-Spellout structure (31):

- (31) [_{C/PP} [_{IP1} John called Mary] [_{C/PP} before [_{FocP} [PRO leaving] [Foc° [_{IP1}]]]]

In (30a), instead, there is no need to de-focusalize the matrix IP₁, since the time clause in Topic is not focussed. Thus the raising of IP₁ need not take place overtly: IP₁ remains in its base position and bears the main sentence stress and non-contrastive focus.

In this approach, the focus-background partition corresponds to the structural position occupied by the constituent clauses. Interestingly, there is independent evidence to the effect that adverbial clauses can be generated both in TopP or in FocP. This evidence comes from a different type of adverbial subordination, namely causative clauses.

In Italian there are two types of causal subordinating conjunctions, *perché* and *poiché*.¹⁷ Contrary to temporal conjunctions, these are specialized with respect to the linear position of the dependent clause that they introduce: causal *perché* (as opposed to purpose *perché*) can only introduce a right-hand clause; on the contrary, *poiché*

only allows the initial position (Cinque 1990: n. 37 to chapter 2):

- (32) a. Me ne vado perché sono stanco
 * Perché sono stanco, me ne vado
 I'm going away because I am tired
- (33) a. * Me ne vado poiché sono stanco
 b. Poiché sono stanco, me ne vado
 I'm going away because I am tired

This distribution follows directly if we extend to causal conjunctions the approach proposed above: *perché* obligatorily selects a Focus Phrase, so that the adverbial clause it introduces is necessarily focused and clause-final (corresponding to the structure in (31)); *poiché* instead selects a Topic Phrase, so that the adverbial clause is clause-initial and defocused (corresponding to (30a)). The different selection properties of the two subordinating conjunctions are independently supported by their behaviour in question-answer pairs. It is possible to answer a *why*-question by a causative clause introduced by *perché*, but not by *poiché*:

- (34) a. Perché te ne vai?
 Why are you leaving?
 b. Perché sono stanco
 Because I am tired
 c. * Poiché sono stanco
 since I am tired

Recall that the answer is always focussed, since by definition it constitutes new information. If the dependent IP in the answer must be generated in Spec, FocP, the contrast between (34b) and (34c) follows directly.¹⁸

The analysis proposed in (30)-(31) also opens a new perspective on the problem of syntactic categorization of temporal conjunctions. These are uniformly analysed as instances of the head *C_P*.¹⁹ This category is akin to complementizers in that it is part of the matrix complementizer system, but it is also akin to prepositions in that it is essentially a connective. *C_P* may in principle assign Case or not: when it does, we have a prepositional conjunction, which can license a DP internal argument; otherwise, we have a non-prepositional conjunction.²⁰

A related problem is the distribution of the declarative complementizer in tensed time clauses. As discussed in section 3, in Italian it only appears after prepositional conjunctions (cf. examples (18a-d)),

whereas in English it does not appear after any conjunction (cf. examples (22)). Note that under the split Comp hypothesis reported in (25), the declarative complementizer corresponds to the highest head *Force*^o, carrying propositional force. However, I have argued that the internal argument of the temporal conjunction must denote an event rather than a proposition. Therefore, the declarative complementizer in (18a-d) is semantically expletive. I propose that it is inserted for purely syntactic reasons, namely, in order to "shelter" the tensed IP from Case assignment by the prepositional conjunction.²¹

As for the English prepositional conjunctions in (22a-d), Johnson (1988: 588-589) and Dubinsky and Williams (1995: 129) point out that they lose their Case assigning properties when they select a clause: in fact, they do not allow Exceptional Case Marking of the subject of the following gerundive clause. If this is the case, there is no need to insert an expletive *Force*^o in front of a tensed time clause.

To conclude this section, let me summarize the main aspects of the proposed analysis. The temporal conjunction is not included in the time clause, but it is a head in the Comp system of the superordinate clause, external to both the time clause and the superordinate IP. The conjunction is a connective, expressing a temporal relation, and it takes two arguments: the internal argument is the clause (or DP) lying in the Spec of its complement; the external argument is the matrix IP, which moves to the Spec of the conjunction by LF. The status of the internal argument in the informational structure of the whole sentence is syntactically encoded: in fact, it may be generated in Spec of a Topic or Focus phrase. In the second case, the matrix IP moves overtly to the Spec of the conjunction in order to be brought out of focus.

5. Movement and constituency

The *C_P* analysis cannot be extended to the temporal conjunction *when*. The latter has the typical *wh*-morphology of interrogative and relative elements, and it has two special properties, at least in Italian: first, it can refer to the event time of an embedded clause:

- (35) È arrivato proprio quando aveva detto [che sarebbe arrivato]
 He arrived exactly when he had said that he would arrive

Second, a *when*-clause can be the internal argument of a prepositional conjunction:

- (36) a. Rimarrò fino a quando non ti addormenterai
(I) shall stay until when (you) not will fall asleep
b. Da quando non sei più qui, sono triste
Since when (you) are not here any longer, (I) am sad

Therefore, I propose that *when* is actually a *wh*-operator binding a time variable; the whole *when*-clause is a free relative (cf. Declerck 1996:228; Larson 1985) denoting the time at which the subordinate event takes place. This hypothesis is supported by diachronic evidence: in Old and Middle English, the equivalent of *when* occurs in the so-called correlative structure, exemplified in (37), where it is resumed by a correlative adverb (*then*) in the matrix clause:

- (36) And *whan* that he wel dronked hadde the wyn, *thanne* wolde he speke no word but Latyn (*Canterbury Tales*, Prologue 636-37)

Adopting Dayal's (1995) analysis of correlative structures, the dependent clause is a free relative which binds the correlative adverb in the matrix clause: as a result, the two event times are identified.

If we analyse *when* as a *wh*-operator in spec, ForceP, we still have to explain how the *when*-clause is syntactically connected to the matrix clause. Note that a *when*-clause can occur both in initial and in final position, like all other localizing time adverbials. Therefore, I tentatively propose that the *when*-clause is the internal argument of a phonetically null *C_P*, semantically equivalent to temporal *on*.

- (38) a. [_{C/PP} Ø [_{TopP} [when [I arrived] [_{Top}° [_{IP} John wasn't there]]]]
b. [_{C/PP} [_{IP}1 John wasn't there] [_{C/PP} Ø [_{FocP} [when [I arrived] [_{Foc}° *t*_{IP1}]]]]

The hypothesis of a phonetically null CP can also account for the status of 'bare NP adverbs' as in (39):

- (39) a. [_{C/PP} Ø [_{TopP} [_{DP} Last night] [_{Top}° [_{IP} John wasn't there]]]]
b. [_{C/PP} [_{IP}1 John wasn't there] [_{C/PP} Ø [_{FocP} [_{DP} last night] [_{Foc}° *t*_{IP1}]]]]

The proposal of an empty preposition introducing bare NP time adverbs has also been made by Giorgi and Pianesi (1997).²² They point out that the denotation of such NP adverbs is a temporal location, whereas the same NPs denote a time interval when they occur in an argument position, as in (40):

- (40) a. Ho passato giovedì al mare
(I) spent Thursday at the seaside
b. Quel giovedì è stata una bellissima giornata
That Thursday was a wonderful day

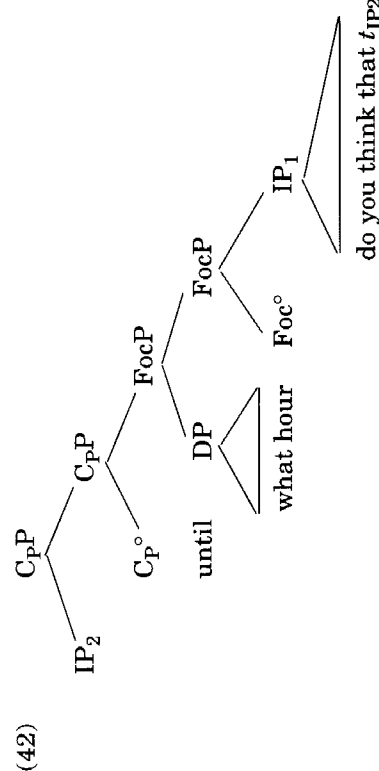
Therefore, they postulate an empty *P*° which combines with the NP to yield the appropriate semantic type for bare NP adverbs.²³

An important problem for the approach proposed here arises from the apparent possibility of moving a time adverbial by *wh*-movement or topicalization:

- (41) a. Fino a che ora pensi [che resterà aperto il negozio]?
Until what hour (do you) think that will be open the shop
b. Prima di partire, mi ha promesso [che verrà a trovarmi]
before leaving, (he) has promised that (he) will come to see me

In the standard approach, the adverbial has been fronted from a position internal to the embedded clause and undergoes reconstruction in LF (cf. for instance Longobardi 1985: 180-187; Guasti 1996: 166-167). On the contrary, in the analysis proposed here the string composed of the temporal conjunction and the subordinate clause or DP is not a constituent: therefore, it cannot have undergone movement.

Recall however that in this analysis modification corresponds to a configuration of predication at LF, in which the external argument of the temporal conjunction raises to its Spec position, as shown in (27) above. Thus, the embedded construal of the adverbial in (41) can be obtained by raising the embedded IP, rather than the matrix IP, to the Spec of the conjunction. For instance, the structure of (41a) will be as in (42):



Let me point out two pieces of evidence in support of this LF raising approach.

Cinque (1990: 89-93) notes that a topicalized adverbial can be construed with the embedded clause, but it can only receive the interpretation corresponding to the clause-initial position, and not to the clause-final one. For instance, (43a) is interpreted as (43b) and not as (43c):

- (43) a. Domani, mi ha promesso che verrà
tomorrow, (he) promised to me that (he) will come
b. Mi ha promesso che, domani, verrà
He promised to me that, tomorrow, he will come
c. Mi ha promesso che verrà domani
He promised to me that he will come tomorrow

The difference in interpretation is subtle, but it may be characterized as follows: the promise is about what he will do tomorrow, and not about the date of his coming. In Cinque's approach, it is necessary to postulate that adverbials allow preposing only from the clause-initial position. The equivalence of (43a-b) vs. (43c) follows straightforwardly from the present analysis: in (43a-b), the embedded IP is in focus and moves to the specifier of the temporal conjunction in LF; in (43c), instead, the time adverbial is in focus and the embedded IP has overtly moved to Spec, C_P in order to be de-focussed (cf. the discussion around (30)-(31)).

A second type of evidence comes from the selective sensitivity of adverbial preposing to weak islands. Luca Dini (personal communication) points out that a time clause can be preposed out of a *wh*-island, as in (44), but not out of a factive island, as in (45):

- (44) Prima di partire, non so [se fare un'ultima nuotata]
before leaving, I don't know whether to have a last swim

- (45) ?? Prima di partire, rimpiango [di non aver fatto un'ultima nuotata]
before leaving, I regret not having had a last swim

This selective sensitivity to weak islands is not expected if what is involved is A'-movement of the adverbial: in fact, A'-movement out of a weak island should be blocked by relativized minimality (cf. Rizzi 1990:1-22).

In the LF raising approach, the contrast can be reduced to the different properties of the two embedded clauses. It is commonly

assumed that the factive complement clause in (45) contains a positional operator (at the level of ForceP) carrying the feature [+presuppositional] or [+definite]; this operator encodes the information that the truth of the embedded proposition is presupposed. Suppose that the IP subconstituent must remain in the c-command domain of this operator in LF: it follows that it cannot raise to the Spec of C_P as in (42),²⁴ and therefore the embedded construal is impossible.

Summarizing, in the present approach the time adverbial is not a constituent, and hence it cannot undergo A'-movement. For apparent cases of long-distance *wh*-movement or topicalization, I have tentatively proposed an alternative analysis: the adverbial is directly inserted in its surface position in front of the matrix clause, and the embedded construal is obtained by raising the embedded IP, rather than the matrix IP, to the specifier of the temporal conjunction in LF. The empirical evidence in support of this LF raising approach is only suggestive, but there may be a conceptual advantage: in fact, we can avoid recourse to an instance of full reconstruction (in the sense of Chomsky 1995:323), by which one step of the overt derivation – although necessary for convergence – is completely undone and has no effect on the output LF representation.

6. Reconsidering the empirical evidence

Let us now reconsider the data discussed in section 2 in the light of the approach sketched in (27)-(31).

First, this approach shares one positive consequence of the adjunction analysis in (4) – namely, it can account for the lack of a Principle C effect in (9), repeated here:

- (9) Mary shot him_i [before John_i could leave]

The syntactic structure of (9) is (46): the pronoun is embedded in the proposed matrix IP and fails to c-command the coreferent R-expression embedded in the subordinate clause.²⁵

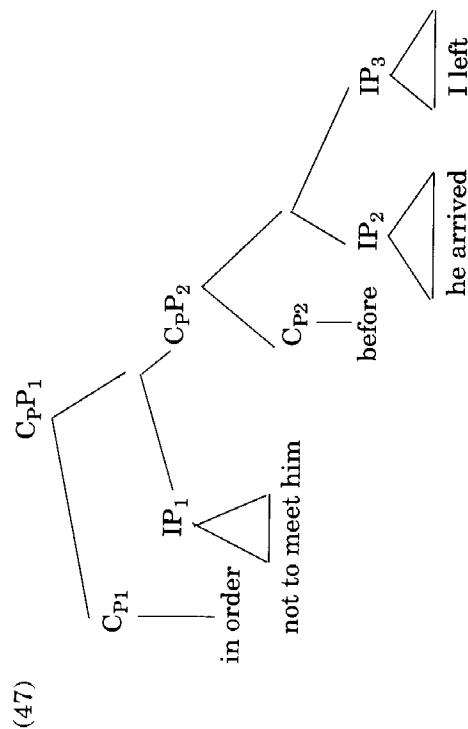
- (46) [_{C/PP} [_{IP} Mary shot him_i] [_{C/PP} before [_{FocP} [_{IP} John_i could leave] [_{Foc°} t_{IP}]]]]

Second, the proposed approach can account for the relative scope of the adverbial clauses in (11), (12) and (15), repeated here:

- (11) I left the party [before he arrived] [in order not to meet him]
- (12) a. ?? [Before he arrived], [in order not to meet him] I left the party
b. [In order not to meet him], [before he arrived] I left the party
- (15) a. [In order not to meet him], I left the party [before he arrived]
b. ?? [Before he arrived], I left the party [in order to meet him]

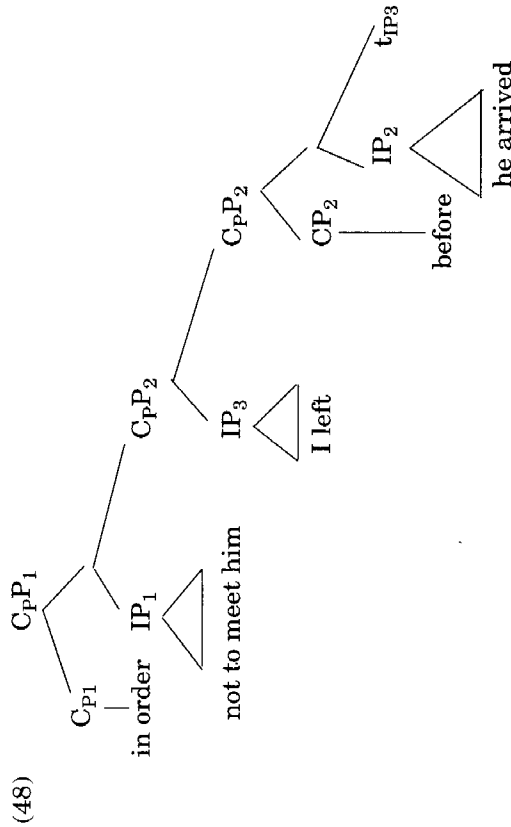
In (11) and (12b), identical scope relations correspond to symmetric linear orders in clause-initial and clause-final position: the adverbial clause having wider scope is always the outermost. In (15), the wide scope purpose clause can be preposed across the narrow scope time clause, but the reverse is impossible. As noted in section 2, these data are predicted by the adjunction analysis but not by the complement analysis.

The present proposal allows us to account for these scope relations without having recourse to rightward adjunction. For the sake of the argument, let us assume that the purpose clause too is introduced by a purpose C_P . The base structure is (47), with both clauses in initial position and the wide scope purpose clause higher than the time clause:

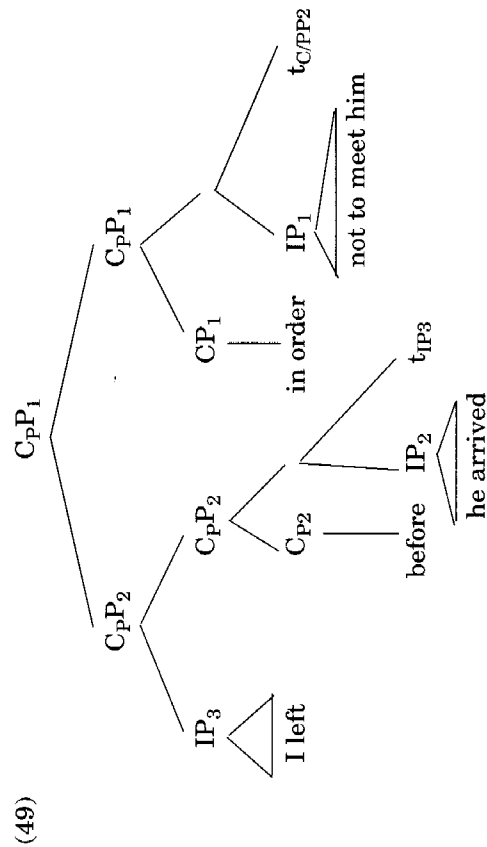


This structure corresponds to (12b), with both adverbial clauses in initial position.

The derivation of (11), with both clauses in final position, proceeds in two steps. First, the matrix IP_3 moves to the specifier of the lower temporal conjunction; this corresponds to the "split" order of (15a), with a left-hand purpose clause and a right-hand time clause:



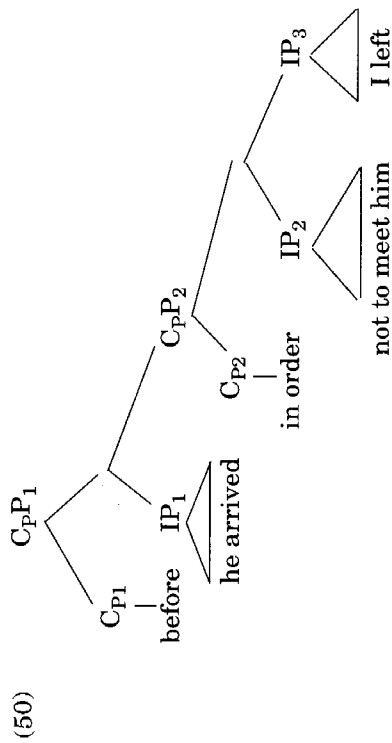
Second, the lower CP_2 , composed of the matrix clause and the time clause, moves to the Spec of the purpose CP_1 :



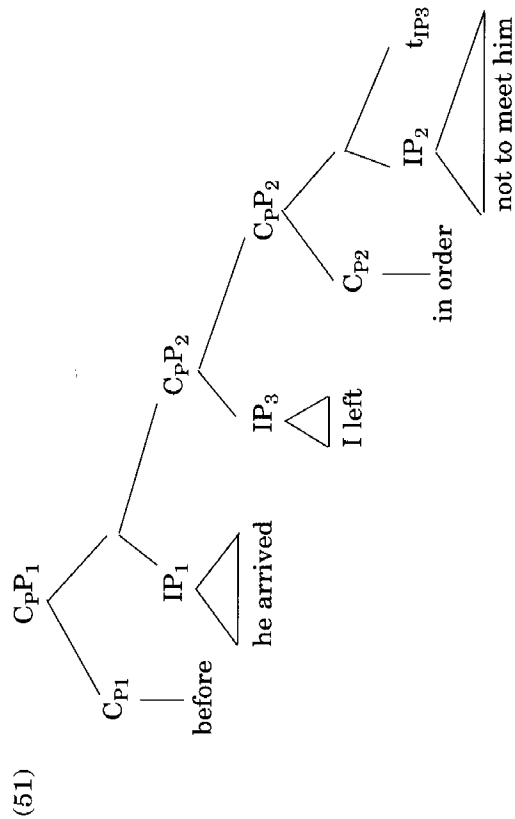
In the resulting structure (49), the relative scope of the adver-

bial clauses is encoded in the syntactic configurations of predication: the time clause is predicated of the matrix clause, and the purpose clause is predicated of the whole structure formed by the matrix clause *and* the time clause. As before, I assume that the overt steps of the derivation of (11) also take place covertly to derive the proper Logical Form for (12b) and (15a).

It is also clear why (12a) and (15b) cannot have the same scope relations as (12b). (12a) corresponds to the structure (50), where the time clause is higher than the purpose clause:



The "split order" in (15b) is derived from (50) by raising the matrix IP₃ to Spec, Cp₂:



For both (50) and (51), the final LF representation will have the time clause predicated of the matrix and the purpose clause, contrary to (47)-(49). Thus, the proposed analysis can account for the symmetric order of adverbial clauses in a straightforward way.²⁶

On the other hand, it is also possible to account for the apparently contradictory evidence concerning the stress prominence of a right-hand time adverbial:

- (8) Gianni ha telefonato a Maria prima di partire
Gianni called Maria before leaving

As discussed in section 2, Cinque's (1993) stress assignment algorithm predicts that the main sentence stress falls on the most deeply embedded constituent. Therefore, the stress prominence of the adverbial follows from the complement analysis but not from the adjunction analysis. However, we have already seen in section 4 that the present approach can account for the stress assignment on the basis of Zubizarreta's (1998) modification of Cinque's theory. In fact, the right-hand position of the time adverbial is derived by leftward scrambling of the matrix IP, as shown in (31) above: in the pre-Spellout structure the time adverbial is in the most deeply embedded position and receives the main stress.

The last type of evidence to be discussed concerns quantifier binding in (6)-(7):

- (6) a. I saw everyone_i [the day before he_i died]
b. Mary hit each man_i [before the other_i could intervene]
- (7) a. I invited nobody_i [before he_i met you]
b. We will sell no wine_i [before its_i time]

In these examples, a matrix complement QP binds a pronoun within the time adverbial. Larson (1988) and Stroik (1990) take this to be decisive evidence in support of the complement analysis. The crucial assumption is that quantifier binding is subject to the C-command Condition (52), first proposed in Reinhart (1983):

- (52) A pronoun P can be interpreted as bound by a Quantifier Phrase only if it is c-commanded by the variable bound by that QP.²⁷

However, the C-command Condition has been recently called into question by a number of scholars, including Acquaviva (1995),

Brody (1994), Jackendoff (1990), Manzini (1994), Williams (1994: 178-198, 230-254). All these authors point out the contradiction between the possibility of Q-binding in (7) and the lack of Principle C effect in (9), and propose that the C-command Condition (52) be replaced by some version of the Leftness Condition, dating back to Chomsky (1976: 342):

- (53) A variable cannot be the antecedent of a pronoun to its left

Clearly, if we adopt this purely linear condition, the possibility of binding in (6)-(7) becomes simply irrelevant with respect to the problem of the structural position of the time adverbial. Since this condition does not require that the QP c-command the bound pronoun, the possibility of binding is consistent with the structural analysis proposed in (31), in which the matrix complement fails to c-command the time adverbial.²⁸

7. Concluding remarks

The preceding discussion has left open many empirical problems in the syntax of time adverbials: for reasons of space, it has only been possible to sketch out the analysis and examine a few consequences.²⁹ To conclude this discussion, I wish to point out some consequences of my proposal for the general theoretical problem of adverbial modification.

- (i) Temporal modification (of the "localizing" type) is here conceived of as an instance of *predication*: the conjunction expresses a temporal relation, and the matrix and subordinate clause (or DP) are its external and internal arguments respectively, denoting an event or a time interval.
- (ii) This predication relation is syntactically projected *outside* the thematic domain of the matrix verb, in the peripheral complementizer system. This implies a new conception of subordinating conjunctions: from a categorial viewpoint, they are akin to complementizers in that they are part of the matrix complementizer system, but they are also akin to prepositions in that they are essentially connectives.
- (iii) These complex adverbials do *not* undergo *movement*. Apparent cases of extraction are accounted for in terms of a "special" LF derivation, which yields the embedded construal.
- (iv) In this specific domain, modification is *not* syntactically realized

zed as *adjunction* to the modified category. Nevertheless, the present approach, contrary to Larson's, maintains a structural distinction between complements and modifiers.

Finally, to the extent that it is successful, the present approach may constitute further evidence in support of the restrictiveness of the Antisymmetry Theory, which excludes rightward adjunction on principled grounds.

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Notes

¹ Localizing time adverbials, which express the temporal location of the matrix clause event, are distinct from measuring adverbials, which measure the duration of the event (cf. Wechsler & Lee 1996 for this distinction). The latter, but not the former, can appear in non-final position with neutral intonation, as shown by the following minimal pairs in Italian:

- | | | |
|-------|--|--------------|
| (i) | ??Gianni è rimasto [quella sera] in casa | (localizing) |
| | G. stayed that evening at home | |
| (ii) | Gianni è rimasto [tutta la sera] in casa | (measuring) |
| | G. stayed the whole evening at home | |
| (iii) | ?? Gianni ha finito [alle cinque] i suoi compiti | (localizing) |
| | G. finished at five his homework | |
| (iv) | Gianni ha finito [in cinque minuti] i suoi compiti | (measuring) |
| | G. finished in five minutes his homework | |

Furthermore, measuring adverbials are sensitive to the Aktionsart of the VP. I adopt Wechsler & Lee's (1996: 658 ff.) proposal that they are internal to VP (or perhaps in the Spec of a Measure Phrase dominating VP, as proposed by Zamparelli 1996).

² See Bianchi (1997) for a more detailed discussion of these and other empirical tests.

³ As pointed out by Manzini (1994), the time adverbial is instead c-commanded by the preverbal subject:

- (i) * She_i knew me [before I met Mary_i at the party].

See the discussion in section 6 below.

⁴ Note that in (9) coreference is possible only if the R-expression is not focussed; otherwise a "weak crossover" effect arises. See Williams (1994:237ff.) for the relevant discussion. The interference of focus has led various scholars to consider coreference impossible in examples parallel to (9) (cf. Brody 1995:82-94; Chomsky 1986:61; Larson 1990:622). But the contrast between (9) and (10) is quite clear: in (10) coreference is impossible even if the R-expression is out of focus.

⁵ The same problem arises in the approach proposed by Hornstein (1995: 118-122). According to Hornstein, in (7) the adverbial clause is adjoined to VP, but the matrix direct object moves to Spec, AgrOP at LF and comes to c-command it; as for (9), he assumes that the adverbial is optionally adjoined above Spec, AgrO.

This implies that Q-binding and coreference cannot take place in one and the same structure. Consider however the following examples:

- (i) I sent each boy_i to her_k [in order to make Mary_k meet him_i] (Brody 1994)
 (ii) ?La_i presenterò ad ogni studente_k [solo dopo che Maria_i lo_k avrà esaminato]
 I shall introduce her to each student only after Mary has examined him

The same problem also arises w.r.t. Kayne's (1994:70-71) proposal that the adverbial clause originates in a complement position but moves out of VP at LF (cf. Manzini 1994 for discussion).

- ⁶ Apart from the *wh*-conjunction *when*, to be discussed in section 5.

⁷ Earlier stages of Modern English allowed for the sequence <prepositional particle + *that*>. Dubinsky and Williams argue that prepositional particles underwent a diachronic reanalysis $P^o \rightarrow C^o$.

- ⁸ For reasons of space, I leave aside the selection of nonfinite clauses.

⁹ Emonds (1985:chapter 7) argues that the two categories P^o and C^o should be collapsed. But this radical hypothesis raises the question of the status of examples like (20), in which the two categories cooccur in a specific selectional relation. For reasons of space, it is impossible here to fully discuss Emonds's proposal.

- ¹⁰ Cf. also Williams's (1990:278-279) proposal that adverbial clauses are "quasi-coordinated" to the matrix clause.

¹¹ The hypothesis of an empty head *Topic*^o is empirically supported by the "anti-adjacency" effect of topicalized phrases for subject extraction, which suggests that topicalization introduces an empty head that counts as a proper governor for the subject phrase. See Culicover (1993) and Rizzi (1997) for relevant discussion.

¹² Actually, Rizzi proposes a low head *Finite*^o immediately above IP, which encodes the finiteness of the clause. This projection will be omitted in this and in the following representations.

¹³ D. DELFITTO & N. CORVER (p.c.) raised the question of whether Spec,CP and Spec,XP count as A-positions, being theta-marked by the subordinating conjunction. I wish to propose that the temporal roles assigned by the conjunction are distinct from the theta-roles assigned by lexical heads: the latter are typically assigned to categories bearing referential ϕ -features, in particular the person feature; on the contrary, temporal roles can only be assigned to event-denoting categories that do not bear referential ϕ -features (cf. Grimshaw 1990: 54-55 on the default ϕ -feature specification of event nominals). Capitalizing on this difference, I assume that temporal roles do not qualify the assigned positions as argument positions (pace GIORGI & PLANESI (1997:101-111); see BIANCHI 1997:83-85 for a criticism of their arguments).

¹⁴ The topical vs. focussed status of the time adverbial also affects its interpretation in aspectually marked contexts (generic, progressive or perfect). This important topic cannot be discussed here; see Bianchi *et al.* (1995), Bonomi (1995, 1997) and Delfitto & Bertinetto (1995).

¹⁵ Since a right-hand time clause can occur within a matrix interrogative, it is necessary to assume that *wh*-phrases do not target Spec, FocP but a different position.

¹⁶ For instance, when in Spanish a postverbal subject is marked [+focus], the structurally lower object may be scrambled to a position higher than the subject's (whose nature need not concern us here):

- (i) Trajo [Juan [t_y el vino]]
 Brought Juan the wine

(ii) Trajo [el vino_i] [Juan [t_y t_i]]

Zubizarreta proposes a slightly different approach to right-hand adverbials: she argues that they are right-adjoined to VP, and that the VP-internal constituents are scrambled outside VP by prosodic scrambling.

- ¹⁷ The formal style conjunction *giacché* and colloquial *dato che* pattern with *poiché*.

¹⁸ A similar contrast holds for French *parce que* vs. *puisque* and English *because* vs. *since*. My analysis implies that the answers in (34) contain an elliptical main IP anaphoric to the main IP of the question. In a more traditional approach, focussing would be related to the VP-internal position of the *perché* clause, as opposed to the *poiché* clause (cf. again Cinque 1990: n. 37 to chapter 2). But if the *perché* clause were VP-internal, the answer (34b) would require the ellipsis of a non-constituent: the ellipted IP would properly contain the non-ellipted clause.

- ¹⁹ Leaving aside *as soon as*, which has a comparative structure, and *when* (on which see section 5).

- ²⁰ Note that a time adverbial can also modify an event-denoting NP:

(i) our meeting before his departure

This means that the external argument of the temporal conjunction can also be an NP. The simplest way to extend the present approach to (i) is to adopt Giusti's (1995) proposal that the DP-internal functional structure includes Topic and Focus projections between D^o and NP. Example (i) is then derived by raising NP to Spec, Cp:

- (ii) [_{DP} our D^o [_{CP} [_{NP} meeting] [before [_{FocP} his departure [_{Foc} t_{NP}]]]]]

²¹ I assume a weak version of the Case Resistance Principle: since tensed Infl checks Nominative Case it does not itself tolerate Case assignment.

²² Larson (1985) proposes a different approach, which cannot be discussed here for reasons of space. See McCawley (1988) for a criticism.

²³ Furthermore, Giorgi and Pianesi examine the distribution of overt vs. empty prepositions in Romance and Germanic and suggest that the licensing of the empty P^o depends on the referential properties of the time-denoting DP.

²⁴ Recall that the whole Force Phrase – denoting a proposition – is not an appropriate external argument for the temporal conjunction (see the discussion at the end of section 4).

²⁵ On the other hand, Manzini (1994) points out that a Principle C effect arises if the pronoun is in the matrix subject position:

- (i) * [_{CP} [_{IP} She_i knew me_i] [before [_{FocP} [_{IP} I met Mary_j] at that party] [_{Foc} t_{IP}]]]

This follows from the Antisymmetry Theory, since Spec, IP₁ is an adjoined position and c-commands the constituents outside IP₁ (cf. Kayne 1994:22-27).

²⁶ In this respect the present approach is very close to the one elaborated by Barbiers (1994) and Costa (1996). The crucial difference is that here the conjunction introducing the adverbial is syntactically external to the adverbial, whereas in their approach the matrix VP or IP moves into the Spec of the adverbial phrase which is itself left-adjoined to an extended projection of the matrix VP.

²⁷ Reinhart's original formulation requires that the QP c-command the pronoun from its S-structure position. In LF, after Quantifier Raising has taken place, this position is occupied by the variable.

²⁸ This recent revival of the Leftness Condition has not been very successful. The reason is clear: the Leftness Condition cannot be stated as a local surface filter, because it does not apply to the surface linear order of constituents, but it is sensitive to LF reconstruction:

- (i) [Which of *this* pictures] does *every painter* like best *t*?

If one adopts the minimalist framework of Chomsky (1995: chapter 4), the Leftness Condition cannot even be stated, because linear ordering takes place in the PF module only, whereas binding relations are carried out by the independent LF module, which by hypothesis only "sees" configurational relations. Thus, it seems that we have to pay too high a price on the theoretical side. However, in Bianchi (forth.) I have argued that in the Antisymmetry Theory the Leftness

Condition can be restated in purely configurational terms as an anti-c-command condition on linking (see Higginbotham 1983). This is achieved by means of the strict mapping relation that the Linear Correspondence Axiom establishes between the configurational relations of asymmetric c-command and the linear relation of precedence. The resulting configurational condition can apply at the level of LF and be sensitive to reconstruction.

²⁶ An open problem is whether the proposed analysis can be extended to other types of complex adverbials. For the moment, I have tentatively proposed an extension to causal and purpose clauses (see the discussion around (32)-(34) and (47)-(51)).

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