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Temporal Ambiguity of Clausal Adjuncts and the Syntax of Simultaneity

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0. Introduction

In this paper I present a syntactic analysis of several contrasts between different types of temporal adjunct clauses. I argue that temporal adjuncts are located in different positions in the clause, depending on their temporal interpretation. This proposal explains contrasts between different temporal adjunct clauses with respect to ambiguity of temporal interpretation and the possibility of TP ellipsis structures.

The paper is organized as follows: in section 1, Geis's (1970) movement analysis of temporal ambiguity is reviewed and Larson's (1990) Case-based approach to this ambiguity is discussed. Several problems for Larson's analysis are raised. Section 2 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. Evidence for this analysis from preposition stranding with temporal adverbs is discussed in section 4, and section 5 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 6. Section 7 shows that the analysis accounts for

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contrasts in simultaneous and nonsimultaneous adjunct clauses with respect to TP ellipsis structures.

1.   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 in (1a), where 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]]]

1.1   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.

(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]]]

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.

1.2   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) (Larson'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 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 nominal object (7b).

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

1.2.1 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* allows an NP 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.[1]

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

1.2.2 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

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[1] Other connectives which pattern like *except* in allowing an NP object but disallowing the long-distance reading are *like. for instance, and such as*:

(i) 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

[2] I am grateful to Beatrice Santorini for pointing out to me the relevance of the German data discussed in this section.

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pattern as in English; the long-distance reading is permitted with *bevor* 'before' and *nachdem* 'after', but not with *waehrend* 'while', illustrated in (9).[3]

(9) a. Ich habe   Maria in D.C. gesehen, bevor sie   behauptete, dass sie ankommen wuerde.
       I   have   Mary in D.C. seen   before she   claimed   that 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 sie ankommen wuerde.
       I   have   Mary in D.C. seen   after   she   claimed   that 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 sie   ankommen wuerde.
       I   have   Mary in D.C. seen   while   she   claimed   that 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 (10a) and (11a), German *bevor* 'before' and *nachdem* 'after' do not allow NP complements, and therefore Larson's analysis incorrectly predicts that they should not permit the long-distance reading. (The German prepositions used with NP complements are *vor* 'before' (10b), and *nach* 'after' (11b).) As seen in (12), German *waehrend* 'while' does allow NP complements, and therefore Larson's analysis incorrectly predicts that it should permit the long-distance reading.

(10) a. *bevor des   Krieges   / dem   Krieg / den   Krieg
         before the   war-GENITIVE   / the-DATIVE   war   / the-ACCUSATIVE war
         'before the war'

     b. vor   dem   Krieg
        before the-DATIVE   war
        'before the war'

(11) a. *nachdem des Krieges   / dem   Krieg / den   Krieg
         after   the war-GENITIVE   / the-DATIVE   war   / the-ACCUSATIVE war
         'after the war'

     b. nach   dem   Krieg
         after   the-DATIVE   war
         'after the war'

(12)   waehrend des   Krieges   / dem   Krieg
        while   the   war-GENITIVE   / the-DATIVE   war
        'during the war'

2.   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 briefly review the

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[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'.

semantic and syntactic theory of tense that I base my analysis on, and I discuss the semantics of the null operator.

2.1   Tense Theory

I assume the semantic theory of tense of Reichenbach (1947). Within this framework, tenses are composed of three time points: the Event point, the Reference point, and the Speech point. This system is illustrated by (13), where the Event point is the time of Mary's leaving, the Reference point is the time by which Mary's leaving takes place (in this sentence, 2:00), and the Speech point is the time at which the sentence is uttered.

(13)   At 2:00, Mary had left.

I assume Hornstein's (1990) neo-Reichenbachian approach to tense, according to which the structures of the basic tenses of English are as in (14), where the linear order of the Speech, Reference and Event points reflects their temporal order. If two time points are separated by a line, the leftmost point is interpreted as temporally preceding the other point. If two points are separated by a comma, they are interpreted as simultaneous.

(14)   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

2.2   A Syntax for Tense

I follow many researchers who have claimed that time points are the syntactic, as well as the semantic primitives of tense (Hornstein 1977, 1981, 1990, Zagona 1988, 1990, Giorgi and Pianesi 1991, Stowell 1993, Thompson 1994). Thompson (1994) proposes that the mapping between the semantic and the syntactic representation of tense is subject to the following condition:

(15)   Tense Structure Mapping Condition: Time points are associated with syntactic heads in a one-to-one fashion.

The tense morphemes of English, which I assume are associated with the head of TP, orders the Reference point in the tense structure with respect to the Speech point. For example, the past tense morpheme orders the Reference point before the Speech point, while the future tense morpheme orders the Reference point after the Speech point, as in (14). I thus follow Hornstein (1990) in associating the Speech point with Infl, and, in particular I claim that it is located in the head of TP.

The aspectual morpheme of English *have* orders the Event point with respect to the Reference point; the presence of *have* orders the Event point as preceding the Reference point, the absence of *have* orders the Event point as simultaneous with the Reference point. Therefore, it is natural that the Reference point be located in the head of Aspect Phrase (AspP), which I assume is positioned between TP and VP. Temporal points are thus associated with syntactic heads in the following way: the Event point is associated with V, the head of VP, the Speech point with T, the head of TP, and the Reference point with Asp, the head of AspP. The hierarchical order of time points is thus: S, R, E.

2.3   The Semantics of the Null Operator

Given that on a Reichenbachian analysis, there are three time points 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 (16); the reading where the preposition *before* is construed with the most embedded clause.

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

The most embedded clause has the past perfect tense structure in (17), 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.

(17) $E \_ R \_ S$

If the preposition *before* in (16) were construed with the Reference or Speech time, a possible reading of this sentence would be as in (18a), where the event of seeing occurs before the Reference and Speech times, but after the Event time.

```
              seeing
                |
(18)    a.    E _ R _ S

              seeing
                |
        b.    E _ R _ S
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However, (16) 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 (18b). This shows that temporal prepositions are construed with respect to the Event time.[4]

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 section 1.2.1, 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 (19a) and (19b), locative adjunct clauses, unlike temporal adjunct clauses, do not permit long distance readings with a null operator.

(19)   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$_i$]]]]

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[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.

This is predicted; given that the null operator is purely temporal, it can not be construed with a locative preposition.[5]

2.4   Syntax of 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.[6] *Before* and *after* force the adjunct Event time to be interpreted as nonsimultaneous with the matrix Event time; in (20), the leaving and the coming in are interpreted as occurring at different times.

(20)   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. This is shown in (21), where the events of leaving and coming are interpreted as taking place at the same time.

(21)   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 section 2.2, 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.[7]

The main idea of this analysis is that it is only when the adjunct is in a local relation with the matrix Event point in the head of VP that the Event of the adjunct clause can be interpreted as simultaneous with the matrix Event. I propose a locality restriction which must hold in order for the two Events to be interpreted as simultaneous, as in (22).

(22)   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 checking domain of β[8]

3.   Analysis of Temporal Ambiguity

3.1   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. I claim that this is instantiated by LF verb raising to the

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[5] This line of reasoning rules out an analysis of the null operator as the spatiotemporal operator discussed in Kratzer (1989).

[6] 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. According to the present analysis, the relevant semantic distinction is simultaneity, not durativity.

[7] See Miyamoto (1991) for discussion of the syntax of temporal adjunct clauses in Japanese.

[8] Following Chomsky (1994), the checking domain of a head includes the specifier of that head and all heads adjoined under that head, but not adjuncts to the maximal projection of that head.

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Inflectional heads, followed by the highest Inflectional head incorporating into the preposition. The preposition then incorporates into the matrix verb, as in (23).[9] [10]

(23)
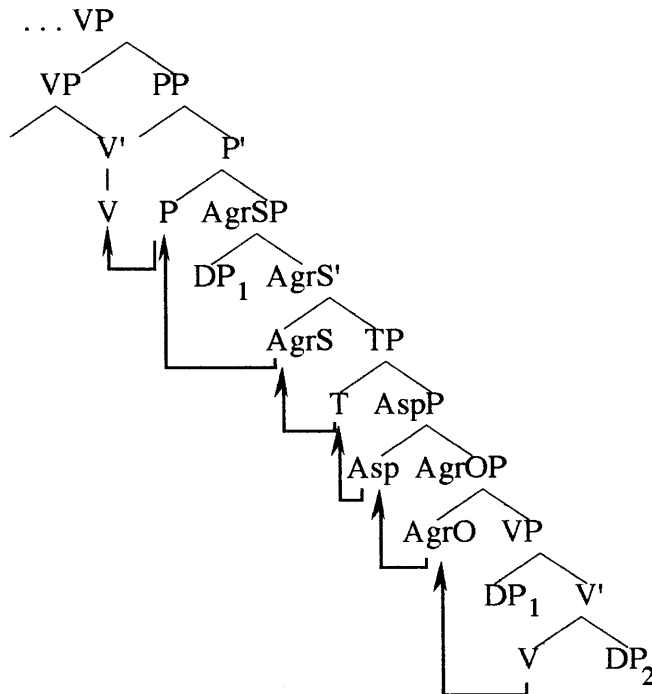
Due to preposition incorporation into the matrix verb, the requirement of the Condition on Simultaneous Interpretation is met for the adjunct and matrix Event points, since the adjunct Event point is in the checking domain of the matrix Event point. Thus, the two Events are interpreted as simultaneous.

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 (24), parasitic gaps are in complementary distribution with long-distance readings; (24) can

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[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.   Viñemos o Venres da festa do Maio.
                 came-we the Friday of-the holiday of-the May
                 'We came the Friday of May day.'
         b.   Viñemolo 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]]]

only mean that the event of seeing takes place before the event of telling and can not mean that the event of seeing takes place before the event of arriving.[11]

(24)   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 (Munn 1991). Since the local reading is possible in this construction, this data shows that it does not involve movement of a null temporal operator, as the long-distance reading does.

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 1.2.2; 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.

3.2   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 incorporation 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*.[13]

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.

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[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] 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 constructions 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.

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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 (25), 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 checking 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.

(25)

```
     ... PP
        /\
      Op    P'
      E    /\
          P    ...
         /\
        V
        E
```
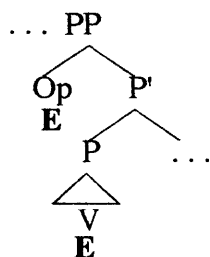
4.   Preposition Stranding with Temporals in English

Evidence for preposition incorporation with VP-adjoined temporal adjuncts, and not TP-adjoined adjuncts, comes from preposition-stranding facts with temporal PP adverbs in English. Braroe (1974) points out that (26) can be paraphrased as in (27a) or (27b), and she proposes a structural account of this ambiguity.

(26)   The secretary had eaten at 3 p.m.

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

Hornstein (1990) argues against this analysis, arguing that on the reading in (27a), the Event time is modified, whereas on the reading in (27b), the Reference time is modified. In Thompson (1994), I adopt Hornstein's claim that this temporal ambiguity is due to modification of different time points, and, following the intuition of Braroe, I argue that there are two different structures associated with the two different modification possibilities. (Zagona 1988, Inclan 1991, Nakajima 1991, and Westphal 1994 also pursue structural analyses of this ambiguity.) When the adverb 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.

Preposition stranding is permitted in many dialects of English with temporal adverbs, as in (28a). 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 (28b), which can ask either for the time at which the event of leaving takes place, or for the time by which the leaving takes place.

(28)   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.

5.   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 (29a), clause-initialtemporal adjunct clauses permit only the local reading; (29b) can only mean that the seeing takes place before the time of saying, and not before the time of arriving.

(29)   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 (29b) is parallel to the unacceptability of parasitic gap structures with clause-initial adjuncts, illustrated by the contrast between (30a) and (30b) (Lasnik and Uriagereka 1988:75).

(30)   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 (31b) 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, etc. 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 an element in 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.

6.   *When* Clauses

Further evidence for the analysis offered here comes from the distribution of 'when' clauses.[14] 'When' clauses are ambiguous in that they permit either a simultaneous or a nonsimultaneous reading; (31) 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.[15]

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

[15] 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.

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(31)   John left the room when Mary came in.

        Geis (1970) notes that 'when' clauses permit either the local or the long-distance reading, as shown in (32), where the seeing can be interpreted as occurring at the time of claiming, or the time of arriving.

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

        The standard analysis of the ambiguity of (32) 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.

        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. However, given that with 'when' clauses there is no preposition, the prediction is that the long-distance reading should be possible even on the simultaneous reading. This is the case, as shown by the fact that (32) permits a long-distance, simultaneous reading; it can mean that the seeing takes place at the same time as the arriving.

7.   Ellipsis Structures

7.1   TP Ellipsis

        As noted by Larson (1987), temporal prepositions which permit the long-distance reading also allow ellipsis in structures such as (33a), whereas temporal prepositions which do not permit the long-distance reading also do not allow this type of ellipsis, as in (33b).

(33)   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 (33) is a phrase which includes not only the VP, but the temporal information of the clause as well; at least TP.[16]

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[16] 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 salió antes de que Bill llegara.
         John left before that Bill arrived
         'John left before Bill arrived.'

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

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 (34):

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

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 (35b):

(35)   a.   John left before Bill [e]
       b.   John left before Bill left

7.2   VP Ellipsis

This analysis predicts that simultaneous adjunct clauses should allow ellipsis, permitted that what is elided is the VP, not a higher projection. This prediction is borne out, as is shown in (36a), where the VP is elided.

(36)   a.   John left while/as Mary did [e]
       b.   John left before/after Mary did [e]

As shown in (36b), nonsimultaneous adjunct clauses also permit VP ellipsis, as predicted.

7.3   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 (37) (see Bouton 1970, Sag 1977, May 1985, Baltin 1987, Larson and May 1990, Lasnik 1993, Takahashi 1993, Hornstein 1994).

(37)   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. Recent analyses within the minimalist framework of Chomsky (1993) claim that this movement is driven by the need for the direct object to check its Case features in Spec, AgrO (Lasnik 1993, Takahashi 1993, Hornstein 1994).[17]

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

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

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       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 (Chomsky 1994, Thompson 1994). 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.

8.   Conclusions

       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 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.

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