Times and events in temporal clauses

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1 Introduction

1.1 Temporal clauses as free relatives

Temporal clauses introduced by *when* very standardly analysed as free relatives (Geis 1970, Bresnan & Grimshaw 1978, Larson 1990, Hall & Caponigro 2010):

(1)   a.   I'll eat what you cook.
       b.   I'll sit where you tell me to sit.
       c.   I'll come when you tell me to come.

(2)   a.   She dreams of when she will finally have her PhD.
       b.   She really hated when John lied like that.

Temporal clauses introduced by *after* and *before* can be potentially be treated in a similar way, but in this case assuming a null operator:

(3)   I arrived before/after ∅ you arrived.

Most compelling evidence: the distribution of **Geis-ambiguities**.

1.2 *When/before/after* clauses involve operator movement

Both "high" and "low" readings possible. . .

(4)   She arrived when/before/after I claimed she would arrive.   Ambiguous
       a.   She arrived at/before/after time t
             such that I claimed at time t that she would arrive. (**High reading**)
       b.   She arrived at/before/after time t
             such that I claimed [that she would arrive at time t]. (**Low reading**)

. . . but low reading blocked by islands

(5)   She arrived when/before/after I made the claim that she would arrive.   Unam-
       biguous
       a.   She arrived at/before/after time t
             such that I made the claim at time t that she would arrive. (**High reading**)
       b.   **Unavailable low reading:** She arrived at/before/after time t
             such that I made the claim [that she would arrive at time t]

1.3   The puzzle of the missing reading with *before/after/when*

Clause-initial temporals have only high readings . . .

Observation 1: When temporal clauses are in clause-initial position, low readings be-
come inaccessible—or at the very least, extremely hard to access (Sabine Iatridou, Amy
Goodwin Davies, personal communication):

(6)   When I said she would arrive, she arrived.
       a.   She arrived at time t such that I said at time t that she would arrive.
       b.   *Unavailable/hard to access low reading*:
             She arrived at time t such that I said [she would arrive at time t]

Compare the sentence-final version:

(7)   She arrived when I said she would arrive.

If the high reading is ruled out (e.g. by a temporal clash between the highest clause in
the adjunct and the main clause), the result is pretty unacceptable:

(8)   ?*When they said that she will arrive, she will arrive.

Again, compare the sentence-final version:

(9)   She will arrive when they said that she will arrive.

The same holds for *after* and *before*:

(10)   After/before I said she would arrive, she arrived.
       a.   She arrived after/before time t such that I said at time t that she would
             arrive.
       b.   *Unavailable/hard to access low reading*:
             She arrived after/before time t such that I said [she would arrive at time t]

Compare:

(11)   She arrived after/before I said she would arrive.   Ambiguous

. . . but some kinds of modification restore the low readings

Observation 2: If a modifier/measure is added to the temporal clause, the low reading becomes possible again, even in initial position:

(12) a. Exactly when I said she would arrive, she arrived.
      b. A few minutes after I said she would arrive, she arrived.
      c. One minute before I said she would arrive, she arrived.

What looks like a similar effect of modification obtains in Japanese *mae* 'before' clauses (Sharvit 2014, Oda & Tatsumi 2017).
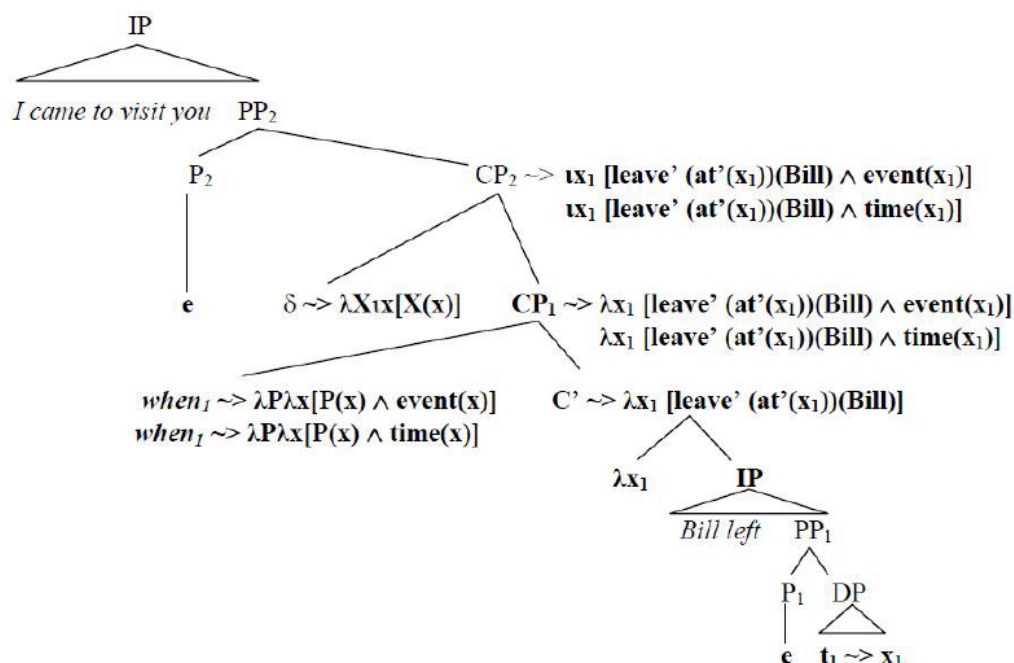
2 Ambiguity of temporal clauses

2.1 Hall & Caponigro: Relatives of Events or intervals

Hall & Caponigro (2010): *when*-clauses are always free relatives, but the relative may involve abstracting either over a time-interval variable, or over an **event** variable, due to an ambiguity of *when*:

(13)

The main evidence for this ambiguity: the parallel between *when*-clauses and cases where the noun *time* is modified by a relative:

(14)   This year, the tulips bloomed *(at) the time we all expected.   (time interval)

(15)   I lost my keys in the water (*at) the time I went swimming in the bay.   (event)

Here there is in fact no ambiguity because if and only if *time* has the event reading it appears as a "bare NP adverb" of the kind discussed in Larson 1985.

Hall & Caponigro (2010): Both the event and the time-interval readings can be paraphrased by *when* clauses:

(16)   a.   This year, the tulips bloomed when we all expected   (time interval)
         b.   I lost my keys in the water when I went swimming in the bay.   (event)

Similarly, they state that (17a) (their (68a)) is ambiguous between the two meanings that correspond to (17b) and (17c):

(17)   a.   I came to visit you when Bill left.
         b.   I came to visit you at the time Bill left.   (time interval)
         c.   I came to visit you the time Bill left.   (event)

For Hall & Caponigro, little hinges on this ambiguity; their assumption is clearly that the syntax at least is the same for the two readings, the only difference lying in the lexical ambiguity of *when*, as illustrated in the decorated tree in (13).

But . . .

2.2   Event relatives allow only local readings

Rothstein (1995): bare *time*-headed temporals ought to have low readings, **but they don't**.

That is, she says, you'd think that (18a) would have the structure in (18b) (her 64a,b)—

(18)   a.   every time (that) John fixed the car
         b.   [$_{NP}$ every [$_{N'}$ time [$_{CP}$ Op$_i$ (that) [$_{IP}$ John [$_{VP}$ fixed the car t$_i$]]]]]

—but this cannot be the right structure, precisely because of the absence of Geis ambiguities; low readings are systematically absent.

> However, there is no evidence for the formation of *wh*-chains headed by a relative clause operator and ending in a trace in adjunct position of an embedded clause. *Every* must always be construed with the highest clause, even where normal restrictions on movement allow movement of adjuncts from embedded clauses.   (Rothstein 1995: p. 20)

She cites the examples in (19)–(20) (her (66)–(67)) as unambiguously quantifying over the events introduced by the matrix verb (*tell, think*):

(19)   a.   Every time John tells me that he fixed the car . . .
         b.   Every time I think John's fixed the car . . .
         c.   Every time I am told John fixes the car . . .

Of course, if those temporals are considered in initial position, the lack of a low reading is not an independent finding. Rothstein does not put the clauses in (19) in a wider context, but she does one non-initial example, which does lack a low reading:

(20)   They announced it every time they decided to move house.

Here are some more examples. As far as I can see, they all lack a true low reading:

(21)   a.   Mary paid the bill every time {Jo told me/#Jo tells me} that they got the car fixed.
        b.   There was a terrible mess every time {I thought/#I think} Jo fixed the car.
        c.   Mary pays the bill every time I am told Jo fixes the car.

2.3   Back to *when*-clauses?

Hypothesis: *when*-clauses are ambiguous, as proposed by Hall & Caponigro (2010), and only time-interval *when*-clauses, as opposed to event *when*-clauses, allow low readings.[1]

Hard to prove the existence of this ambiguity in English because it's hard to come up with cases that aren't at least potentially ambiguous.

(22)   #I lost my keys in the water [when I told you [I went swimming in the bay]]].

2.4   Why is there no "low" reading for the event case?

Rothstein (1995): eventive *time*-headed relatives don't involve A′ movement. Rather, the predicate that is required to combine with bare NP *time* comes about in a different way.

- Assuming the existence of a neo-Davidsonian event argument, this event argument usually remains open until bound by default existential quantification, which she proposes takes place just above IP (the existential quantifier being introduced in an empty C position).

- But, if no existential quantification takes place, the event argument remains unbound, and the IP will itself denote a set of events which can then be combined directly with *time* under its interpretation as a sortal predicate of events.

- Since in this case the predicate is not created by movement, and since presumably any event argument in a lower clause would be captured by existential quantification at the level of that clause, the lack of any low reading is predicted for these eventive *time*-adverbials.

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[1]Note that Ürögdi (2009) proposes this distinction between two types of temporal clauses in Hungarian, on the basis of earlier work by Lipták (2005), with event relatives not involving the long-distance A′-movement that takes place in the temporal relatives. For English she suggests that temporal *while*-clauses should be analysed as event-relatives in order to capture their lack of Geis-ambiguities.

Note also proposals for distinct types of temporal clauses—some with, others without, operator movement—within Cantonese and Mandarin Chinese (Yip 2021, Yip & Chen 2022).

The same analysis can be extended to free relatives introduced by *when*, or the null-headed free relatives that are the complements to *before/after* on a fairly minimal adaptation of an account like that of Hall & Caponigro (2010).

Nevertheless, like temporal *while*-clauses (which also lack a low reading), clause-initial *when*-clauses cannot host topicalization:

(23) a. I read *War and Peace* when she read *Anna Karenina*.
      b. *I read *War and Peace* when *Anna Karenina*, she read.
      c. *When *Anna Karenina*, she read, I read *War and Peace*.

They can in at least some cases host the epistemic adverb *probably*. Ürögdi (2009) takes this to be incompatabile with crossing A′ movement, citing Haegeman (2007), but *probably* seems to be able to occur in other relatives (including temporal clauses in final position).

(24) a. When you were probably still drinking, I was already at home.
      b. I was already at home when you were probably still drinking.
      c. I was competing with someone who you had probably already lost to.

3   Where we have got to

3.1   Reframing our original observations

We started out with two observations about clause-initial temporal adverbials in English:

- **Observation 1:** When temporal clauses are in clause-initial position, low readings become inaccessible—or at the very least, extremely hard to access (Sabine Iatridou, Amy Goodwin Davies, personal communication)

- **Observation 2:** If a measure phrase(?) of some kind is added to the temporal clause, the low reading becomes possible again, even in initial position

Now we can reframe these observations:

- **Observation 1 (revised):** When temporal clauses are in clause-initial position, there is a very strong preference for reading them as descriptions of events, rather than of time-intervals

- **Observation 2 (revised):** Measure-phrases are compatible with definite descriptions of time-intervals, but not of events.

Does that get us any further? Possibly...

3.2   Structural/order effects on temporal adverbs

It's well-known that the interpretation of *then* depends in part on its structural position.

Glasbey (1992) points out that clause-final *then* can get a simultaneous-time interpretation when there are two successive eventive clauses in the simple past, and she interprets this as involving anaphoric reference to a previously mentioned time-interval:

(25)   a. Daniel climbed Ben Nevis in July
         b. Gareth climbed Snowdon then.
             =he climbed Snowdon in July

Note that the explicit previous mention is necessary:[2]

(26)   a. Daniel climbed Ben Nevis.
         b. #Gareth climbed Snowdon then.

Clause-initial *then* **can't** get a simultaneous-time intepretation, it can only get an "update" interpretation:

(27)   a. Daniel climbed Ben Nevis in July.
         b. Then Gareth climbed Snowdon.
             = he climbed Snowdon after Daniel climbed Ben Nevis
             $\neq$ he climbed Snowdon in July

Her interpretation involves *then* in initial position translating as a relation between two **eventualities**, such that the second is not part of the first, and temporally follows it.

This seems to support the idea that there is a strong dispreference for a purely time-interval reading for a clause-initial temporal expression if there is an event-relating reading available.

Strikingly, if we modify *then*, we now can get the simultaneous-time interpretation *even in initial position*, exactly as happened also for our temporal clauses:[3]

(28)   a. Daniel climbed Ben Nevis in July.
         b. Exactly/roughly then, Gareth climbed Snowdon.

I suggest this is the same fact as the contrast we saw earlier, when low readings in clause-initial time-adverbial clauses are generally extremely hard to access but are greatly facilitated by measure-phrase modification:

(29)   After/before I said she would arrive, she arrived.   UNAMBIGUOUS
         a. She arrived after/before time t such that I said at time t that she would arrive.

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[2]This is not true if the second sentence is in the progressive: see Glasbey (1992) for discussion and analysis.

[3]There is also an intonational break, which may support the idea below that examples like (28b) involves topicalization of the temporal from a VP-internal position. It is striking though that even with such an intonational break it is at best very hard to get this reading for unmodified clause-initial *then*.

      b.   *Unavailable/hard to access low reading*:
          She arrived after/before time t st I said [she would arrive at time t]

(30)   ALL AMBIGUOUS:
      a.   Exactly when I said she would arrive, she arrived.
      b.   A few minutes after I said she would arrive, she arrived.
      c.   One minute before I said she would arrive, she arrived.

4 Conclusion

Summary:

- English temporal clauses introduced by *when/before/after* are ambiguous between being free relatives denoting EVENTS and free relatives denoting TIME-INTERVALS

- The same ambiguity shows up in some headed relatives (at least with *time* and also *moment*); the event reading for these cases correlates with bare-NP adverb syntax

- The event reading only allows local interpretion (i.e. no Geis-ambiguities); a possible explanation for this is that event-relatives are formed by binding an open event argument, not by operator movement. Nevertheless, internal topicalization is blocked.

- The event reading is incompatible with modification by *exactly, roughly*, or, in the case of *before/after*, also measure phrases like *two minutes, three hours*

- When the temporal clause is in initial position, the event reading is heavily preferred over the time-interval reading

- This sensitivity of temporal clauses to their position, and to the presence of modification, is shared by the non-clausal temporal form *then*

Further research:

- What is the *explanation* for the effect of attachment site?

- How can we formalise the effect of modification? Is the right way to think of this rather that the modification facilitates topicalization of adverbials from the VP-internal position?

- Is Rothstein's proposal about the role of the event argument the best way to think of how the event-relative reading is derived?

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