

REFERENCE TIME AND TIME IN NARRATION

1. INTRODUCTION

The problem posed by time in narration is that of explaining why e.g. the events described in (1) are understood as occurring in sequence:

- (1) As she looked up the first stone was thrown: it missed its mark, but another followed, and struck with a thud upon the deer's side. He bounded forward. Hinnihami cried out and ran towards him: at the sound of her voice he stopped and looked round. A shower of stones fell about him: a thin stream of blood began to trickle down his flanks; suddenly he plunged forward upon his head, his two forelegs broken at the knees. A cheer broke from the men. Hinnihami, as she dashed forward, was caught by two men and flung backwards upon the ground [...] Woolf (82)

To be sure, a narration may deviate from this simple sequence in some fairly complex ways. But we note that even the simplest textual structure is problematic in a treatment in which tense is interpreted indefinitely, as it is e.g. in those systems using Priorean tense operators. To see this, consider the semantics of the Priorean 'Past' operator, formulated in (2):

- (2) PAST(p) holds at t iff $\exists t' < t$ and p holds at t'

If we apply this semantics to two sentences in narrative sequence, p_1 and p_2 , we may derive that these are true at t iff there exist t_1 and t_2 , both earlier than t , and such that p_1 holds at t_1 and p_2 holds at t_2 . But no order between t_1 and t_2 can be established using (2), and this is what is required. We might attempt to establish an order by reformulating (2) using an existential quantifier restricted to a *set* of relevant times, and then establishing an order among these sets of times. A more direct tack, however, is to give up the indefinite interpretation of tense embodied in (2), and to immediately specify an order among the times at which successive sentences hold.

It is this more direct tack which will be taken here. The general strategy is fairly simple: tense will be allowed to refer to definite times, which are taken to be specified by context. A narration is then simply a

sequence of sentences whose tenses refer to a temporally ordered sequence of times. Dowty (1982, p. 19) is the source of this suggestion. The formalization, refinement and criticism of this strategy for explaining time in narration are the tasks of the following sections.

2. FORMALIZATION

Since a great deal of what follows may be viewed as Reichenbach exegesis, we first provide a formalization of his views on tense.

In *Elements of Symbolic Logic* Reichenbach distinguished between speech time t_s , event time t_e and reference time t_r . The event time of a clause is the time it purports to say something about. (Thus truth conditions for atomic sentences are based on t_e .) Reference time is the time from whose vantage point the “event” is viewed. In the first clause of the sentence:

- (3) After he had eaten everything, he said goodbye

the event of his eating everything is described from the vantage point or reference time of his saying goodbye. Following Åqvist (1976) and Johnson (1977, p. 12), I interpret Reichenbach’s speech, event and reference times as based on different contextual parameters, i.e. indices in a tense logic. It is these times to which one may refer. A three-dimensional tense logic is employed.

Logically, the system will treat all temporal expressions as sentence operators. For this reason, a sentence logic is sufficient to demonstrate the treatment. An interpretation function I assigns truth values to atomic propositions with respect to intervals of time. This is encoded in (4):

- (4) for t an interval, p an atomic proposition $I(p, t) \in \{0, 1\}$

Note that for these atomic propositions, only one interval of time – not three, as the full system allows – is relevant to the determination of truth conditions:

- (5) for atomic p , $\mathfrak{A}_{t_s} \stackrel{t_e}{\vDash}_r p$ iff $I(p, t_e) = 1$.

(t_s and t_r range over intervals, too. This is a simplifying and not an essential assumption.) It is important that the intuitively persuasive notion of temporal dependence familiar from simpler tense logics is preserved here, i.e. that basic expressions are still assigned semantic values with respect to a single time. Intuitively clear foundations are required if we are to interpret the formal system, and it is not immediately

clear how one would interpret a basic expression with respect to pairs or triples of times.

No simple sentences are interpreted by atomic formulae, however. All include some temporal modification, viz., tense. Some tense rules will be provided below.

It is of course the concept of reference time which has puzzled researchers. Considering example (3) above, we see that reference time in subordinate clauses may be provided by the event time of the matrix clauses, but reference time is often provided only by the context, as Reichenbach noted. He commented that in the sentence *Peter had gone*:

- (6) [. . .] it is not clear which time point is used as the point reference. This determination is rather given by the context of speech. In a story, for instance, the series of events recounted determines the point of reference[. . .]

The leading hypothesis of a Reichenbachian system for describing narrative time will be that reference time is the time of narration, i.e. one of those times that are ordered in narrative.

It is worth noting that Reichenbach's remark about how events already recounted may determine the reference time is qualified: this is so "in a story". This suggests that reference time isn't always provided in previous discourse, and that we have, in effect, two sorts of discourse – (*temporally*) *connected discourse*, in which reference time is fixed by previous discourse, and (*temporally*) *free discourse*, in which it isn't. Let us contrast examples of these:

- (7) *connected*: Al went to New York. The others were there, too.
 (8) *free*: Al went to New York. The others were there once, too.

The temporally connected discourse continues talking about the same time, while the free discourse does not. In connected discourse, these times may not be out of order, while in free discourse, this is possible. (We shall examine which times these are presently.) Connected discourse is the usual sort found in narration and it is this which we will try to characterize more exactly.

Reichenbach claims that "the series of *events* recounted determines the point of reference" and the above example (7) of connected discourse bears him out. The time spoken of in the second sentence in this discourse is clearly determined by the time in the first, i.e. the time at which Al went to New York, i.e. the event time. Some examples are different, however:

- (9) Al went to New York. Bo had found him a room. He went directly to it.

Here it is clear that the time spoken of in the last sentence is *not* the event time of the previous sentence, i.e. the time at which Bo found the room. It is also clear that events have not been recounted in order, and therefore that event times are not properly ordered. Still this has the feel of a temporally connected discourse.

3. NARRATION

3.1. Reichenbach's Pragmatics

The elusive principle of organization is based on reference time. The second sentence in the discourse above has an event time prior to the first's, but its reference time is fixed and non-prior to that of the first. And it is again the reference time which is spoken of in the third sentence. This suggests the following codification of Reichenbach's implicit Pragmatics (RP):

- (10) *Reichenbach's Pragmatics (RP)* For S_1, S_2, \dots, S_n a sequence of sentences uttered in a temporally connected discourse:

$$t_r(S_i) \not> t_r(S_{i+1})$$

where $t_r(S)$ designates the reference time with respect to which S is to be evaluated. ($t_r(S)$ may be an interval; for intervals i_1, i_2 : $i_1 > i_2$ iff i_1 properly follows after i_2 , i.e., formally, iff for all points t_1 in i_1 and t_2 in i_2 , $t_1 > t_2$.)

Dowty (1982) has proposed essentially the same principle.

In order to see RP at work, we need to provide some rule of interpretation for tense. Below are Reichenbach's rules for the Preterite and the Pluperfect cast within the model theoretic interpretation of Reichenbach proposed.

- (11) *Preterite*

$$\mathfrak{A}_{t_s} \stackrel{t_e}{\underset{t_r}{\models}} \text{PRET}(p) \text{ iff } t_e = t_r \text{ and } t_e < t_s \text{ and } \mathfrak{A}_{t_s} \stackrel{t_e}{\underset{t_r}{\models}} p.$$

Let us first unpack this a bit. The left side may be read 'PRET(p) is true at t_s, t_r, t_e ' and the right side ' t_e is identical to t_r and t_e completely precedes t_s and p is true at t_s, t_r, t_e '. This is simply the model theoretic analogue of Reichenbach's diagram:

(12) $E, R \text{---} S$

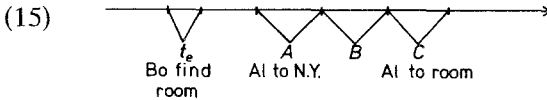
(13) *Pluperfect*

$$\mathcal{A}_{t_s} \stackrel{t_e}{\underset{t_r}{\models}} \text{PLUP}(p) \text{ iff } t_e < t_r < t_s \text{ and } \mathcal{A}_{t_s} \stackrel{t_e}{\underset{t_r}{\models}} p.$$

Cf. again Reichenbach's diagram:

(14) $E \text{---} R \text{---} S$

To see these rules at work, suppose discourse (9) is to be evaluated at reference times A, B, C and $A \not> B \not> C$, so that RP is satisfied. Suppose further that the three sentences might be correctly symbolized $\text{PRET}(\text{Al go to New York})$, $\text{PLUP}(\text{Bo find him a room})$ and $\text{PRET}(\text{He go directly to it})$, respectively. Since the rule of interpretation for PRET requires that $t_e = t_r$ and atomic (tenseless) sentences are true at t_s, t_r, t_e iff the atomic sentence holds at t_e , we obtain immediately that (Al go to New York) holds at A and that (He go directly to it) holds at C . From the rule of interpretation for Pluperfects we may infer that $t_e < B$ and that (Bo find him room) holds at t_e . This is, at least roughly, the sort of temporal structure we want to postulate. It is sketched in (15).



Let us note that Reichenbach's requirement that event time equal reference time in the Preterite is absolutely essential to the workings of the system proposed here. The proposed principle of narrative organization, RP, imposes an order on reference times. Moreover, we argued above that its work couldn't be shifted to a principle which would organize event times. But the event times of sentences in the Preterite must be ordered in some fashion. The effect of linking these two matters – the ordering of reference times and the required order of event times for sentences in the Preterite – will always be a stipulation that event time be identical to reference time in the Preterite. I stress this point only because Reichenbach has been criticized for it, for example in Comrie (1981, pp. 28–29). If the system proposed here is Reichenbach exegesis, then Reichenbach is vindicated on that point.

3.2. *The Treatment of Temporal Adverbs*

The approach sketched above has ramifications for the semantics of other temporal expressions. It constrains the treatment of temporal

adverbs such as *on June 17, 1953*, or *at two o'clock*, for example. That is, if we weren't interested in maintaining the analysis proposed above, we might treat the semantics of such adverbials in the following way: Let the adverbial denote the time it names, so that *on June 17, 1953* denotes the day of June 17, 1953 and *at two o'clock* denotes two o'clock. Then, for any such adverbial f , let its semantic effects be specified by the following rule (16):

$$(16) \quad \mathcal{A}_{t_s} \stackrel{t_e}{\models} f(p) \text{ iff } \exists t'_e \subseteq [f]_{\mathcal{A}_{t_s, t_r, t_e}} \text{ and } \mathcal{A}_{t_s} \stackrel{t'_e}{\models} p.$$

The important characteristic of (16) for our purposes is the replacement of t_e , the time originally referred to, by t'_e . (16) thus analyzes frame adverbials as “substitution operators” in van Benthem's (1977, p. 412) sense. This sort of treatment has been frequent enough in the analysis of time adverbials; cf. Dowty (1979, pp. 327–28) or Bäuerle and Stechow (1980, pp. 407–08). But it is incompatible with the proposed treatment of time in narration. To see this, first consider the following sequence of sentences, which clearly doesn't constitute a narrative:

(17) Tom arrived. Sue arrived the day before.

We might evaluate this at times A and B where $A \not\prec B$, satisfying RP. Then Tom arrives at A and *Sue arrived the day before* holds at B . We might suppose that the scope of the adverbial includes, or alternatively, is included in, the scope of the tense. The assumption that tense has wider scope leads to the following derivation of truth conditions:

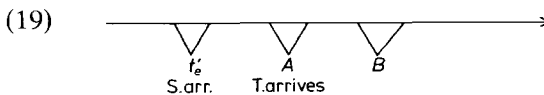
$$(18) \quad \mathcal{A}_{t_s} \stackrel{t_e}{\models} \text{PRET}(\text{the day before}(\text{S.arrive})) \text{ iff}$$

$$\mathcal{A}_{t_s} \stackrel{t_e}{\models} \text{the day before}(\text{S.arr.}) \text{ and } t_e = B < t_s \text{ iff}$$

$$\exists t'_e \left(\mathcal{A}_{t_s} \stackrel{t'_e}{\models} \text{S.arr.} \text{ and } t'_e \subseteq [\text{the day before}]_{\mathcal{A}_{t_s, t_r, t_e}} \right)$$

$$\text{and } t_e = B < t_s.$$

But in this case the sequence (17) is evaluated as true of the following sort of situation:



This is clearly incorrect.

We would seem forced to the alternative scope assignment, i.e. that temporal adverbials have wider scope. But this runs afoul of the correct analysis of (20):

(20) Tom arrived. Sue had arrived the day before.

Let us again evaluate this (well-formed) sequence at A, B where $A \not\prec B$, so that Tom arrives at A . Then:

(21) $\mathcal{A}_{t_s} \stackrel{t_e}{\models}_t$ **the day before**(PLUP(**S.arr.**)) iff

$\exists t'_e \subseteq [\mathbf{the\ day\ before}]_{\mathcal{A}_{t_s, t_r}}$ and $\mathcal{A}_{t_s} \stackrel{t'_e}{\models}_t$ PLUP(**S.arr.**) iff

$\exists t'_e \subseteq [\mathbf{the\ day\ before}]_{\mathcal{A}_{t_s, t_r}}$ and $\exists t''_e < B < t_s$ and $\mathcal{A}_{t_s} \stackrel{t''_e}{\models}_t$ **S.arr.**

The difficulty here is plain to see. These truth conditions allow that Sue needn't have arrived the day before, but might have arrived at any time prior to B . Neither the reference time nor the event time need be within the time denoted by *the day before*. (This argument hinges crucially on the assumption that the Pluperfect is to be interpreted indefinitely, but this is defensible in the light of sequences such as (22):

(22) Tom was there. Sue hadn't arrived.)

The non-substitutional account of the semantics of temporal adverbials is straightforward. For f such an adverbial, let f denote the time named, so that *on June 17, 1953* denotes June 17, 1953 etc. Then:

(23) $\mathcal{A}_{t_s} \stackrel{t_e}{\models}_t f(p)$ iff $t_e \subseteq [f]_{\mathcal{A}_{t_s, t_r, t_e}}$ and $\mathcal{A}_{t_s} \stackrel{t_e}{\models}_t p$.

Scope vis-à-vis tense is irrelevant, at least in the analysis of the examples so far. Both (17) and (20) can now be analyzed correctly.¹

The point illustrated by temporal adverbials may be generalized somewhat: The use of substitution operators destroys the effect of requiring, as in RP, a temporal sequence of reference times. Wherever this sequence must be preserved, substitution operators are prohibited.

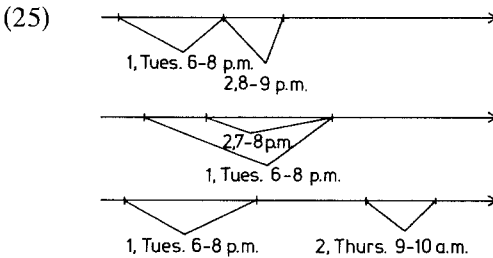
Note that this doesn't ban the use of substitution operators entirely. The temporal sequence of reference times needn't always be preserved, e.g. where the word *ever* is used, as in (24):

- (24) Tom arrived at two. Sue wasn't ever on time, and this was no exception.

The semantics of *ever* might well employ a substitution operator.

3.3. Implicatures vis-à-vis Telicity

Let us return to example (7). This presents some problems not yet discussed. Let this be evaluated at the sequence of reference times A, B where $A < B$, so that RP is again satisfied. By steps identical ones taken earlier, we may infer that (Al go to New York) holds at A and that (the others be there) holds at B . The discourse thus might be true of any of the following situations:



Given the present formulation of rules, (7) is true in all of the above situations and it seems uncontroversial that it ought to be regarded as true in the first two. I believe that it ought to be regarded as true in the third sort of situation as well, and this becomes obvious in the right sort of discourse. I offer the following as an example:

- (26) The friends agreed to meet again in New York, six weeks from Thursday, at 9:00 a.m. in the lobby of the hotel. Al left them with the firm intention of keeping the appointment and even booked an evening flight for the Tuesday before their meeting. His enthusiasm waned during the intervening weeks, however, and he was quite undecided come Monday of the week of the meeting. He changed his mind several times that day and wasn't even completely sure when Joyce called to assure him that she hadn't had a change of heart. Finally, and partly as a rebuke to his own indecisiveness, *Al boarded his plane and went to New York. The others were all there, too.*

If one can forgive the purpler passages, then the above is an acceptable example of the third sort of situation sketched in (25). I've never found real examples of this sort, however. Very similar examples may be found, such as (27):

- (27) [Harry] rested a hand carelessly on her neck.
 'Harry, I'm slipping.'
 'No, you won't, I've got you safe. This is nothing – wait till we get to Noah's Ark.'
 And five minutes later she was clinging to a hard wooden camel which was tearing her asunder[...] (Cary, p. 252)

Let us recall the argument from the previous section that established that temporal adverbials such as *five minutes later* are not substitution operators, but rather modifiers of the times at which sentences are evaluated. Given this, it is clear that we may evaluate the last two sentences of the excerpt (27) at times *A* and *B* so that Harry says 'No, you won't' etc. at *A* and she is clinging to the wooden horse at *B* and that *B follows five minutes after A*. This genuine example thus demonstrates as well as the concocted one that even the reference time of an atelic proposition may properly follow the reference time of the immediately preceding proposition, that is, given the preferred analysis of adverbials .

But the examples demonstrate only that the inference in (7) that the others were there at Al's arrival in New York is one of conversational implicature. The inference is detachable in the right sort of context, but it is normally valid.

Crucial to the inference is, of course, the fact that we are dealing with a state – or, more generally, a state or activity – in the second sentence in discourse (7). For a sequence of accomplishments or achievements, the situation sketched in the third line in (25) would be unobjectionable.

This suggests the following refinement of (RP):

- (28) *RP*: . . . It is furthermore conversationally implicated that, for all S_i , if S_i is atelic (a state or an activity), then there is no t such that

$$t_r(S_{i-1}) < t < t_r(S_i).$$

This strengthening of RP rules out situations of the questionable sort.² It will be noted that the formulation above requires that the *Aktionsarten*, viz. state and activity, be defined for sentences, and not e.g. only for verbs or verb phrases. Dowty (1979) and Mourelatos (1981) (and others) have argued that this is the most – and perhaps the only – coherent view of these distinctions in any case. If we follow Taylor (1977) and Dowty (1979) in viewing the *Aktionsart* distinctions as properly characterized semantically, then the present account of time in narration is thoroughly semantic.

4. THE DISTINCTIVENESS OF THE PROPOSED TREATMENT

The main attraction of the proposed treatment will be that it posits a minimum additional level of structure, i.e. (RP), and this merely imposes an ordering of the times at which sentences are evaluated semantically. There is no level of "text" or "tense structure" or even "semantic representation" to which appeal must be made.

This attractive aspect of the proposal is related to another, viz. that the treatment proposes an absolute limit on the temporal parameters to which interpretation may be sensitive. In the sketch here there are exactly three such parameters, viz. speech time, reference time and event time. It may eventually be necessary to expand this somewhat.³ But compare this fixed and reasonably small limit to the situation in which rules may be made sensitive to elements within semantic representations. There is clearly no limit on the complexity of semantic representations, and therefore no natural limit on the number of distinct parameters to which rules of interpretation might be sensitive. One might propose an artificial limit on the complexity of rules manipulating semantic representations; but a limit is required if time in narration is to be handled using Reichenbach's Pragmatics.

The proposed treatment also commits us to some non-obvious analyses. Let the analysis of adverbials in 3.2 serve as an example here.

5. THE TEMPORAL NATURE OF NARRATIVE

The principle formulated here as Reichenbach's Pragmatics (RP) is fundamentally a formal view of narrative structure. It requires no appeal to the idea of listeners (or readers) "making sense of a description."

I take it that such a formal view of things always results in tighter hypotheses and more exact predictions than accounts of what I would like to call "an informal pragmatic sort." The disadvantage of the formal view is that it is much less flexible in the face of counterexample.

It isn't difficult to find counterexamples even in very careful narration. Occasionally events are obviously recounted out of order, as in (29):

- (29) 'The house is empty. There is no use for me to live now.'
Karlinahami, who had been growing more and more impatient, here broke in:
'Are you mad, brother? The child is a woman now, and it is time to give her to a man. Is she to die childless because she has a father? There is no need for her even to leave the

compound. There is room for Babun to make himself a house here.'

Babun eagerly seized upon this suggestion. He assured Silindu that he had no intention of taking Punchi Menika out of the compound. Punchi Menika, still crouching at his feet, told her father that she would never leave him.

It was eventually arranged that for the present Babun should live in the house while he put up another house for himself and Punchi Menika. Silindu took no part in the discussion. After Karlinahami intervened, *he became silent* [...] (Woolf, pp. 37–8, italics added – JN)

The passage clearly means that Silindu took no part in the discussion which *followed* Karlinahami's interruption and his becoming silent. The last sentence of the excerpt thus describes a time completely prior to the times described by the previous five sentences, in violation of RP.

In another sort of counterexample, an author first establishes a reference point and then proceeds to ignore it in order to narrate extensively about prior events:

(30) [...] Lord Edward Tantamount was busy in his laboratory.

The younger Tantamounts were generally military. But the heir being a cripple, Lord Edward's father had destined him for the political career, which the eldest sons had always traditionally begun in Commons and continued majestically in the Lords. Hardly had Lord Edward come of age, when he was given a constituency to nurse. *He nursed it dutifully* [...] [ca. 800 wd. later:]

Lord Edward was filled with an extraordinary exultation; he had never felt so happy in his life before.

That evening he told his father that he was not going to stand for Parliament. Still agitated by the morning's revelations of Parnellism, the old man was furious. Lord Edward was unmoved; his mind was made up. The next day he advertised for a tutor. In the spring of the following year he was in Berlin working under Du Bois Reymond.

Forty years had passed since then. The study of osmosis, which had indirectly given him a wife, had also given him a reputation. *His work on assimilation and growth was celebrated.* (Huxley, pp. 33–35, italics added – JN)

It is noteworthy that this is not simply a case where one narrative ends

and another begins; this is demonstrated by the fact that the original reference point is reinstated by the end of the excerpt above.⁴

In view of these counterexamples, some modification of the account proposed thus far is required. We might try to segregate the excerpts above (from Woolf and Huxley) from the class of narratives which accord with RP. We might then seek further distinguishing characteristics of these narratives. But, as was pointed out in Section 2 above, we are already dealing with an idealized sort of text whenever we invoke RP. A further idealization on the order of the one presently under discussion might leave the empirical air altogether too rarefied.

A more promising approach would be to regard RP as a scheme of conversational implicature – i.e. a principle which holds in the absence of contrary indication. This approach requires an ancillary account of the way in which a principle such as RP might be calculable from conventional meaning and general principles of conversation, but it is plausible that some such account might be forthcoming.⁵

NOTES

¹ Nerbonne, 1984 provides an account of temporal adverbs in which they are allowed to modify either event time or reference time. The refinement isn't required in the analysis of these sentences, however, so it has been omitted.

² A further remark is in order here. Since conversational implicatures ought to be calculable from conventional meaning together with general principles of conversation, a more satisfactory account of this aspect of RP ought to show how it is calculable. See Nerbonne (1984, pp. 21–24) for an account of this calculation based on Taylor's (1977) and Dowty's (1979) analysis of the inherent temporal structure of verbs.

³ To treat the problem of subnarratives in the Pluperfect, noted by Hinrichs (1981, pp. 69–70). This may be analyzable using event time, however.

⁴ A third, and different sort of counterexample was suggested to me by a conference participant. I recall that her example was approximately of the following sort:

B said that he talked with *T*. *T* hadn't heard the news.

The problem here, of course, is that the Pluperfect in the second sentence suggests that *T* hadn't heard prior to *his talk* with *B* and not merely prior to *B's report of the talk*, which we would take to be t_e . Thus RP provides too little specification of t_e .

Two comments are in order. First, it needn't be taken as surprising that some further principles of temporal organization might be found which would have the effect of specifying temporal parameters more exactly than RP. Second, I am not convinced that we ought to attribute our understanding of the event time of the second sentence to the fact that its reference time is the reference time of *B's* conversation with *T*, rather than to an extra-grammatical inference that *T* is likely to have heard the news no later than his talk with *B*, since "talks" after all, involve the exchange of information. In favor of this latter explanation is the very tenuous status of the construal of the temporal import of the Pluperfect in the second sentence. In this connection, consider the following:

- (i) *B* said that he talked with *T*, but that he didn't have the nerve to tell him. *T* probably hadn't heard the news, then.

In this case we can easily understand the Pluperfect to mean only that *T* hadn't heard the news as of *B*'s report of their conversation.

⁵ The skeleton of the calculation is easy to provide: events and circumstances are recounted in the order in which they occur or obtain. This is done simply to ease comprehension. It is more difficult to explain the differential treatment of the atelic states and activities on the one hand, versus the telic accomplishments and achievements, on the other, but see note (2) above.

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