

## CLOSER TO A THEORY OF TENSE FOR CONTRASTIVE ANALYSIS

JAMES N. PANKHURST

*University of Utrecht*

### 1.0. Introduction

Although most of this paper is devoted to criticism of Norbert Hornstein's (1977) recent paper, "Towards a Theory of Tense", my aim is to support and strengthen that theory, since I believe it can provide a valuable tool for the analysis of time and tense relations on a cross-linguistic basis within an autonomous syntax framework.\* Hornstein provides a language-independent framework (the SRE framework), which means that tense phenomena in one language do not have to be defined in terms of another or in terms of *ad hoc* constructs; furthermore, its predictive power enables it to characterise the exceptional features of some systems of time relations, independently of considerations from other languages (cf. discussion of finite *have* in 2.2. and of *since* in 3.0. These considerations make it ideal as an independent tertium comparationis for contrastive time-tense descriptions.

"Towards a Theory of Tense" is an attempt to delineate a constrained theory of tense from which the facts concerning the interaction of tense forms and adverbials will follow. In addition to accounting for possible combinations within simplex clauses, H. is able to predict the grammaticality of possible tense sequences in clauses linked by temporal connectives (i.e. the relations holding between the tense of adverbial clauses of time and their superordinate clause), to state the possible sequential relationship of events in main clause and *when*-clause, and to state whether a *before*-clause has a time-sequential, a

---

\* Carlota Smith's "The syntax and interpretation of temporal expressions in English" appeared in *Linguistics and Philosophy* after this paper was completed. She works within a similar framework but makes no reference to Hornstein. While there are inevitably differences, Smith's analysis supports the proposals made here.

counterfactual or an ambiguous reading. His paper falls into two distinct parts: the first treating of relations holding between tenses and adverbials in simplex clauses, and the second concerning clauses linked by temporal connectives.

H. argues that his theory is of relevance to language acquisition in that it provides a framework for the development of "semantic competence of tense and time". Section Two of my paper will be devoted to showing how extensive revision of the proposals made in the first part of H.'s paper will lead to a very considerable strengthening of this claim; Section Two will also show that the revisions I propose are necessary to deal with a large number of sentences without having to resort to H.'s *ad hoc* interpretative rules and without having to rely on his untenable dichotomy between the epistemic modal *will* (together with all other epistemic modals) and his unmotivated future *will*. Section Three surveys briefly the claims made by H. in the second part of his paper concerning relations between clauses linked by a temporal connective, showing that my revisions do not detract in any way from the substantial claims made for the theory as a whole. Section Three will also indicate the place that such a theory of tense could have within the field of contrastive analysis. Finally, an appendix summarises my proposals for revision. The major burden of this paper is undoubtedly Section Two, where I propose a revision of H.'s representation of basic and derived tense structures. H.'s research on temporal connectives, although obviously preliminary, holds promise of interesting results, and thus it is essential that it be based on a correct theory. In its present state his theory is inadequate, occasionally on observational grounds, always on descriptive grounds wherever modals or modal pasts are involved, and, in view of its unnecessary complexity, on psycholinguistic or explanatory grounds.

In order for readers to appreciate the significance of the revisions proposed, the remainder of Section One will be devoted to a short summary of the section Tense and Adverb from H.'s paper. Those familiar with this should pass directly to Section Two.

### 1.1. Hornstein's theory of tense:

H. represents tense structures "in terms of three theoretical entities. S, E, and R, which are the moment of speech, the moment of the event, and a reference point, respectively... [R] is simply a theoretical entity that will help us explicate concepts like 'more past than normal past' and 'past in the future,' i.e. the past perfect and future perfect tenses. The idea of representing tenses in this way is Reichenbach's" (1977: 522). It should be evident from these remarks that H. uses the term 'tense' in the language teacher's sense rather than the more restricted linguistic sense. He distinguishes progressive tense in his notation by a superscript arrow over the E; however, the system can be understood without paying attention to the progressive, so it will be ignored in this outline.

He also distinguishes a future tense, whose marker is *will*. Where *will* is clearly not referring to a future event, it is re-analysed as modal *will*.

The three theoretical entities are sequentially placed along a horizontal axis, representing the progress from past to future (left to right). When entities are separated by a line, the one on the left is prior in time; when entities are separated by a comma, they are seen as contemporaneous, however, their order relative to each other is still of theoretical significance. Each tense has a basic tense structure associated with it as follows:

Simple past:	E, R _____ S
Past perfect:	E _____ R _____ S
Simple present:	S, R, E
Present perfect:	E _____ S, R
Simple future:	S _____ R, E
Future perfect:	S _____ E _____ R

These configurations, known as basic tense structures, are assigned to clauses on the basis of the tense form of the verbs; in order for a clause to receive a time interpretation, time adverbials in the clause must be associated either with E or with R. A time interpretation is possible if the time adverbials and the S are in a sequential relation of anteriority and posteriority on the time axis, with a line separating earlier and later points. In his discussion, H. uses the adverbials *yesterday*, *now*, and *tomorrow*; he is concerned with what we will call punctual time adverbials rather than boundary time adverbials, and is not concerned with adverbials referring to times embedded within a larger adverbial reference point (e.g. not with *at one o'clock today* as two adverbials). If it is not possible to read off a time interpretation once adverbials have been mapped onto E and R, certain movements of SRE are possible to produce a derived tense structure which will be consonant with a time interpretation if (i) such movements do not destroy the original linear order of SRE and (ii) such movements do not result in the association or coming together of any of the theoretical entities (SRE) which were previously separated by a line. In practice, these constraints mean that where two entities are already associated, the one at the extremity may move away and become separated by a line. As a simple illustration of how this works, consider the basic structure of (1), with the adverbial mapped onto E (Hornstein offers no criteria as to whether it should be mapped onto E or R in such a case):

1: John is coming tomorrow.  
       S, R, E  
               tomorrow

Such a basic structure cannot receive a time interpretation since *tomorrow* denotes a point in time ahead of the present, but is here represented as cotem-



poraneous with S, the moment of speech. The constraints allow E to move out of its present association, resulting in the derived structure (2), which shows that the combination of tense and time adverbial is consonant with a time interpretation:

2: S, R\_\_\_\_\_E  
                  tomorrow

In contrast, (3) is rejected as a sentence having a time interpretation, since there is no way, given the constraints, in which E or R can move to the right of S:

3: \*John came tomorrow  
      E, R\_\_\_\_\_S  
      tomorrow

H. finds it necessary to posit a special interpretative rule for the fact that (4) is acceptable, a matter which will be taken up in Section Two:

4: John was coming tomorrow.

Ambiguities in the past perfect are accounted for by the fact that the time adverbial may be attached to E or to R. When attached to R, the interpretation is that the eating took place before three, but when attached to E, the interpretation is that it took place at three in (5):

5: The secretary had eaten at three.  
      E\_\_\_\_\_R\_\_\_\_\_S  
                  at three  
      E\_\_\_\_\_R\_\_\_\_\_S  
      at three

No such ambiguity is possible with (6), because no matter whether we attach the adverbial to E or to R, there is no reason for a movement rule to apply and the event must have taken place at three:

6: The secretary ate at three.  
      E, R\_\_\_\_\_S  
      at three

The system handles clauses with two adverbials, as (7), where one of the adverbials may be fronted. The adverbial which is or could be fronted is always mapped onto R:

7: Yesterday, John had left a week ago.  
      E\_\_\_\_\_R\_\_\_\_\_S  
      a week ago      yesterday

Note that the time axis is maintained here, whereas it could never be maintained in the ungrammatical (8):

8: \*A week ago John had left yesterday.

Sentences with *will* as a future marker and all sentences without a modal receive a pure time interpretation or are rejected (although the past progressive also has an alternative interpretation); however, the system does not work with modal verbs in general, and H. presents a further set of basic structures to deal with these; such sentences do not receive a pure time interpretation in his system, and will be incorporated into the total system in my proposed revisions.

The system, as presented by H., provides a method for specifying whether time adverbials fit their accompanying tenses; the fact that it is able to account for ambiguities in the past perfect, to cope with instances of two time adverbials in one clause, and indeed to predict whether any combination of tenses and adverbials is acceptable makes it an impressive step towards an explicit account of time-tense relations. As H. say, the fact that it can account for tense relations between clauses linked by temporal connectives and can disambiguate factual and counterfactual instances of *before* constitutes further plus points. This brief account of how the system works has avoided, as far as possible, all critical remarks. It does not replace H.'s own account, but provides a framework for the following Section in which substantial revisions are proposed.

## 2.0. Revisions to the theory:

### 2.1. Acquisitional Considerations:

Hornstein's system provides a semantic representation of time relations within a framework related to the Extended Standard Theory in that the semantic reading is clearly derived from the surface structure representation, e.g. past perfect forms are all given identical configurations of S, R and E irrespective of whether they are derived from a combination of two pasts in remote structure or a past and a perfect; furthermore the surface structure position of adverbials is shown to play a crucial role in the determination of the temporal reading, resolving possible ambiguities. My critique of H.'s proposals will assume without further discussion an identical framework. Of more immediate concern is the fact that H. claims that his theory of tense interpretation is of explanatory or psycholinguistic relevance (1977: 522):

The small number of initial configurations, in conjunction with these conditions on derived tense structures, provides the child with a rather tight system with which to work in deciphering the tense phenomena and their corresponding temporal interpretations. It is precisely this "tightness" that offers to provide an explanation of how the semantic competence of tense and time arises.



This is a significant claim and will provide a starting point for our critique of H.'s theory. His account may be seen as explanatory in that it makes use of a linear time axis, the left side denoting anteriority to the speech event, the right side posteriority; sentences with a strict time interpretation will preserve, within strict and motivated constraints, the original configuration of points E, R and S, as determined by the basic tense structure. The preservation of the form of the linear axis, or, alternatively, its destruction provide a motivated reason for accepting or rejecting time interpretations with adverbials. In order for the system to be convincingly relevant to language learning, it would seem desirable to have the most basic set of primitives possible, and for their basic ordering to be related to the verbal form of the tense structures in the most natural way possible. In taking over the three basic elements from Reichenbach, H. has taken the minimum number of elements possible to account for the fact that two punctual adverbials can in fact occur within one simple sentence, cf. (7), repeated here:

7: Yesterday, John had left a week ago.

However, H.'s proposals for basic structures are not convincing in terms of learnability considerations since his system requires learners to select and learn four out of the six possible ordering relations of the abstract elements SRE; our proposed revision only requires them to select two ordering relations, and it is arguable that the learner in our system would first of all select these two ordering relations while aware of only two elements, E and S, and thus there would be only two possible positions, so the learner would only actually have to deduce that there were two elements in a sequential relation to each other. R would be inferred at a later stage of learning as an element that is always on the left of S. Thus it will be claimed that my proposals (henceforth P.'s proposals) relate to a system that could be acquired by a language learner, while it is completely unclear how a learner would come to associate a large number of relatively complex patterns, as proposed by H., with the tense forms. The table below shows H.'s four ordering relations and P.'s two. In addition to the ordering relation there is also the spatial relation. H.'s groups 1 and 2 both have alternative spatial patterns, as does P.'s group 2. We do not consider progressives because their patterns are identical to their non-progressive equivalents; P.'s system does not include the so-called future tense, since within the P system all clauses with modals receive identical tense structure to their equivalents without modals. It should also be noted that H.'s hypothetical learner will have to learn still more patterns for sentences with modal verbs.<sup>1</sup>

<sup>1</sup> *will have arrived* in *John will have arrived home yesterday* receives the structure: (m) E, R\_\_\_S, which is unrelated to other instances of *will* and to other instances of *have*, and thus cannot be deduced on the basis of previous learning.

H.'s four ordering relations		P.'s two ordering relations	
Simple present:	S, R, E	Simple present:	R, S, E
Simple future:	S___R, E		
Simple past:	E, R___S	Simple past:	E, R___S
Past perfect:	E___R___S	Past perfect:	E___R___S
		Present perfect:	E___R, S
Present perfect:	E___S, R		
Future Perfect:	S___E___R		

For the time being, the reader must accept the fact that P.'s system is capable of accounting for all the data that H.'s accounts for. It will subsequently be shown that it accounts for more, and does so in a more satisfactory manner. For the present we will assume that they are both equally satisfactory on a descriptive level and consider the desirability of these two sets of basic tense structures from the point of view of the role that they might play in the acquisition of tense competence.

Some idea of the learnability of a system may be perceived from the number of basic steps required to learn it. We shall look upon the acquisition of basic tense structures as a two stage process (logically rather than temporally), where the first stage involves ordering and the second stage association or separation. Here is how the two systems might work:

Pankhurst Stage One: {ed<sub>1</sub>} morpheme or aux *have*: E R S  
 (Ordering) otherwise: R S E  
 Stage Two: {ed<sub>1</sub>} morpheme: separate: R\_\_\_S  
 (Spacing) aux *have*: separate: E\_\_\_R  
 These four steps are sufficient to generate all basic structures.

Hornstein Stage One: *will*+aux *have*  
 (Ordering) {ed<sub>1</sub>} morpheme or other S E R  
 groups with aux *have* E S  
 otherwise: S E  
 {ed<sub>1</sub>} morpheme: R S  
 otherwise: S R  
 Hornstein Stage Two: {ed<sub>1</sub>} morpheme: R\_\_\_S  
 (Spacing) aux *have*: E\_\_\_R  
*will*: S—{E  
 R}

H. can accomplish stage one in five steps rather than two, however even this degree of simplicity is achieved by treating the so-called future perfect idio-



syncretically, in a way that it obviously could not be treated by a learner. Stage two does not differ significantly in the two models; the additional step can be seen as a direct result of the treatment of *will* in terms of basic tense structure rather than as we do.<sup>2</sup> However, the amount the learner has to learn in the two systems varies even more than is suggested by the counting of steps. It can be argued that the learner would learn *will have* at a late stage, but in H.'s system he would straight away have to acquire it before the other steps of stage one could be accomplished, otherwise countless false generalisations would ensue. In my proposed system, all the learner has to do for stage one initially is to hypothesise that when there is a marker of pastness ( $\{ed_1\}$  or *have*), E precedes S, and in other cases it follows S. Then, as he differentiates the various ways of signalling pastness, he will hypothesise that there is a third theoretical element, R, which always immediately precedes S. Contrast this with the learning task in H.'s system: R follows S for simple present, simple future and present perfect, but follows E for the simple past, the past perfect and the future perfect. We cannot escape from the conclusion that if both systems were of equal value on the descriptive level, P.'s is undoubtedly superior in terms of its possible significance for acquisition.

## 2.2. Non-modal sentences:

Having considered the psycholinguistic viability of the two proposals for basic tense structures, we now turn to a consideration of the mapping of adverbials and the relative merits of H.'s systems. H. simply says (1977: 524): "Adverbs can modify R or E". However, when there are two adverbials, he has a procedure, described above in Section One, which amounts to attaching the most internal of the two adverbials to E (which I have claimed to be more

<sup>2</sup> It is noteworthy that Hornstein treats the future perfect as normally future, i.e. in unmarked cases he sees it as having future reference. Following our recognition of the formal tense identity of *will have* with *have*, we see the unmarked case as having past reference. Clearly, the construction refers to past, present and future with equal ease. Hornstein's position follows from his very questionable recognition of a future tense, ours follows from recognising all epistemic modals as verbs with possible future reference. Hornstein does not provide a single argument for the recognition of a future tense and is forced to assign totally different structures to the following two sentences:

i: John will be there now.

ii: John will be there in half an hour.

I would suggest that the superiority of my own proposals stems largely from the fact that I do not recognise a future tense. If we get a significantly better theory without positing such a tense, then it seems that there can be no such tense. Thus an explicit theory of tense may well lead to a solution of the apparently still unsettled question as to whether we can properly talk about a future tense. We need no longer debate whether or not tense is a morphological phenomenon: a tense is simply a verbal structure which has a distinctive basic SRE structure.

basic than R, at least from an acquisitional viewpoint), and attaching the other (frontable) one to R. I adopt H.'s procedure with two adverbials, seeing the attachment of the prominent adverbial to E as consonant with my assumptions about tense acquisition. However, in cases where there is only one adverbial, I find it impossible to accept H.'s random treatment of R and E. In my system a single adverbial always associates with E if the verbs in the clause manifest a simple tense structure,<sup>3</sup> a consequence of the learner's initial perception of E prior to R. Naturally, if there are two adverbials with a simple tense form (as can happen), both E and R will have adverbials mapped onto them. Only in the case of complex tenses is there the possibility of a single adverbial associating with R. In the case of the present perfect, R is sought out as the only position that would result in a time interpretation for adverbials such as *now*. The choice of E or R is determined by the particular reading selected, since there is the possibility of two readings with the past perfect, cf. (5).<sup>4</sup> Thus, I consider my own account of adverbial mapping to be superior in that it is never random, whereas it is random in half of H.'s basic structures, and because my account continues to make use of the hypothesis that E has acquisitional priority over R, a hypothesis which would lead to an explanation of how the learner is able to develop the basic tense structures proposed by P.

After the mapping of adverbials, we compare constraints on movement

<sup>3</sup> By simple tense structure I mean instances of the simple present and the simple past (the latter being distinguished in English by an inflectional suffix in regular verbs), and a complex tense structure would involve instances of the present perfect or past perfect (where two verbs will be required to signal the tense of a clause); my distinction is based on a recognition of the perfect as a secondary tense in view of its function of deictically locating an event prior to the speech act or prior to R, the point of reference. In this respect *have* contrasts with *will*, which need not necessarily distance the E from S or R. The progressive aspect does not make a tense structure complex here because it is not itself a tense, not being responsible for any change in configuration of the theoretical entities ESR; the same goes for modals. Thus (i) is a simple tense, and (ii) a complex tense in this paper:

i: John will be working.

ii: John has arrived.

<sup>4</sup> See M. A. Sharwood Smith's (1976) "More on time reference and the analysis of tense" for a detailed account of factors affecting the selection of one reading rather than the other. Sharwood Smith's approach is based on an analysis of underlying predicates, thus presenting an entirely different approach to time-tense relations. However, he comes to similar conclusions to those of Hornstein and myself with respect to the fact that the auxiliary *have* is part of the tense system. On the other hand, Hornstein's work and my own revision of it suggest that the following claim of Sharwood Smith can be strongly contended with respect to the tense system: "For the purposes of contrastive analysis, translation theory and pedagogical grammar, analyses that are not founded on a belief in autonomous syntax are needed". Hornstein's theory clearly assumes an autonomous syntax theory, but provides a basis for comparison between languages.



and the relative psycholinguistic validity of the two sets of proposals. H.'s proposals with respect to constraints on derived structure are discussed in Section One, and repeated here verbatim from his own paper (1977: 523):

None of SRE are associated in derived TS [tense structure] that were not associated in basic TS.

The linear order of the SRE in basic TS is maintained in derived TS.

Thus the only permitted change is that any lateral element may move out of a group, but may not move into another group. My own constraints are even more severe in that they only allow this dissociation from E, and not from R or S. In practice this means that E, R, \_\_\_S may become E \_\_\_R \_\_\_S and R, S, E may become R, S \_\_\_E. There are no other possibilities of derivations from basic structure. The effect of this severe constraint on derivations is to simplify the learning load, at no loss of descriptive accuracy, given the system of basic tense structure I am proposing. By way of illustration of the necessity of movement rules, consider (9), which is treated identically in both systems:

9: Yesterday, he left a week ago.

E, R \_\_\_ S

*Yesterday* is associated with R, *a week ago* with E, according to adverbial mapping rules, which guarantee a left-right temporal sequence for grammatical sentences. However, the sentence cannot yet receive a time interpretation, since E and R are associated, but refer to different points on the time axis. E, however, is permitted to move leftwards, and it is possible to give a time interpretation to (10), since different points of time are separated in correct sequence:

10: E \_\_\_ R \_\_\_ S  
a week ago yesterday

A further illustration was given for *John is coming tomorrow* in Section One. Note that my system also requires the operation of a movement rule for *John will come tomorrow*, while H.'s does not.

Thus far I have summarised the differences between H.'s system and my own for sentences with what H. calls a strictly temporal interpretation. Both systems are descriptively adequate for the set of sentences that falls within this category, a category set up by H., but which I claim to be arbitrary in view of its inclusion of only some instances of *will*; thus far I claim that my system is more adequate because it presents a more viable approach to the acquisition of the tense and time reference system. We will now consider sentences with modal verbs and modal past tense, and it will become evident that my system is more descriptively adequate in that it does not have to employ any ad hoc solutions for individual cases.

### 2.3. Tense in modal sentences:

Hornstein has a number of exceptions to his rules for temporal interpretation. Notably, there is his Past Progressive Interpretation rule: "NP was Ving Z can have the interpretation 'NP was supposed to V Z'"; furthermore, his tense rules only apply to the modal verb *will* with future time adverbials (11a), or without adverbials; with present time adverbials or past time adverbials, (11b) and (11c), H. is forced to say that *will* is no longer a future tense marker, but is instead, an ordinary modal, a distinction now rejected by almost everyone.

11a: John will be shaving soon.

b: John will be shaving right now.

c: John will have been shaving then.

Thus, an alternative reading is provided for sentences with modal verbs: (m) S, R, E for adverbial modifiers of present time and (m) E, R \_\_\_S for adverbial modifiers of past time. Presumably (m)S, R, E will also be assigned to *John may come tomorrow*, since S \_\_\_R, E is reserved for *will*, although it is difficult to see why this sentence should receive a different basic structure from *John will come tomorrow*. Incidentally, the first clause of the preceding sentence provides an excellent example of timeless *will*, to which H.'s rules will counterintuitively assign the structure S \_\_\_R, E. In itself this may seem of little practical consequence, but it demonstrates an inherent weakness in H.'s system. He cannot assign basic tense structures on the basis of the verbal structure alone, but has to take into account the adverbials at the stage of basic structure assignment. The whole point of his theory is to accept or reject adverbial-tense relations according to a system of rules relating the two. The necessity of looking at adverbials for the assignation of basic structures reduces a potentially predictive system to a set of observations about possible combinations.

These facts about modals, together with the special interpretation rule for the past progressive, mean that numerous *ad hoc* interpretations are provided, to keep in the language a set of perfectly normal sentences, and consequently to reduce the generality of the theory. Unfortunately, even these points do not exhaust the number of problems: H. provides no explanation for the fact that the conditional clause of (12) and object clause of (13) are well formed:

12: If we left tomorrow, we would get there on Friday.

13: I wish I knew the answer now.

Instead of a number of unrelated exceptions, as invoked by H., I propose the following general exception to the constraints on movement from basic structure to derived structure, which, together with my basic tense structures, will account for all of H.'s difficulties, and those others I have drawn attention



to in (12) and (13):

- 14: If either E or R is to the left of S and requires to move to the right on account of an attached adverbial, it may do so, even if it crosses another symbol, but the clause minus the first verbal element will be assigned the *irrealis* reading with respect to the moment of speech.

Here are some examples of how rule (14) applies: contrast (15) and (16):

- 15: If John comes tomorrow, ...

Basic structure: R, S, E  
(tomorrow)

Derived structure: R, S\_\_\_\_\_E  
tomorrow

- 16: If John came tomorrow, ...

Basic structure: E, R\_\_\_\_\_S  
(tomorrow)

Derived structure: R\_\_\_\_\_S\_\_\_\_\_E  
tomorrow

In (16), following rule (14), E has moved to the right, destroying the *realis* reading; it has had to move to the extreme right of S in order for a time interpretation to be possible. The tense element is normally considered the first verbal element of a finite clause, thus in (16) *John comes tomorrow* is specified as *irrealis*, or simply "not on", in contrast to (15), where *John comes tomorrow* remains a real possibility. Consider (17), where the verbal structure manifests a complex tense (cf. note 3), and thus the adverbial may be associated with E or R:

- 17: John will have arrived tomorrow.

Basic structure: E\_\_\_\_\_R,S  
(tomorrow)

Derived structure: R,S\_\_\_\_\_E\_\_\_\_\_

We assume here that it is associated with E; rule (14) then produces the transformation to derived structure indicated and the *irrealis* meaning is assigned to *John has come tomorrow*, which clearly contrasts with the *realis* meaning of *John will come tomorrow*, where the event is a real possibility at the time of speaking. *John has come tomorrow* is not a real possibility at the time or moment of speech, since its question transform can never receive an affirmative answer. A final example of the operation of rule (14) will involve a sentence with two adverbials, (18):

- 18: Tomorrow, John will be leaving in a week.

The fronted adverbial is attached to R and *in a week* to E. By rule (14) R travels through S, pushing E further to the right, resulting in the derived

structure illustrated in (19):

- 19: Basic structure: R, S, E

Derived structure: S\_\_\_\_\_R\_\_\_\_\_E  
tomorrow in a week

The *irrealis* interpretation is attached to *John is leaving in a week*, which indeed is an unreal plan at the moment of speaking. The prediction in (18) is that John's leaving will take place a week from tomorrow, not from the moment of speech. Contrast this state of affairs with (20), where it is predicted that John's leaving will take place in a week, and where rule (14) has had no reason to operate and assign an *irrealis* reading.

- 20: John will be leaving in a week.

Basic structure: R, S, E— — —

Derived structure: R, S\_\_\_\_\_E— — —

It might seem that after constraining derived structure even more severely than H., I am guilty here of abusing all constraints in order to account for some sentences with modal verbs and other sentences with modal past tenses. A number of points have to be made in support of my proposal: firstly, the fact that when a time relation constraint is violated by the crossing of any two elements of SRE, it seems an inherently natural state of affairs that it should cause us to move out of the real world; secondly, the proposal has the effect of dividing into precisely two sets those clauses with modal verbs where the speaker considers the proposition expressed by the rest of the clause as possible at the moment of speaking and those where he considers the proposition expressed to be impossible at the moment of speaking (the question form of the proposition can only receive a negative reply in impossible cases, as demonstrated for (17));<sup>5</sup> thirdly, although giving a temporal interpretation, it accounts convincingly for the ungrammaticality of sentences like (21):

- 21: \*John came tomorrow.

It interprets them in derived structure as

R\_\_\_\_\_S\_\_\_\_\_E<sub>tomorrow</sub>

as a result of rule (14)) and labels them as *irrealis* or inherently unlikely. The point is that the rules of language use tell us that main clauses are normally interpreted as statements of fact, and something which is inherently unlikely simply cannot be stated positively in a main clause. Thus an *irrealis* non-progressive main clause is always rejected as ungrammatical. Progressive *irrealis* main clauses are possible because the progressive signifies incompleteness, whereas its absence signifies completion. The incomplete nature of

<sup>5</sup> We do not consider here the additional complexity introduced by negation, since it involves no problems, but simply makes the computations more involved.



*irrealia* is reasonable; the completion is absurd. Fourthly, besides avoiding the *ad hoc* nature of H.'s multifarious ways of dealing with modal pasts and combinations of modal verbs (and perfectives) with adverbials of present and past reference, requiring special rules of interpretation and a whole supplementary set of basic tense structures, our basic rules and constraints, with this one special exception to the constraints, account uniformly for all cases which H. cannot account for.

22: \*John will come yesterday.

Hornstein is unable to systematically exclude (22), because if he sets up an arbitrary structure for *John will have come yesterday* of the form (m)E, R—S, there seems to be no reason why he should not also use it for (22). In fact, this illustrates the crux of his problem: once a modal is used with any adverbial other than a future adverbial, he has no system whatsoever — only arbitrary solutions, which he constantly extends to achieve observational adequacy, but which clearly fall short of descriptive adequacy. In contrast, even our exception to the general constraint, rule (14), can be seen as having explanatory value with respect to learning: by travelling through another abstract entity, the E or R can no longer claim to have currency in the world of the speech act, and thus becomes *irrealis*.

23: Tomorrow, he will arrive in a week.

Our system accepts double punctual adverbials as in (23), just as it accepts all the grammatical examples of double punctual adverbials in Hornstein (532). Our system also accepts (24a) - (26a) and rejects (27a). Hornstein's system would first of all need a further basic structure, namely (m) E—R—S, which would allow it to accept (25), but it would still incorrectly reject (24). But (24) is clearly interpretable and could mean something like: 'Judging by the way he was acting a week ago, John would have left at the earliest opportunity, namely yesterday, but he is still here, so things must have changed'.

24a John would have left yesterday a week ago.

b: A week ago, John would have left yesterday.

25a: John would have left a week ago yesterday.

b: Yesterday, John would have left a week ago.<sup>6</sup>

<sup>6</sup> Doubts may exist about whether *yesterday* can be fronted in (25). In fact it can, with appropriate intonation, whereas it never can in (26). The distinction is even clearer in the following examples:

ia (=25): John would have been gone a week yesterday.

b : Yesterday, John would have been gone a week.

iiia (=26): John will have been gone a week yesterday.

b : \*Yesterday, John will have been gone a week.

26a: John will have left a week ago yesterday.

b: \*Yesterday, John will have left a week ago.

27a: \*John will have left yesterday a week ago.

b: \*\*A week ago, John will have left yesterday.

Perhaps (25) is not obvious in its meaning out of context. It could mean: 'My prediction is that John left a week ago from yesterday (8 days ago)'. Consider the analyses of (24) and (25), which are formally past perfects, the past marker being attached to the modal. In P.'s system the basic structure of (24) is (28a):

28a: E \_\_\_\_\_ R \_\_\_\_\_ S  
(yesterday) (a week ago)

*a week ago* is attached to R, being the frontable adverbial. By (14) E moves through R and the clause minus the first element ( $\{ed_1\}$ ) is assigned the unreal interpretation, which is precisely what (24), but not (25) must mean, since *John will have left yesterday* simply is not the case. P.'s derived structure of (24) is thus (28b):

28b: R \_\_\_\_\_ E \_\_\_\_\_ S  
a week ago yesterday

In H.'s system there is no way that the correct ordering can be achieved for (29), which must be his basic structure for (24), thus he is forced to reject this grammatical sentence, in spite of his special modal basic structure.

29: (m) E \_\_\_\_\_ R \_\_\_\_\_ S  
yesterday a week ago

In P.'s system and in H.'s there is no problem with the analysis of (25b), since the basic structure, regardless of whether there is an initial (m), is also the final structure in both cases:

30: E \_\_\_\_\_ R \_\_\_\_\_ S  
a week ago yesterday

However, another analysis is possible for (25a): it is arguable that *a week ago yesterday* is one adverbial rather than two, the four words being replaceable by *then*. In this case, this one adverbial could associate with either E or R, indicating that the leaving either (a) took place a week ago yesterday, or (b) had already taken place then. It seems that (25a) is genuinely ambiguous in this respect. Under the original two adverbial analysis, the (a) reading is forced, which is confirmed by our speaker intuitions about the fronted variant where two adverbials must be involved. None of the other sentences demonstrate this ambiguity. In (24), *yesterday a week ago* cannot be replaced by



then and must only be two adverbials; (26) must be interpreted as having only one adverbial since fronting is not possible, and the basic structure only allows this to be placed in one position. No judgement is possible for (27) since it is clearly an unacceptable sentence.

(26) presents no difficulty in the P. system: *a week ago yesterday* is one adverbial and it will be assigned to E, association with R being impossible since my system does not have the option of moving S rightwards in the derivational rules:

31: E \_\_\_\_\_ R, S  
a week ago yesterday

H., however, can associate *a week ago yesterday* with R, given his special modal *will have* structure: (m) E, R \_\_\_\_\_ S. Although this option is without practical consequence here since E and R are contemporaneous, it leads H. into trouble with his theory because it is an established fact that when *will have* or any other modal + *have*, refers to the past with only one punctual adverbial, that adverbial refers to E, not to R. Thus (32) can only mean 'John, according to the prediction, saw her last Sunday'. The *already* means 'before now' in (32), not before last Sunday:

32: John will have already seen her last Sunday.

33: John will have already seen her on Sunday next.

Thus H. would provide a theoretically unsatisfactory reading by associating the adverbial with R. In contrast, (33) may be a prediction either that John sees her on Sunday or by Sunday. This future reference is catered for in H.'s system and follows automatically in P.'s from the fact that the *irrealis* use of the perfect for a future event may arise from either E or R travelling rightwards.<sup>7</sup> Thus, this is a further plus point for the P analysis, that it correctly and systematically predicts the ambiguity of *will have* with present or future reference, and the unique reading of *will have* for past reference. In contrast, *would have*, with its distinct basic structure, is correctly predicted as being ambiguous in both past and non-past readings.<sup>8</sup>

<sup>7</sup> *John will have seen her on Sunday next* has the following basic structure: E \_\_\_\_\_ R, S. If attachment of the adverbial is to the R, giving a meaning synonymous to *by Sunday next*, then R travels rightwards, as in (i); otherwise, attachment is to E and the prediction is that John sees her on Sunday, as in (ii):

i: E \_\_\_\_\_ S \_\_\_\_\_ R on Sunday next

ii: R, S \_\_\_\_\_ E on Sunday next

<sup>8</sup> Interesting evidence of the inability of past time adverbials to associate with R in *will have* constructions is to be found in considering alternatives to *He will have finished last Sunday*. This, according to Pankhurst's analysis of tense structure and our intuitions about meaning, can only mean that the day he finished was Sunday. How can we express the meaning that it is likely that he had finished before Sunday, using a punctual ad-

In H.'s system (27) is completely ruled out for the same reasons as (24) was wrongly ruled out. In P we would have a basic structure with adverbial attachment as in (34):

34: E \_\_\_\_\_ R, S  
yesterday a week ago

According to rule (14), E could travel to a position between R and S, which would give an *irrealis* reading and have entities in the correct order, but they would also require separating from each other. There is no mechanism in the rules for separating items out, for R cannot move leftwards, nor can S move rightwards. Thus (27) will be rejected if it is interpreted as having two separate adverbials. There would be no problems with only one adverbial, however, *yesterday a week ago* itself has no meaning, in other words, the rules of English have no provision for giving these words a semantic reading as one phrase.

We now consider the special case of finite instances of the auxiliary *have* in English. H., surprisingly, recognises *John has come home yesterday* as grammatical, if not entirely felicitous. The sentence has the structure in the P. system of E \_\_\_\_\_ R, S. Justification for setting the E anterior to S comes from our intuitions about the relation of the event to the moment of speech and the fact that certain indefinite past adverbials such as *in the past*, *before today* could replace *yesterday*. Language teachers are well aware of the unique status of English among European languages in not allowing punctual adverbials with *have*. However, the restriction is not absolute for as an infinitive it accepts punctual adverbials freely, as well as in its past tense forms, cf. (35):

35a: To have gone yesterday would have been silly.

b: I would have come yesterday.

c: He had seen her yesterday.

verbal (thus not *by Sunday*)? One way is with a modal adverbial; another the past perfect with modal verb:

He had probably finished on Sunday.

He would have already finished on Sunday.

Both would have the basic tense structure E \_\_\_\_\_ R \_\_\_\_\_ S, making it possible to join the adverbial to R. Another interesting way would be to change the construction into a stative one:

He will have been finished last Sunday.

Compare also the following pair, noting that the second does not necessarily imply that John didn't do the painting:

John may have painted the house last Sunday.

John may have had the house painted last Sunday.

In the first case the painting took place on Sunday, in the second it may have been on Sunday or before Sunday. The relation of stative clauses to time adverbials in the context of this theory of tense awaits investigation.



In view of the fact that non-finite *have* can occur with past adverbials, superficially the rejection by finite present *have* appears arbitrary, especially in view of the evidence from other languages. In actual fact, the non-occurrence of past time adverbials with non-finite *have*, even if arbitrary, is not as pointless as it might appear. *Have* is normally assumed to be a marker of perfect aspect, i.e. a way of showing that something has been completed at a certain point. To indicate completion at a certain point and to indicate the actual point of performance is pragmatically rather too much of a good thing. Other European languages, where both possibilities exist, rarely make use of both at the same time, but cf. (36) below. However, in view of morphological inadequacies in the system, *have* is sometimes forced into doing duty as a marker of pastness: e.g. the past morpheme can only be attached to finite verbs and thus pastness can only be indicated in non-finite clauses and after some modal verbs by *have*, and in such cases there is no alternative but for a past time adverbial to co-occur with *have*. Thus, by force of necessity, *have* has taken on full past tense adverbial carrying capacity in its non-finite forms. There seems absolutely no reason at all in principle why it could not do so in its finite present form as well, retaining its ability to carry adverbials referring to the present. The rather artificial Dutch example in (36) illustrates that *hebben* is not sometimes past and sometimes perfect, but is both at the same time (the context is that the speaker, an enthusiastic birdwatcher, realises to his delight that he saw three rare bird species yesterday, not two as he had originally thought):

- 36: Nu heb ik dus gisteren drie soorten vogels gezien.  
(Now have I thus yesterday 3 kinds of birds seen)

Thus, all the evidence argues that we should, in a universal theory of tense, treat the finite form of *have* in the present perfect as an exception; consequently, I propose the following superficial solution (37):

- 37: Basic structure of present perfect: E \_\_\_ R, S  
If *have* is finite, circle E:  $\boxed{E}$

The function of the circle will be to prevent any punctual adverbial attaching itself. Attachment to R will thus be forced, and will be ruled ungrammatical by the ordinary rules. Such an arbitrary system would be required by H. as well. Cases like this where arbitrary solutions are inescapable point to genuinely idiosyncratic features within a language system. This comment on *have* completes my proposed revisions to H.'s system; Appendix One summarises my revision proposals for basic and derived tense structure and time interpretation.

### 3.0. Tense relations in complex sentences:

In the second part of his paper, H. provides a rule for guaranteeing the grammaticality of tenses in sentences with adverbials of time linked by temporal connectives (1977: 538):

Line up the S points of P<sub>1</sub> and P [where P<sub>1</sub> is the adverbial clause and i indexes the elements of that clause]<sup>1</sup>; that is, write the TA of P<sub>1</sub> and P, lining up the Ss. Move R<sub>1</sub> to under R, placing E<sub>1</sub> accordingly (preserving linearity and associativity relations of basic TS).

If it is possible to perform this operation, sentences have grammatical tense relations. H. investigates some 50 sentences and the system works perfectly for all sentences with a strict temporal interpretation. My own system also provides identical results for all sentences, bearing in mind that my system does not allow the lining up of Rs (only Es can undergo dissociation), itself a useful simplification. Furthermore, while H. is able to exclude instances of *will* in temporal clauses by means of his theory of tense, I rely on a more general rule which excludes epistemic modals in conditional and temporal clauses. H.'s system would also need to make use of this general rule for epistemic modals other than *will* in clauses of future reference. My system, like Hornstein's, rejects his (74) and (94):

- 74: ? John will have come when we  $\left\{ \begin{array}{l} \text{had arrived} \\ \text{arrived} \end{array} \right.$   
94: ? John will have left after Harry  $\left\{ \begin{array}{l} \text{had come} \\ \text{came} \end{array} \right.$

It is impossible to align the Rs, as can be seen in (38) for H.'s approach and (39) for mine:

- 38: P:            S \_\_\_ E \_\_\_ R  
      P<sub>1</sub>: ER \_\_\_ S  
39: P:            E \_\_\_ R, S  
      P<sub>1</sub>:        E \_\_\_ R \_\_\_ S

While it initially seems as if such sentences should be rejected as ungrammatical, introspection will reveal that these are possible sentences with respect to the past, although they would be ungrammatical if the adverbial were fronted, cf. (40). However, (41), which both systems predict as grammatical, can undergo adverbial fronting without loss of grammaticality:

- 40a: \*When we had arrived, John will have come.  
      b: \*After Harry came, John will have left.  
41a: John will have called his mother before Bill has phoned.  
      b: Before Bill has phoned, John will have called his mother.



Thus it seems to be the case that my system is certainly as satisfactory as H.'s for predicting the grammar of temporal connectives in that it works in the same way as his does for all his examples, under his pure time interpretation. In addition it will work under all possible interpretations to specify the grammaticality of tense relations for sentences where the adverbials are fronted. Nevertheless, there is a small set of grammatical sentences with adverbial clauses in final position which are rejected as ungrammatical and thus are apparently not covered by the theory. They consist of precisely those where *have* functions with past time reference. I have not presented here more detailed applications of the rule discussed above since I believe that at this stage there are unresolved problems in both H.'s and my own system; however, it should be clear that the revisions proposed in Section Two extend rather than reduce the ability to predict the grammaticality of tense relations between clauses.

One area where this system of acceptance or rejection does break down for H. and myself is in the analysis of the temporal connective *since*. We both wrongly predict that (42) is ungrammatical:

42: Bill has played ball since he came back.

H.'s analysis: P: E \_\_\_\_\_ S, R

P<sub>1</sub>: E, R \_\_\_\_\_ S

P.'s analysis: P: E \_\_\_\_\_ R, S

P<sub>1</sub>: E, R \_\_\_\_\_ S

In H.'s system it is impossible to align the Rs because it would involve crossing S; in my system one is not allowed to move the Rs, so the sentence is rejected. H. recognises that *since* must be idiosyncratic in this respect in English. Other languages do not follow the same pattern, but normally take a present or perfect after the equivalent of *since* with a preceding present perfect (Dutch however is like English in this respect). The case of *since* constitutes an important example of how an explicit theory can help us to establish whether we are treating of genuine differences in languages or whether we are treating of a less important idiosyncrasy of one language, which although a contrastive difference, does not rank as a systematic one in a comparison of the two languages as a whole.

The above rule for aligning the SRE points of two propositions also allows us to interpret which event happened first, according to whether the E of P or P<sub>1</sub> is further to the left. There is no difference in the results obtained by H or by myself. However, it should be noted that some of H.'s claims are of dubious accuracy, especially with respect to his (122c):

122c If E<sub>1</sub> and E<sub>2</sub> are coincident, then either the events in P<sub>1</sub> and P<sub>2</sub> are contemporaneous or E<sub>1</sub> precedes E<sub>2</sub> or E<sub>2</sub> precedes E<sub>1</sub>.

Examination of H.'s (110) will show that in fact the events are coincident or E<sub>2</sub> precedes E<sub>1</sub>, but the third possibility does not exist:

110: John built his sailboat when Bill wrote his novel.

Perhaps the most immediately fascinating aspect of H.'s whole paper is the fact that one can predict whether *before* is factual, counterfactual or ambiguous according to the position of one E relative to another:

If E<sub>1</sub> is prior to E<sub>2</sub>, a time sequential reading is forced.

If E<sub>2</sub> is prior to E<sub>1</sub>, a counterfactual reading is forced.

If E<sub>1</sub> and E<sub>2</sub> are in the same position either reading is possible and will usually be resolved by the context.

Thus the theory of tense can provide a uniform semantic interpretation of *before*, rather than necessitating the positing of two *before*s (as Lakoff has proposed). It is possibilities of this kind that show the inherent worth of H.'s theory and have led me to propose the revisions described here. Hornstein's work on temporal connectives is fragmentary, but is sufficient to suggest that the theory would provide a precise framework for cross language characterisations of temporal connectives, in addition to crosslanguage studies on tense and adverbial restrictions. However, the most significant contribution which it can make is to provide a justified theoretical framework for a language-independent definition of tense. The notional approach to tense has been replaced by a morphological approach, and that is giving way to a more adequate semantic approach, but confused notions of a future tense survive, at least in English studies. If there is no basis within the theory of tense for positing a distinct basic tense structure for a supposed tense, then there can be no such tense. The perfect in English has far more respectable claims to being called a tense in English, although these were overshadowed by the morphological approach to tense; this theory of tense indeed shows that the perfect has tense status. Finally, I believe I have shown that it is possible to incorporate modal pasts and *irrealis* verb forms into a general theory of tense, rather than making such verbal structures into an awkward appendage to the so-called proper uses of the tenses.

## APPENDIX

### Summary of rules in the Pankhurst revision of Hornstein

*Stage One:* Assign basic tense structure as follows disregarding modals and progressives, but recognising that the past tense morpheme may appear on a modal verb:

i: Simple present: R, S, E

ii: Simple past: E, R \_\_\_\_\_ S

iii: Present perfect: E \_\_\_\_\_ R, S Circle the E if *have* is finite

iv: past perfect: E \_\_\_\_\_ R \_\_\_\_\_ S



*Stage Two:* Attach punctual adverbials to E and R as follows: For sentences with one adverbial only:

If tense form is simple (no form of aux *have*) attach to E.

If aux *have* is present, attach to E or R, uncross circled.

For sentences with two punctual adverbials:

Attach the fronted adverbial to R. If neither is fronted, attach the second to R.

Attach the other to E.

*Stage Three:* Proceed to derived tense structure: in order for a tense structure to be acceptable, adverbials must have been attached in such a way that they follow the temporal axis on a right left basis, thus future time adverbials must follow S and be separated by a line from it. Past time adverbials must precede S, present time adverbials must only be separated from S by a comma. In the case of two past or future adverbials, the earlier must precede the latter. Certain transformations of basic tense structure are allowed in order to bring S, R and E into the proper temporal relations required by adverbial attachment. We will now refer to the two transformations as the *realis* and *irrealis* rules:

*Realis:* When E is on an extremity and is associated with another entity, R or S by a comma, it may move out of this association.

*Irrealis:* (14) Any element to the left of S may move rightwards for the proper positioning of an attached adverbial. The result of such movement is that the clause minus the first verbal element receives an *irrealis* interpretation at the time of the speech act. In all respects the full temporal interpretation is maintained.

*Stage Four:* Accept sentences as having a time orientation if points of time are separated from each other, earlier ones preceding later ones. Otherwise reject.

#### REFERENCES

- Hornstein, N. 1977. "Towards a theory of tense". *Linguistic Inquiry* 8.3. 521 - 554.
- Reichenbach, H. 1947. *Elements of symbolic logic*. Berkeley, California: University of California Press.
- Smith, C. 1978. "The syntax and interpretation of temporal expressions in English". *Linguistics and Philosophy* 2. 43 - 98.
- Sharwood Smith, M. A. 1976. "More on time reference and the analysis of tense". Paper read at the 12th International Conference on Contrastive Linguistics in Białowieża, December 1976.