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Reichenbach's Theory of Tense and it's Application to English

Tense and the English tenses

The term 'tense' can be defined as a secondary grammatical category which serves to locate an event or a situation in time. It accounts for example for the difference in the sentences *John leaves / John left*. It encompasses two aspects: a morphological aspect, namely a system of tenses encoded in the verb's morphology, and a semantic aspect dealing with the temporal location of the event or events depicted in one or more sentences: the 'meaning' of the various tenses.

Although of course closely related, both aspects can and will be described separately. For the description of the tenses on a morphological basis I shall use a formula which is an adaptation of Chomsky's phrase–structure rule for the English auxiliary (CHOMSKY 1957) as presented in Prof. Wagner's classes. An important question arising here is whether the various tenses in this system really only indicate temporality in the above mentioned sense, thus locating events in time, or if they serve other functions as well. For the description of the semantic aspect I will introduce Reichenbach's theory of tenses. The interaction of these two aspects will be analysed, and if and how the formal–morphological tenses can be mapped onto the semantic tenses.

The tenses are not the only means available of locating events in time. An additional possibility is the use of other linguistic elements, for example temporal adverbs such as *yesterday* or *soon* or prepositional phrases such as *before* or *in two weeks*. But these expressions do not have the same status as tense: they are lexical, not grammatical expressions of temporality, and whereas in prototypical sentences (at least in English or German) tense is a typical feature, the occurence of a temporal adverb or prepositional phrase is not. Still, a theory of tense also needs to account for problems arising from the interplay of grammatical and lexical indications of time and temporality.

The English tenses

The following phrase–structure rules are a possible way of describing the English verbal group (called *Verb* here):

VP   →   Verb + NP
Verb →   Aux + V
V   →   *hit, take, walk, read*
Aux   →   C(M) (have+en) (be+ing)[1]
M   →   *will, can, may, shall, must* (CHOMSKY 1957:111)

In a linearised form, these rules yield the following sequence:

$[[[C \ (M) \ (have+en) \ (be+ing)]_{Aux} \ V]_{Verb} \ NP]_{VP}$

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[1] The 'C' stands for one of the following morphemes: S (in the context NP$_{sing}$, indicating 3rd pers sing pres); ∅ (in the context NP$_{pl}$ indicating a variety of other forms such as 1st or 2nd pers sing or pl) and, most important in the present context, past, indicating past tense. Elements in brackets are optional

The bracketed and therefore optional elements of the auxiliary complex stand for a modal auxiliary (M), the auxiliary *have* in combination with a past particple and the auxiliary *be* in combination with a present participle.

On the basis of this formula, the various English tenses can be accounted for as in the following table. The 'C' of the Aux–rule will be rewritten as 'tense' and can either be past or non-past. The 'M' stands for the modals *will/shall*, which serve to indicate future tense:

Tense ([±past])	Modality (M)	Perfect (have+en)	Progressive (be+ing)	Verb	
[–past]				**sings**	simple present
[–past]			**is**	**singing**	present progressive[2]
[–past]		**has**		**sung**	present perfect
[–past]		**has**	**been**	**singing**	present perfect progressive
[–past]	**will**			**sing**	simple future
[–past]	**will**		**be**	**singing**	future progressive
[–past]	**will**	**have**		**sung**	future perfect
[–past]	**will**	**have**	**been**	**singing**	future perfect progressive
[+past]				**sang**	simple past
[+past]			**was**	**singing**	past progressive
[+past]		**had**		**sung**	past perfect
[+past]		**had**	**been**	**singing**	past perfect progressive

Thus, the English tenses are a result of the serial application or concatenation of one or more of the above mentioned parameters:

- <u>tense</u> — tense is either [+past] or [–past] and the only obligatory element of each finite verbal complex (apart from the verb)
- <u>modality</u> — the use of the modals *will* or *shall* in combination with [–past] is used to locate the event in the future; the verbal element following the modal must be infinite
- <u>perfect</u> — the perfect is formed with the auxiliary *have* and the past participle ('*en*') of the following verbal element
- <u>progressive</u> — the progressive is formed with the auxiliary *be* and the present participle ('*ing*') of the following verbal element

Tense and Aspect, Perfect and Mood

The advantage of the representation above is the fact that the verbal group is presented as a complex construction and can be analysed accordingly. It is quite obvious that 'tense' in a very strict sense only comprises two values: past or non–past. The other tenses are formed with parameters such as aspect or perfect.

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[2] Verbal groups with the feature [+progressive] are also called 'continuous', thus *present progressive* may also be termed *present continuous.*

– Tense and Aspect

As far as aspect goes, it is difficult to distinguish between tense on the one hand and aspect on the other. Aspect is another grammatical category of the verb which also concerns questions of temporality — but in contrast to tense it has more to do with the temporal structure of the event or situation itself, or the way this temporal structure is represented, thus lacking the relational character of tense. The differentiation of tense and aspect is far from easy, since they can be regarded as 'intimately related' (HORNSTEIN 1990:9). In the English language, aspect comprises the feature [± progressive]. The following example will make matters concrete:

I read a book
I was reading a book when Phil called.

In both cases, the event (*I–read–book*) is in the past relative to the moment when the sentence is uttered. In both cases, the event will have some kind of temporal extension. But only the second sentence explicates this temporal extension, or the duration of this event. In the second sentence it is therefore possible to locate a second event (*Phil–call*) within the temporal frame of the first event. This example shows that tense and aspect must not be confused; nonetheless, as in the table above, aspect in the shape of the feature [± progressive] will be treated as part of the tenses.

– Tense and Perfect

The same goes for perfect. One possible use of the perfect is the so–called *"finished"–use*:

> The "Finished" Use of the Present Perfect shows that an action happened and finished at some time in the past but it says nothing at all to indicate when. All it shows is that the action happened (or began to happen *and finished happening*) at some time before the moment of speaking in the present. (WARD 1963:47)

Ward illustrates his point with the following example:

**I visited the Parthenon* vs *I have visited the Parthenon*

If one wanted to express an event taking place in the past without using any other expressions specifying the exact time, one has to use present perfect.[3] In this context, the perfect may well be regarded as a temporal marker or tense–form. Constructions such as *On Monday, John will have read the book* illustrate, though, the importance of the "finished" sense of the perfect, regardless of whether it refers to the past or, as in this case, the future. The perfect has quite a number of uses with varying semantic functions, some of which will be discussed below.

– Tense and Mood

As already mentioned, it can be argued that English has only two tenses in the strict sense: past and non–past. To refer to events taking place in the future, one can use the modal auxiliaries *will* or *shall*.[4] In this context the relation of tense and modality needs to be discussed. In the table above, the modal *will* appears only in combination with the tense–feature [–past]. If one uses *will* for the indication of future tense, tense must be [–past], otherwise the sentence will have the feature [+conditional]:

John will have read the book by monday (future perfect)
John would have read the book by monday (conditional perfect)

In some cases though, it can be difficult to distinguish between a 'modal' or a 'temporal' meaning: Does *John will be in the garden* denote likelihood/probability (modal meaning, as in *This'll be the book you're looking for*) or does it indicate future tense (temporal meaning)?

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[3] This works, as will be shown (and explained) later, also the other way round: sentences with present perfect must never contain an expression of past time

[4] For other ways of indicating future tense see below

This ambiguity concerning *will* or *shall* may be related to the fact that statements about events taking place in the future lack the certainty of those made about events that have already taken place. The verification of a statement like *John will leave at 6 o'clock tonight* must be postponed until after 6 o'clock, the speaker's attitude to such a statement is therefore of a different nature than that to a sentence as, for example, *John left yesterday at 6 o'clock.*

As these paragraphs show, an expression containing a composite verbal group such as *will have been teaching* incorporates not only tense in the strict sense, but other categories as well. Still, it will be regarded as a complex tense, in this case future perfect progressive.

The use of the various tenses

The next paragraphs deal with some of the possible uses of the various tenses. The aim is to show that there is no 1–to–1 mapping of a tense onto a meaning: one and the same tense can be used in different contexts with different meanings and vice versa. This will be the motivation for the introduction of Reichenbach's system. To start with, we will use an abbreviated and rather informal version of a semantic tense system to make this point and then elaborate this system below.

As mentioned above, the tenses serve the function of locating events in time. They can be re-presented as semantic operators or functions ranging over propositions and denoting a point in time or a time span at which the proposition can be allocated a truth–value (cf VATER 1994: 17). Since this point in time or time span is ususally relative to the time of the utterance of the proposition, tense can be regarded as a deictic category. A definition of deixis is given in LYONS (1977:637):

> By deixis* is meant the location and identification of persons, objects, events, processes and activities being talked about, or referred to, in relation to the spatiotemporal context created and sustained by the act of utterance and the participation in it, typically, of a single speaker and at least one addressee.
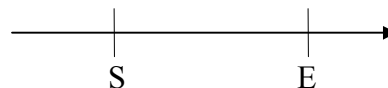
The tenses are deictic in that they determine temporal relations with reference to the time of the act of speech. This act or point of speech (or, more precisely, the time when the utterance is made) will be abbreviated S from now on, the time when the depicted event happens will be abbreviated E. There are two possible temporal relations between E and S: one is sequential in the sense that E precedes S or vice versa; this relation is expressed by a dash; the other is simultanous in the sense that E and S happen at the same time or that S is included in E and is represented by a comma. A rather simple tense system comprising only two points of time can thus be described as follows:

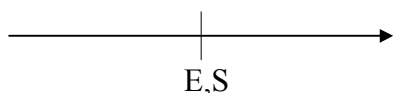| Relation	Meaning	Tense
E—S	E takes place before S	Past
S—E	E takes place after S	Future
E,S	E coincides with S	Present

If we were to imagine time as an arrow (as is commonly done), these structures could be represented as follows:
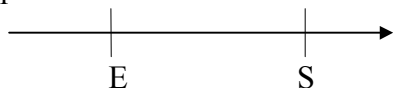
Example: *John saw Bill* (E—S)   Example: *John will see Bill* (S—E)

Example: *John sees Bill* (E,S)

Unfortunately, as the following example illustrates, not all tenses map so easily onto this system:

$$John \begin{Bmatrix} will\ leave \\ is\ leaving \\ leaves \end{Bmatrix} London\ on\ Monday \qquad \text{(S—E in all three cases)}$$

Here, we have three different tenses: *simple future*, *present progressive* and *simple present* all denoting the same: that the depicted event will take place after the point of speech. This of course has to do with the temporal explication (the PP *on Monday*) without which things would look quite different:

$$John \begin{Bmatrix} will\ leave \\ is\ leaving \\ ?leaves \end{Bmatrix} London$$

In this case, only the verbal group *will leave* indicates future tense. Present progressive indicates that the event is happening this very moment, whilst the simple present *leaves* would probably not be used in isolation at all (and is marked accordingly).

Depending on the context, this example shows that present progressive can either be E,S or S—E. Simple present can also be S—E, but with *leave* the interpretation E,S (which, according to the table above, is actually what present tense ought to be all about) seems unlikely. To see why this is so, one has to realize that the tenses carry more than just a temporal meaning in the strict sense. They are also used to indicate other kinds of information. As for the simple present in a E,S context, it is ususally being used to express the following:

repeated actions:	*He <u>comes</u> to my office every Monday*
	That girl <u>smokes</u> too much
'eternal truths':	*The earth <u>goes</u> round the sun*
customs, habits:	*Men <u>precede</u> women when going downstairs*
	Betty always <u>has</u> a glass of milk at 11 a.m.

<div align="center">(WARD 1963:8)</div>

In the example given above, the meaning of the tenses used varied in relation to the occurrence of the prepositional phrase. This PP, *on Monday*, was said to locate the event in the future. But what about the following sentence:

John left London on Monday

Here, we have a clear case of E—S. This example was given to show that other means of inidicating temporal relations, namely adverbs, prepositional phrases, or even sentences and their relation to tense must be analysed in more detail.

Another interesting phenomenon occurs with present perfect. One can see quite a difference in meaning between sentences with the present perfect and simple past (the following examples are from the handout *Zeit und Tempus*: 6 Prof.Wagner):

His sister has been an invalid all her life
His sister was an invalid all her life

While the second sentence clearly indicates that 'his sister' is dead at S, the first sentence does not. A similar contrast can be found in

For generations, Nepal has produced the word's greatest soldiers (and still does)
For generations, Sparta produced the word's greatest soldiers (but does not anymore)

These examples have been chosen because they show one very important aspect of the present perfect: the fact that it is somehow closely related to the time in which the sentence is uttered, to the present. A German expression for this fact is 'Gegenwartsbezug'. But this reference to

the present usually correlates with a non–grammatical expression of tense. The following example illustrates this aspect of 'continuation–up–to–the–present–moment':

Helen has been in England for about six months now
Helen has been in England

Ward comments this example as follows:

> It is at this point that the student of English sometimes throws up his hands in despair. If the same tense is used, he says, to produce two entirely different, two entirely opposing, meanings, how can one ever be expected to understand which is which? If 'Helen *has been* in England' means that she is **not** there now, while 'Helen *has been* in England for about six months' means that she **is** there still, how can one possibly understand which meaning is intended — since the tenses are exactly the same?' (WARD 1963:53)

Ward of course realizes that the difference between the two sentences lies in the occurrence of what he calls a 'period' — in this case the PP *for about six months*.

To come back to the 'little' semantic tense system from above: The relation E—S, represented by the past tense, needs to be discussed in more detail. Otherwise, how does one account for the difference in

John left on Monday   (simple past)
John had left on Monday   (past perfect) ?

In both cases, E precedes S. But the second sentence differs in meaning in that it implies that the depicted event had already taken place before the monday. Thus, in a way, there are three points in time involved which can be expressed as follows (the arrow indicates the direction of time):

JOHN LEAVE   MONDAY   POINT OF SPEECH

In contrast, in the sentence with simple past E (JOHN LEAVE) coincides with the PP 'on Monday', and both precede S:

JOHN LEAVE   POINT OF SPEECH
   MONDAY
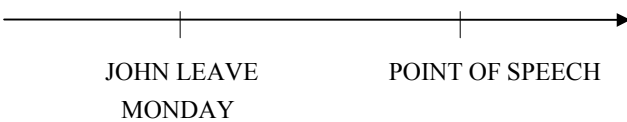
Past perfect is interesting for another reason, as well. In connection with certain temporal adverbs it is ambiguous, as the following sentence shows:

The boy had eaten the ice–cream at 7 o'clock.

This sentence can have two meanings: either the act of eating takes place at 7 o'clock, or the boy has finished eating the ice–cream at that time, but, with the simple system above, this ambiguity cannot be captured.

These examples show is that the semantic tense system as presented above does not suffice for the representation of the various meanings of the tenses. The next few paragraphs introduce another, more complex system of tense as developed by Reichenbach. With this system at least some of the above mentioned problems can be solved.

Reichenbach's tense system

One very important innovation of Reichenbach's tense system is the fact that in contrast to a binary strucure as presented above, it involves three points of time: E, S and what Reichenbach termed 'point of reference' (henceforth abbreviated *R*). It is in fact the past perfect which motivated the introduction of R:

> From a sentence like 'Peter had gone' we see that the time order expressed in the tense does not concern one event, but two events, whose positions are determined with respect to the point of speech. We shall

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call these time points the *point of the event* and the *point of reference*. In the example the point of the event is the time when Peter went; the point of reference is a time between this point and the point of speech. (REICHENBACH 1947:288)

The interesting point here is that in contrast to a sentence like the one given above in Reichenbach's example the point of reference, R, is not overt. In his system there are thus three points of time (S, E and R) and two types of relation between these points of time (simultaneity and precedence). The crucial point is that these types of relation can only hold between R and S on the one hand and R and E on the other hand — the relation between S and E is of a more indirect nature, as will be seen. Therefore, the reference point R can be considered as a kind of hinge in the whole system. The relations between S and R on the one and E and R on the other hand are as follows:

Relation	*Meaning*	*Name*
S,R	S is simultaneous with R	present
S—R	S precedes R	future
R—S	R precedes S	past

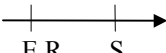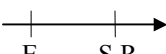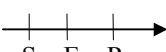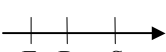| *Relation*	*Meaning*	*Name*
E,R	E is simultaneous with R	simultaneous
E—R	E precedes R	anterior
R—E	R precedes E	posterior
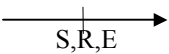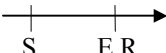
One important aspect of this schema is the fact that all possible tenses are defined using a point of reference — even those, like simple past or present, which seem to be 'describable' with S and E alone.

Applied to the English tenses, Reichenbach's system can be represented as in the following table. The traditional names of the English tenses are given in boldface in brackets. Two cells are marked in grey: POSTERIOR FUTURE and POSTERIOR PAST. This is because they do not correspond to an English tense in the strict sense:
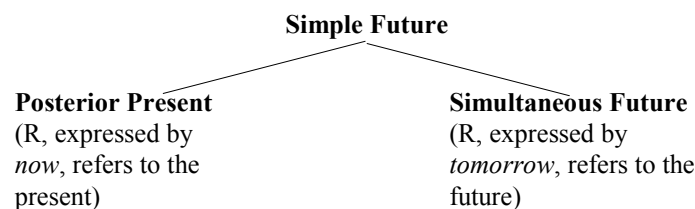
	S,R	**S—R**	**R—S**
E,R	S,R,E SIMUL. PRESENT *(simple present)*	S—E,R SIMUL.FUTURE *(simple future)*	E,R—S SIMUL. PAST *(simple past)*
R—E	S,R—E POST. PRESENT *(simple future)*	S—R—E POST. FUTURE	R—E—S; R—S—E; POST. PAST R—S,E *(conditional)*
E—R	E—S,R ANT. PRESENT *(present perfect)*	E—S—R S—E—R ANT. FUTURE E,S—R *(future perfect)*	E—R—S ANT. PAST *(past perfect)*

Reichenbach suggests (and this has become standard practice in many later adaptations of his system) that posterior past may be realized in sentences with a conditional ([+past]+will), such as *I would leave*. Apparent examples for this can be found in indirect speech: *John said he would leave*, in which the embedded clause refers to an event which takes place after John's telling of the event (which serves as R) but before S. The conditional, though, is used in quite a number of special ways[5] with non–temporal meanings, for example in certain requests such as *Would you close the window?* or to express duty or obligation, like in *You should go to the dentist* (cf Ward 1963:26ff). Since prototypical conditionals also differ from the tenses because they predominantely occur in subordinate clauses, this proposal will not be elaborated. REICHENBACH (1947) uses the following examples:

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[5] predominantely, of course, in the formation of conditions, such as in *If I were a carpenter, would you marry me anyway?*

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Example	Diagram	Category	Tense
I see John	⟶ S,R,E	simultaneous present	simple present
I shall go	⟶ S,R · E	posterior present	simple future
I'll see John	⟶ S · E,R	simultaneous future	simple future
I saw John	⟶ E,R · S	simultaneous past	simple past
I have seen John	⟶ E · S,R	anterior present	present perfect
I'll have seen John	⟶ S · E · R	anterior future	future perfect
I had seen John	⟶ E · R · S	anterior past	past perfect

The differentiation between posterior present and simultaneous future, which both correspond to simple future, may need some explanation. In his 1947 book, Reichenbach uses the examples *Now I shall go* and *I shall go tomorrow* to distinguish the two:
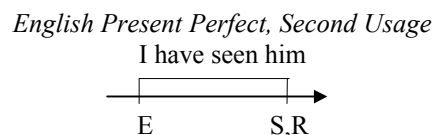
Simple Future

Posterior Present
(R, expressed by *now*, refers to the present)

Simultaneous Future
(R, expressed by *tomorrow*, refers to the future)

In respect to the feature [±progressive], Reichenbach argues that English uses the present participle to 'indicate that the event covers a certain stretch of time'. He calls these tenses 'extended tenses' and represents them as shown in the following examples:

I had been seeing John   ⟶ E · R · S

I am seeing John   ⟶ E over S,R   (cf REICHENBACH 1947:290)
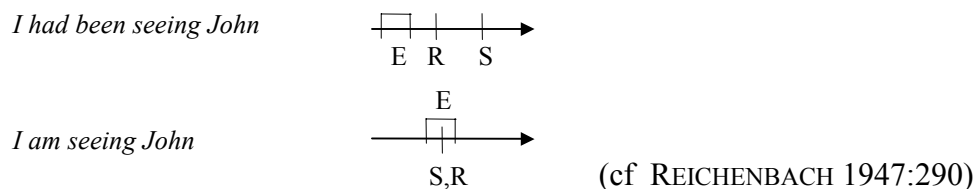
A similar representation is employed for the meaning 'continuation–to–the–present–moment' (see above) of the present perfect:

> The English present perfect is often used in the sense of the corresponding extended tense, with the additional qualification that the duration of the event reaches up to the point of speech. Thus we have here the schema
>
> *English Present Perfect, Second Usage*
> I have seen him
> ⟶ E ———— S,R
>
> In the sense of this schema we say, for instance, 'I have known him for ten years'. (REICHENBACH 1947:292)

In this case, though, Reichenbach's example *I have seen John* is not appropriate. As HAMANN (1987:32) points out:

> Reichenbach gives another sketch for Present Perfect, that of "duration of the event … up to the point of speech" (Reichenbach 1947:292). Though this is a common grammar book description of the 'continuative' Perfect it is simply wrong for Reichenbach's example […] *I have seen John*. The event of seeing John does not last up to the present.

The choice of *see* (the main verb Reichenbach uses in his examples) is unfortunate in other respects, too. His example for simultaneous present (simple present), *I see John*, would not work with a verb like *smoke*, since *I smoke* would have quite a different interpretation, namely

a habitual one. If one wanted to express that the action of smoking takes place at the moment of speech, one would almost definetely have to use present progressive: *I am smoking.* This shows a very important aspect in the interpretation of the tenses: the relation between tense on the one hand and the type or kind of verb on the other. As already mentioned, the interplay of tense, aspect and what would be called *Aktionsart* in German is a rather difficult point.

Two functions of progressive aspect are rather salient: present progressive can denote that the event takes place at the very moment of speech, past progressive tense, as mentioned before, can be used to express some temporal frame:

I am smoking right now
I was reading when John came in

These uses can be captured in a system like the one presented, possibly in a representation like the following:
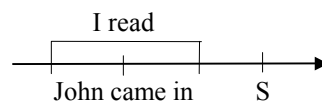
But the meaning of aspect is closely related to the kind of verb involved, as the following examples show (cf handout *Zeit und Tempus*):

She lives in London / She is living in London
The boy nodded / The boy is nodding

The first example's main verb is *live*, a state verb with the inherent feature 'duration'. The use of progressive aspect changes this and implies limited duration. The main verb of the second sentence, on the other hand, is *nod*, an action verb with hardly any duration at all. Here, progressive aspect draws out the duration and implies iteration: *He nods* = one action, *He is nodding* = repeated action. With transition verbs, simple past indicates that the transition has been completed, past progressive does not:

The boy was drowning but was rescued just in time /
*The boy drowned but was rescued just in time

Hence, the Aktionsart of the verb has to be taken into consideration when interpreting the meaning of tense and aspect.

Discussion of Reichenbach's system

In Reichenbach's system, there are three points in time and two types of relation between these points. These relations can hold either between E and R or between S and R. Thus, the relation between S and E is indirect: it is mediated by R. This means that <u>all</u> tenses, and not only 'complex' tenses (such as past perfect) are constructs of three points in time. One advantage of this assumption will be shown in connection with the differentiation between simple past and past perfect. The reference point can be overt and represented by various means — prototypically by temporal adverbs or prepositional phrases — but it may also be covert. Although S, R and E are called 'points in time', we shall treat them as intervals.

Reichenbach's system allows for 13 tenses, while the English tense system (excluding aspect) is usually said to consist of 6 tenses. Reichenbach's tenses correspond to the 'traditional' English tenses, but there is no 1–to–1 mapping. In contrast to systems derived from the morphological tenses of a single language, Reichenbach's system is more independent, as it functions as a kind of autonomous logical construct underlying the morphological tenses. This independence can be seen in the fact that Reichenbach's system contains complexes which are not morphologically realized in English but may be so in other languages. As an example he uses the posterior future (S—R—E), which, as he points out, can be represented directly in languages which have a future participle such as Latin (cf Reichenbach 1947:297). The

overcapacity of the system has been subject to criticism, though. Reichenbach has three different future perfect tenses, but, as DECLERCK (1986:307) observes:

> no language appears to have theses three different tenses. The same overcapacity is observed in connection with the three tenses corresponding to the English future, and in connection with the three tenses corresponding with the English conditional [=*posterior past*]. If there is only one tense (as in English) to realize three different configurations, this tense will have to be three ways ambiguous [...]. However, there is no evidence whatever for claiming that the future perfect, the future and the conditional are ambiguous in English

Notwithstanding this critcism, Reichenbach's system has a number of advantages, one of which will be discussed in more detail: the representation of simple past and present perfect. As has been pointed out above, the relation between simple past and present perfect in English is intricate, since they share certain properties, but differ in their syntactic behaviour. In his chapter on *The past ordinary tenses* [=simple past] WARD (1963:44ff) gives the following examples:

I visited the Parthenon $\begin{cases} \text{on July 1st last year} \\ \text{in July last year} \\ \text{last year} \\ \text{some years ago} \\ \text{before the war} \\ \text{etc.} \end{cases}$

For the indication of some past action without an expression of past time one must use the present perfect. Here, the occurence of an expression of past time would render the sentence ungrammatical:

> It is most important to remember that we cannot ever use an adverb of completely past and finished time with the "Finished" Use of the Present Perfect.
>
> We cannot ever say:
>
> I have visited the Parthenon $\begin{cases} \text{last month} \\ \text{in 1953} \end{cases}$

Present perfect and simple past both indicate that events have taken place in the past, which means that in both cases E precedes S. But it is not possible to combine present perfect with an adverb of time denoting past. This difference can be explained by allocating the following tenses to simple past and present perfect, respectively:

- E,R—S   simple past/simultaneous past
- E—S,R   present perfect/anterior present

The above mentioned 'Gegenwartsbezug' of the present perfect is thus being captured by the simultaneity of S and R, whereas, in simple past, E and R are simultaneous and precede S. For a rule preventing the combination of present perfect and temporal adverb denoting past on the basis of the difference of these two structures see below. Here, the advantage of the three–place representation of seemingly simple tenses becomes obvious.

In one form or another, aspects of Reichenbach's system are nowadays incorporated in many theories dealing with the syntax and semantics of tense systems. Quite a number of proposals concerning the modification and improvement of this system have been made. In his influential *Tense* (COMRIE 1985), B. Comrie differentiates between 'absolute tense' (simple present, past and future) and 'relative tense' (the complex tenses) and claims that only the the latter need to be represented by use of a reference point. Another approach is presented by A. Prior (PRIOR 1967), who introduces the concept of multiple reference points to deal with sentences such as *I shall have been going to see John*, for which he suggests a structure like S—R_1—E—R_2. For further discussion of modern approaches see HAMANN 1987:34ff.

Complex strucures: Sequence of tense (SOT)[6] and temporal adverbials

In the next paragraphs we shall briefly examine some aspects of the interplay of tense forms in complex sentences and the relation between tense forms and and temporal adverbials.

There are certain limitations for the combination of tenses in a complex sentence. Thus, only the second of each of the next three sentence pairs is well–formed:

Gascoigne makes a run for it, stops the ball and passed it downfield to Huddle
Gascoigne makes a run for it, stops the ball and passes it downfield to Huddle
*John had written to Mary before Phil arrives
John had written to Mary before Phil arrived
*The teacher will call your mother and told her you are sick
The teacher will call your mother and tell her you are sick

Other examples can be found in sentences with 'backshift'. This traditonal term refers to a change in tense which can for example be found in the contrast between direct speech on the one hand and indirect speech (and also free indirect speech[7]) on the other:

| Direct speech: SIMPLE PAST	Indirect & free indirect speech: PAST PERFECT
He stopped and asked himself: 'Is that the car that I saw here yesterday?'	*He stopped and asked himself if that was the car he had seen there the day before.*
	He stopped. Was that the car he had seen here yesterday?

Backshift is by no means simple. In certain cases, the past tenses of the direct speech are not subject to backshift, for example in

Direct speech: SIMPLE PAST	Indirect speech: SIMPLE PAST
My mother told me: 'My grandmother died when I was ten'	*My mother told me that her grandmother had died when she was ten*
	(not: **when she had been ten*)

SOT–phenomena are notoriously difficult, and we will not enter too deeply into this matter. Reichenbach studied these phenomena as cases in which certain constraints on tense sequences are at work. To account for some of the SOT–phenomena he formulated a constraint called the 'permanence of the R–point'. That means that although a complex clause may contain events that occur at different points in time, thus having more than one E–point, the reference point must be the same. To see what effect this constraint has, let us look at the following example:

I had mailed the letter when John came
*I had mailed the letter when John has come[8]

These sentences each consist of two clauses, their temporal structures can be represented as follows (S is of course identical for both clauses):

I had mailed the letter: E_1 —— $\boxed{R_1}$ —— S
John came: $\boxed{E_2, R_2}$ —— S

---
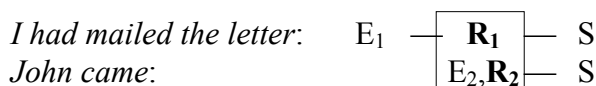
[6] this term refers traditionally to sentences with a verbum dicendi in the main clause with an embedded sentence as a complement, but can also be used to cover sentences with conjunctions such as in the examples given.

[7] (deutsch = *Erlebte Rede*)

[8] the adverbial clause *when John came* could simply be interpreted in the same way as other adverbials; namely as a specification of reference time. This is the case in the handout *Zeit und Tempus*. But there are obvious differences between an adverbial clause and, say, a temporal adjunct such as *at six o'clock*. For example, the 'past–perfect–ambiguity' only occurs in sentences with the latter, such as in *I had mailed the latter at six o'clock.* The clause *when John came* itself comprises a temporal structure, in this case E,R—S

As can be seen, R_2 coincides with R_1, thus the constraint of the permanence of the R–point is not violated. The temporal structure of the bad sentence looks like this:

I had mailed the letter: E_1 —   **R_1** —   S
*John has come*: E_2 — **R_2**,S

Here, R_2 does not coincide with R_1, the constraint is not obeyed and the sentence ungrammatical.

This is just one example which shows how Reichenbach's system can be employed to account for some of the tense phenomena in natural language.[9]

Other ungrammatical constructions may result from the interplay of tense form and temporal adverbial. There are obvious restrictions in the combination of tense form and lexical expression of temporality:

*I will see you last month
*He had gone next monday
*The choir sung right now
*I have seen him yesterday[10]

Temporal adverbs (and other lexical expressions of temporality) can be classified in the following way (compare handout *Zeit und Tempus* or SMITH 1978:45ff):
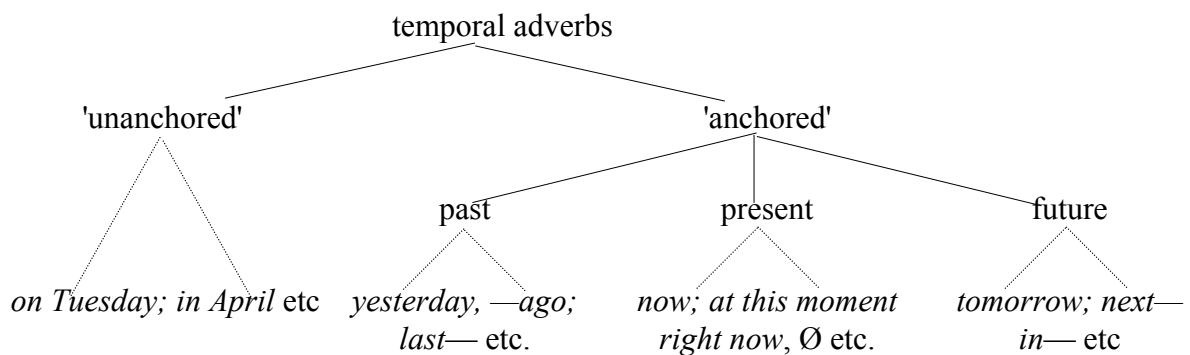
A temporal adverb may be called 'anchored' if it has an explicit relation with the moment of speech, namely by explicitly refering to a time before, after or simultaneous with S. It may be called unanchored if indicates a time that can either follow or precede S:

$I \begin{Bmatrix} saw \\ will\ see \end{Bmatrix}$ *him on Tuesday*

Obviously, an adverb such as *yesterday*, which is explicitly past, may not be combined with a structure such as S—E,R (simple future).

In the following paragraphs we will examine how these phenomena are being dealt with in a modern adaptation of Reichenbach's system as presented in HORNSTEIN 1990. In this monograph, Hornstein attempts to integrate a Reichenbachian–style tense analysis or theory into a much wider linguistic or, rather, language–theoretic framework, in which such far–ranging topics as language acquisition, linguistics universals and the like are being discussed. For a criticial discussion of Hornstein's system see the MA–thesis of A. SCHLEPPER (forthcoming).

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[9] There are obvious exceptions to this constraint, for example in complex sentences with conjunctions such as *after* and *before*. Reichenbach was aware of these cases and proposed another principle, namely that of 'the positional use of the reference point'

[10] This kind of sentence poses some problems for native speakers of German, since there is an interference with the German Perfekt: a comparable sentence such as *Ich habe ihn gestern gesehen* is perfectly ok.

We will not go into detail concerning these points, but look instead at the actually quite simple way Hornstein uses a Reichenbachian system to account for some of the possible combinations of tense forms and temporal adverbs in English.

The Basics of Hornstein's System

One of Hornstein's aims is the development of a kind of temporal syntax. The next paragraphs introduce some of the basic assumptions of his system. He proposes the following six BASIC TENSE STRUCTURES (BTS) for English:

BTS (*basic tense structure*)	
S,R,E	present
E,R—S	past
S—R,E	future
E—S,R	present perfect
E—R—S	past perfect
S—E—R	future perfect

(HORNSTEIN 1990:15)

As can be seen, these BTS correlate with their counterparts in Reichenbach's system (for examples, see page 8). Thus, Hornstein assumes, as Reichenbach does, that all tenses are complexes of three points (or intervals) in time.

Hornstein differentiates between basic tense structures on the one hand and the more complex DERIVED TENSE STRUCTURES (DTS) on the other. One possible way for such a DTS to arise is by modifying a BTS with a temporal adverb. Examples for this can be found in sentences such as *I will leave tomorrow, John had gone by monday, I saw him a week ago.*

But, and this is the crucial point, a DTS needs to comply with Hornsteins *Constraint on DTS* (CDTS):

1. X associates with Y $=_{def}$ X is separated from Y by a comma
2. BTSs is preserved iff
    a. No points are associated in DTS that are not associated in BTS
    b. The linear order of points in DTS is the same as that in BTS
3. **Constraint on DTS (CDTS)**: DTS must preserve BTS (HORNSTEIN 1990:15)

Explanation:

Pt. 1. Here Hornstein introduces his terminology: two points are 'associated' if they are seperated by a comma (in other words, if they are simultaneous). In a structure such as
X,Y—Z
X *'associates'* with Y and vice versa (which means that they are separated by a comma); but X and Y respectively do not associate with Z.
To take an example: in
E—S,R
S associates with R and vice versa, but neiter associates with E.

Pt. 2. In this point, which is actually what it's all about, Hornstein states the requirements which must be met iff[11] a BTS is preserved:
– the DTS must not have points associated which are not associated in the BTS
– the linear order of the DTS must be the same as the one in the BTS

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[11] *iff* is no typing error but an abbreviation for the expression 'if and only if', thus denoting logical equivalence

Pt. 3. Point 3 formulates the actual constraint on derived tense structures: they must preserve BTS in order to be grammatical

Let us take a look at some abstract structures to make matters more concrete:

BTS		DTS	COMMENT
X—Y,Z	$\Rightarrow$	X—Y,Z	ok – this is the easy case, since DTS is the same as BTS
X,Y—Z	$\Rightarrow$	X—Y,Z	not ok, because Y and Z are associated in DTS but not in BTS
X—Y—Z	$\Rightarrow$	X—Z—Y	not ok, because the linear order of DTS is different from the one of BTS
X,Y,Z	$\Rightarrow$	X—Y,Z	ok, no points in DTS are associated which aren't in BTS, linear order of BTS is preserved

Hornstein assumes that one way for a DTS to arise is via modification of a BTS by a temporal adverbial. The important point here is that this modification can refer either to the reference point of the BTS (this is how we handled it so far) or, and this is new, to the event point of BTS. This means that the temporal adverb is either mapped onto R or onto the E to produce the DTS[12].

The process of the modification of a BTS by a temporal adverb can formally be described as

> … a process that linearly rearranges R and E points in accordance with the meaning of the particular adverbs. For example, *now* will move the points onto which it is mapped to a position associated with S. (HORNSTEIN 1990:16)

In many cases, the result of this modification looks similar to the original BTS, for example in *John left yesterday*, which would be represented as follows (cf HORNSTEIN 1990:17):

$$E,R—S \xrightarrow{\text{yesterday}} E,R—S$$
yesterday

On the left we have the BTS (for *John came*), on top of the arrow is the modifiying temporal adverb (in this case *yesterday*), on the right of the arrow is the DTS. The DTS is just like the BTS with the exception of the modification of the (associated) [E,R] by the temporal adverb. As we shall see below, this notational form will be useful for the representation of a past perfect–DTS.

In some cases, a rearrangement takes place. If the resulting DTS complies with the CDTS, the sentence is grammatical, otherwise, it would be ungrammatical and ruled out. The following examples give a short overview on how this system works.

Examples

*John left now $E,R—S \xrightarrow{\text{now}} E,R,S$
now

Here, the simple past of *John left* cannot combine with *now*, because it would result in a shift of E,R to associate with S. Since E, R and S are not associated in BTS, they may not be so in DTS.

*John left tomorrow $E,R—S \xrightarrow{\text{tomorrow}} S—E,R$
tomorrow

In this example both E and R (which are associates) move to the right of S. Thus, the linear order of BTS is not preserved, the structure is ruled out.

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[12] In Reichenbach's proposal, a temporal adverb maps onto (or denotes) R but not E. In modern adaptations though, it is commonly assumed that a temporal adverb may also specify E.

John has left yesterday E—R,S $\xrightarrow{\text{yesterday}}$ E,R—S

at the position below: yesterday

Here we have the above mentioned case of present perfect plus past adverb. Since E,R are not associates in BTS, they cannot be in DTS.

John leaves tomorrow S,R,E $\xrightarrow{\text{tomorrow}}$ S—R,E

below: tomorrow

This example shows how simple present tense plus temporal adverb denoting future can combine to produce the future–interpretation of the sentence. The DTS S—R,E complies with the CDTS since R and E are associates in BTS and the linear order of BTS is preserved.

Another advantage of this system is the fact it captures the above mentioned temporal ambiguity of sentences such as *The boy had eaten the ice–cream at 7 o'clock*. Here we have a past perfect BTS to which a temporal prepositional phrase is added. This phrase can refer either to E or to R, thus yielding the following structures (compare HORNSTEIN 1990:39):

'The time at which the boy ate the ice–cream was 7 o'clock':

E—R—S $\xrightarrow{\text{at 7 o'clock}}$ E—R—S

below: at 7 o'clock

'The boy had already eaten the ice–cream by 7 o'clock':

E—R—S $\xrightarrow{\text{at 7 o'clock}}$ E—R—S

below: at 7 o'clock

A similar example is being discussed in HARKNESS 1987:92ff:

> In *Lily had spoken to Thomas at noon* the pluperfect indicates the presence of an RT [reference time] anterior to ST [speech time] and posterior to ET [event time]. The RT here can be viewed either more as a vantage point from which we look at ET or more as a time on the time line. Consequently, the TA [temporal adverb] time can be taken as characterizing either RT or, alternatively, ET. If the focus is on RT as a time, the TA will characterize RT, if the ET is of more interest, the TA will characterize ET. In the event that TA time characterizes RT in *Lily had spoken to Thomas at noon* it is already the case at noon that Lily had spoken to Thomas. If the TA time characterizes ET, at a noon anterior to RT Lily spoke to Thomas.

Final remarks

Many interesting topics had to be neglected in this paper — for example multiple temporal adverbs in sentences such as *Tomorrow, John will leave for London in three days*. But the main aspects of Reichenbach's tense system and their advantages when put to use have been demonstrated. It has become clear that the introduction of a reference point in the description of tenses solves many problems which other systems are inherently unable to cope with.

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