

TEMPORAL RELATIONS IN INTENSIONAL SEMANTICS

Anita Steube

Karl Marx University, Leipzig

In speaking about temporal relations, we would like to distinguish at least three levels of description:

1st level: level of objects in the outer world

2nd level: level of mental representation of these objects and their relations and properties

3rd level: level of the structure of natural language with the level of the semantic structure of the verbal expressions as one of its parts.

Linguists are aware of the close relations between levels two and three as far as the meaning of the verbal expressions is concerned. On level three, it is necessary to distinguish further between meaning structures as ideal objects and the form in which they are objectified, that is the linguistic description of meaning structures which of course is dependent from the concept of grammar and meaning the linguist makes use of. We will try to use intensional semantics and ignore the difference between the objects and their descriptions on level three here.

If time (level one) is conceived of as a property of matter, man is included in the course of time. So, if he wants to give order to the continuum of time in his mind he has to divide it at fixed points. One of the most suitable divisions is the so-called 'moment of actual experience' which of course constantly changes in time as man's experience changes.

If man abstracts in his mind from those movements of matter which - from a certain point of view - are not relevant for him at a time, he creates the concept of 'space of time' (level two). One of the those spaces of time is

'Present'. It includes the moment of actual experience. Other relevant spaces of time are 'Past' and 'Future'.

When Reichenbach introduced the reference point into logic¹ he found not only a wonderful means for handling temporal structures, but - as I see it - also a candidate for psychological verification (on level two), that is, something man makes use of in giving order to the continuum of time. We are of the opinion that every space of time has a reference point. This is meant as the point from which that space of time is regarded by the speaker of the corresponding expression. Those spaces of time regarded from their beginning (such as expressed by 'since') have their reference point at their point of beginning, those regarded from their end have their reference point at their end point (such as those expressed by Past Perfect, 'up to'). The other spaces of time take a certain point in the space of time for their reference point (i.e. Future, Past). We have to add that a space of time (on level three) is defined as an uninterrupted ordered set of points of time. Having come so far, we can define what Present, Past or Future are going to mean: Present is a space of time comprising the moment of actual experience (t_0) as its reference point (t_R). Past is a space of time ending before the moment of actual experience. Future is a space of time beginning after the moment of actual experience. We use an elaborated predicate calculation to formulate the semantic structures for the spaces of time.

Present: $T_i \subset T_0$ & $t_{Ri} = t_0$
Past : $T_i < t_0$ & $t_{Ri} \in T_i$
Future : $T_i > t_0$ & $t_{Ri} \in T_i^2$

As mentioned above, Past, and Future have their own reference points, they are defined in relation to the moment of actual experience which is really the main reference point. So all the reference points form a system of relations.

I think that the spaces of time Past, Present, and Future have been exhaustively defined according to their place in the German tense system in this way because they cannot be objectified without knowledge of the context: If we use the expression 'heute' - in contrast to 'gestern' - Present comprises one day only. But if we use the expression 'wohnen' Present may comprise - dependent on the context 'X wohnt in Y' - several years³. If we speak about the so-called complex tenses or 'resultative Tempora' in German (they are Present perfect, Past perfect, Future perfect if we use the English names for the German forms) 'perfect' or 'resultative' doesn't mean the same as it means with aspects or, to be more precise, Aktionsarten. For tense forms do not express the result of an action. 'Resultative' means that these tenses mark the end (the maximum) of the relevant space of time. The maximum for Past perfect is at a point of time before a contextually fixed point in the past. The maximum for Present perfect is either at or shortly before the point of actual experience. The maximum for Future perfect is at a point of time before a contextually fixed point in the future. These end points are at the same time the reference points of these spaces of time.

Perfect : $t_i = \max T_i$ & $t_i = t_{Ri}$ & $t_{Ri} = t_0$
Past Perfect : $t_i = \max T_i$ & $t_i = t_{Ri}$ & $t_i < t_0$
Future Perfect: $t_i = \max T_i$ & $t_i = t_{Ri}$ & $t_i > t_0$ ⁴

In German there is no one to one relation between tense forms and the corresponding temporal meaning. Abstracting from the genre-dependency of tense forms and from the influence of text formation on tense relations, we can make up Table one showing the most important German tenses⁵.

Table 1:

temporal meaning	tense form
Present (aktuelle Gegenwart)	Präsens
Past (Vergangenheit)	Präteritum, Perfekt
Future (Zukunft)	Futur I, Präsens
Present perfect (resultative Gegenwart)	Perfekt
Past perfect (resultative Vergangenheit)	Plusquamperfekt
Future perfect (resultative Zukunft)	Futur II, Perfekt

Defining the main reference point as the point of actual experience means that it is of a deictic nature. The consequence is that each tense form can be interpreted only when we know who uttered it and which time it refers to. That means, temporal semantics has to be based on utterance meaning rather than on sentence meaning. In a communicational process. t_0 is defined as the point of common actual experience of the partners. If one of the partners quotes somebody else's speech (let as for simplicity think that the quoted person does not belong to that party) he must know that he cannot refer the temporally fixed proposition in someone else's utterance to this own reference point but only to that of the former speaker. But at the same time it is clear that man can give order to time only in accordance with *one* scheme. So the reporting partner has to bring the former speaker's reference point into relation to his own. We know how this is done: The reporting partner announces the reported utterance by saying who made it and when (in relation to t_0). Let us take the announcement *Peter said* and the quoted utterance *I will come tomorrow*.

Indirect speech : *Peter said, he would come the following day*

spaces of time : T_i T_j
reference points: $t_{R_i} < t_0$ $t_{R_j} > t_{R_i}$
(derived from the definition of Past) (derived from the definition of posteriority)

relation between the spaces of time T_i and T_j : posteriority. Should the reference point in the former utterance not differ from t_{R_i} the temporal relation between the two spaces of time is simultaneity: with $t_{R_j} < t_{R_i}$ you have anteriority. Thus the reference point of the reported utterance is indirectly related- via that of the announcement - to t_0 .

As already mentioned, intensional semantics makes it possible and necessary to interpret the reference point by means of the context. Hence it should remain unspecified in the tense meaning itself. The semantic structures should be reformulated, comprising the main reference point as a variable (say t_{R_k}). If we know from the context, that $t_{R_i} = t_0$ we get Present, Past or Future (t_0 -based tenses are called absolute tenses), if it remains t_{R_j} , as in indirect speech, we get Simultaneity, Anteriority or Posteriority (t_{R_i} -based tenses are called relative tenses). If we take the reference point in the tense meaning to be a variable, we easily understand how it is possible to use the same tense forms in absolute as well as in relative usage. The context-dependent interpretation of the tense form Present Tense as either Present or Simultaneity in German points to an ambiguity in tense meaning. Let us explain this by comparing tenses with temporal adverbs.

There are adverbs which - like the tenses - have a variable reference point:

bald, gleich - soon

bald danach, gleich danach - soon after

and there are others which are only related to t_0 : *heute, demnächst, vorhin*. t_0 -related adverbs have to be replaced in reported speech: *am gleichen Tag, bald, kurz vorher*.

The tense forms and the adverbs with the variable reference point need not be replaced.

There are slight differences between the occurring tense forms in direct and reported speech, only when we use the subjunctive mood in German reported speech. There are two types of subjunctives, one formed from the stem of the present tense form and the other formed from the stem of the past tense form. But the two types do not differ in tense meaning but only in what we would call the speaker's attitude towards what is expressed by the reported utterance. When there are no longer temporal differences between Present Tense and Past Tense in the subjunctive mood the relation between form and meaning changes in comparison with table one⁶:

Table 2:

temporal meaning	tense form
Simultaneity (Gleichzeitigkeit)	Konjunktiv Präsens, Konjunktiv Präteritum
Anteriority (Vorzeitigkeit)	Konjunktiv Perfekt, Konjunktiv Plusquamperfekt
Posteriority (Nachzeitigkeit)	Konjunktive Präsens, Konjunktiv Präteritum, Konjunktiv Futur I, würde + Infinitiv
Posteriority Perfekt (resultative Nachzeitigkeit)	Konj. Perfekt, Konj. Plusquamperfekt, Konj. Futur II., würde + Part, Perf.+ Inf.

Simultaneity Subjunctive I:

$T_j \subseteq T_i$ & $t_{R_j} = t_{R_i}$ & CLAIM (reporting speaker, SAY (reported speaker, p_j))

Simultaneity Suggestive II:

- a) $T_j \subseteq T_i$ & $t_{R_j} = t_{R_i}$ & CLAIM (reporting speaker, SAY (reported speaker, p_j)) & THINK (reporting speaker, MÖGLICH ($\forall p_j$))
- b) $T_j \subseteq T_i$ & $t_{R_j} = t_{R_i}$ & CLAIM (reporting speaker, SAY (reported speaker, p_j)) & THINK (reporting speaker, \neg MÖGLICH (p_j))

The differences a) and b) in the meaning of subjunctive II are differences in the reporting speaker's increasing degrees of doubt concerning the truth of proposition_j expressed by the reported utterance.⁷

If sentences contain temporal expressions apart from tense forms, these are related to each other and to the temporal meaning by means of the reference point and by a specification of the simultaneity relation. In a simple sentence, all the spaces of time have the same reference point. And the space of time immediately to the right is a proper subset of the space of time immediately to the left in linear ordering from left to right. This concerns the temporal interrelation of the adverbials. *Yesterday morning at 9 o'clock.*

The space of time expressed by the meaning of the verb (often called action time) must be a proper or improper subset of the narrowest space of time expressed in the temporal frame which the tenses and the adverbials form together (often called valuation time). *Yesterday morning at 9 o'clock Peter posted the letter.*

In temporally complex sentences the action time expressed in the subclause becomes the temporal frame for the space of time expressed in the main clause. In durationally

complex sentences the action time in the subclause is equivalent in time to the space of time expressed in the main clause. This meets the above mentioned simultaneity relation. In sentences with the conjunctions *nachdem* or *bevor* there are two spaces of time ordered by the temporal relation 'before'. Both spaces of time however must be within the same temporal level (Zeitstufe). A temporal level is the intersection of sets of the comparative temporal meanings. Thus Present and Present Perfect belong to PRESENT, Past and Past Perfect to PAST, Future and Future Perfect to FUTURE.⁸

These findings allow us to explain text coherence. Propositions that are directly or indirectly related to the same reference point are interpreted by means of the same world-time points or - in other words - are in the same world. They can be temporally ordered by the relation 'before' when there are sufficient additional reference points which allow all the suborderings required. Spaces of time that are not in relation to the main reference point can not be temporally interpreted or understood. This is already seen from the simple example of a complex sentence.

^x*After I got the second edition of Longman's dictionary at a second-hand bookseller's my sister had asked for it several times in vain before.*

The great majority of texts deal with objects and relations which are related to each other in *one* world. But when we come to literary fiction this does not suffice to fix the reference point. We must know in which world the moment of actual experience is. I.e. in science fiction, the temporal relations do not differ from those in the real world, they refer to t_0 and are ordered by means of the relation 'before'. It is only our knowledge of the real world that tells us that a fictitious world is being spoken about, that the fictitious t_0 has been used for a point of time which - according to our knowledge of the laws of development in the

real world - could possibly be there after t_0 but certainly not in t_0 or even before. That means that the temporal relations remain the same as in the real world only the axis, the main reference point has been replaced.

If one text speaks about events that have to be interpreted in different worlds it is homogeneous if the world-time points of both can be related to each other. Each set of world-time points has its own main reference point by means of which you can divide the text into subtexts. If there is no possible relation - such as for instance, when one has a dream - textual connection has to be achieved by other than temporal means.

But there are other cases where only part of the objects and relations are placed in another world: Historical Present, for example, places part of the objects that in the actual world have the world-time points $t_{R_i} < t_0$ in an individual view with the reference point $t_{R_i} = t_0$. The relevant objects are described as if they were experienced at the time of speaking about them. So the speaker for a time identifies two different points of reference, the actual t_0 with the non-actual, but actualized one. But this identification is not supported by the adverbial temporal means. So that his partners' view of the actual world is maintained with the aid of linguistic means too and not only through their knowledge of the actual world:

Da gehe ich doch gestern nichtsahnend über die Strasse.

These forms are often used in every-day German as well as in literature. If the adverbial frame changed too, the hearers would not notice the transpositional effect of the Historical Present so well, they could even take the speaker for a liar if they knew the facts. Using the Historical Present in fiction changes the main reference point once more from the real and non-actual but actualized world to a fictitious non-actual world.

Intensional semantics also helps to solve the long-lasting dispute about the temporal value of the German Preterite in Fiction. It was initiated by Käthe Hamburger⁹ who deprived the epic preterite of any temporal meaning. The scholars taking part in the discussion afterwards expressed the most varied views. Leaving aside the interior monologue as an additional complication, intensional semantics meets K. Hamburger half-way: It was expressly said above that only the interpretation of $t_{R_1} < t_0$ is accepted as Past, and we have to add now that t_0 must be the point of actual experience in the real and actual world. This automatically leads us to the decision that in fiction the semantic structure of the epic preterite is a function selecting a space of time (level one, in a fictitious outer world) before a fictitious moment of actual experience. It is not the temporal value (expressed by the relation 'before' and the fact that the maximum of the space of time is not marked) of the tense that proves to be different in fiction, but that it is referring to a different world¹⁰. What is kept in fiction is the system of temporal relations in general and the classification of German tenses in temporal relations in general and the classification of German tenses in temporal levels.

In what has been said so far we have given no new data. The intention was to show that new theoretical insights may help to explain old problems in an easy and natural way and may also help to avoid mistakes like those made in the past. At the same time we warn against the overestimating of intensional semantics. It cannot be used to explain the sequence of tenses in texts because these are so extensively influenced by non-linguistic factors such as, among other things, the reader's and/or hearer's knowledge of the sequence of events in the outer world or the linear ordering of text-production and - perception. Here are two examples by way of illustration:

1. Sentences following each other in a coherent text written in Präsens or Präteritum may be interpreted as expressing successive events if this accords with the semantics of the non-temporal nucleus of the propositions. On a strictly linguistic basis we could only interpret them all as belonging to the given temporal frame.

2. The textinitial and/or - concluding function of German Perfekt and Plusquamperfekt¹¹ - often listed among the so-called 'stylistic' functions of these tenses -

*Mein Grossvater ist bis in sein hohes Alter viel gereist. Hinmal fuhr er durch Ungarn, eigentlich aus keinem endern Grunde, als um das Land kennenzulernen, in welchem sein verstrobener Bruder 1849 gefochten hatte. Auf einer kleinen Station stieg ein Mann von reichlicher Körperfülle zu ihm ins Coupe. Unnötig zu sagen, dass der Wein pünktlich eintraf. Mein Grossvater legte bei seinen Freunden Ehre mit ihm ein. Später hat er sich noch manche Sendung kommen lassen. Als er starb, schon in unserem Jahrhundert, fand sich noch ein beträchtlicher Rest vor. Ich habe mich seiner mit Vergnügen angenommen.*¹²

is of course, related to the temporal meaning of these tenses and to the fact mentioned above that action time can function as a temporal frame relative to which other propositions are temporally ordered (in temporally complex sentences as well as in successive sentences in texts). But this is not enough for text formation. Different genres have different structuring principles. German Perfekt and Plusquamperfekt would certainly not be used in the same way in strictly descriptive texts and not every content can be fitted into such a frame.

Notes

- ¹ H. Reichenbach 1947: Elements of Symbolic Logic. New York, London
- ² <: before; $T_i < t_0$: all points of time belonging to the space of time T_i are before t_0
>: after: $t_i > t_j = \text{def } t_j > t_i$
Given that each space of time has its own reference point and that this is never outside the corresponding space of time the last conjunct in the formulas above can be left out as redundant.
- ³ compare p. 6 for the interrelationship between the adverbial frame and action time.
- ⁴ max T_i is the marked end of the space of time T_i .
- ⁵ A. Steube 1980 a): Temporale Bedeutung im Deutschen, in: Studia grammatica 20. Berlin, 18-21.
- ⁶ A. Steube 1980 b): Die consecutio temporum in Deutschen als Ausdruck eines komplexen Zuordnungsverhältnisses von Zeichenfolge und Bedeutungsstruktur, in: Linguistische Arbeitsberichte 26, Leipzig. The sequence-of-tense rules were formulated as a recursive mechanism for the first time in E. Hajicová, J. Panevová, P. Sgall 1971: The meaning of tense and its recursive properties, in: Philologica pragensia, vol. 14, Nr. 1; vol. 14, Nr. 2. in a formal way. I want to thank P. Sgall for a helpful discussion of this paper.
- ⁷ For a more detailed discussion see A. Steube (to appear): Indirecte Rede und Zeitverlauf, in: Studia grammatica, Berlin

- ⁸ A. Steube 1980 a): chapters 4, 6.
- ⁹ K. Hamburger 1951: Zum Strukturprinzip der epischen und dramatischen Dichtung. in: DVjS für Literaturwissenschaft und Geistesgeschichte, 25. Jg., Nr. 1, 1-26;
K. Hamburger 1953: Das epische Präteritum, in: DVjS für Literaturwissenschaft und Geistesgeschichte, 37, Jg., Nr. 3, 329-357.
- ¹⁰ In model-theoretic semantics a 'world' is mostly considered as a set theoretical structure, which can be regarded as the structure of the real world (level one, cf. M.J. Cresswell 1973: Logics and Languages, London). A proposal by M. Bierwisch 1980 (Semantic Structure and Illocutionary Force, in: J.R. Searle, F. Kiefer eds: Speech Act Theory and Pragmatics. Dordrecht, 1-35) to take a 'world' as the structure of the internal, cognitive representation of a person's experience (level two) is of greater significance for our purposes: Man's experience may be based on his adequate reflection of the states of affairs in the outer world (leading to the real world - level two). But there may also be cognitive operations transforming the experience and creating imaginary structures for certain purposes. Our fictitious worlds in literary art belong to the latter category.
- ¹¹ This concerns the beginning and end of paragraphs, subtexts, and whole stories.
- ¹² W. Bergengruen 1965: Die Charakterprobe, in: W. Fehse ed.: Deutsche Erzähler der Gegenwart - eine Antologie. Stuttgart; 68, 70. Perfect Tense forms emphasized by A. St.